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Ensuring effective and transformative policy reform: lessons from rezoning Australia's Great Barrier Reef, 1999-2004

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PSM, B. Nat Res (Hons)

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Australian Research Council Centre of Excellence for Coral Reef Studies

James Cook University. Townsville Australia

DEDICATION

This PhD is dedicated to my late father, Dr. Max Day AO FAA, who motivated me to pursue conservation as a profession, and then continued to inspire and encourage me throughout my career.

ABSTRACT

Real-world examples of transformative environmental policy reform are rare. An example of such reform at an ecosystem-wide scale is the policy process that led to the *Great Barrier Reef Marine Park Zoning Plan 2003*. The Great Barrier Reef (GBR) is the largest coral reef ecosystem on the planet, and the GBR rezoning is widely regarded as a valuable case study, especially when other marine protected areas are considering policy development. While much has been written about the scientific underpinning of the GBR rezoning and the consequent benefits of the revised zoning network, the policy process underlying the reform has received little research attention. The primary purpose of this research was to provide a comprehensive assessment of the overall policy process, during which the key factors that contributed to the policy reform were examined. As a consequence, insights were identified that might inform the conduct of transformative environmental policy reform elsewhere.

The Representative Areas Program (or RAP as it became known) was a highly publicised and contentious part of the policy reform. There were no precedents for the innovative and complex policy process to develop the RAP and concurrently rezone the entire GBR, an area equivalent in size to Japan or Italy. The policy process, collectively termed the RAP/rezoning, involved a wide range of players comprising two levels of government, a variety of industries whose livelihoods depended on the GBR, and a diverse group of concerned stakeholders and Traditional Owners. The resulting multiple-use zoning plan included a revised network of no-take zones (known locally as green zones) that protected the full range of biodiversity and represented all known habitat types and much of their associated biodiversity throughout the entire GBR while also allowing for sustainable use in other zones.

My primary research objective was to investigate the key factors that influenced the policy outcome and to examine the extent to which they impacted the policy process. As part of the research, in-depth interviews were conducted with a diverse range of participants, including managers, scientists, politicians, and others, across multiple levels and sectors. My own observations as a participant involved in the policy process have also been considered.

The following five research questions were investigated in relation to the RAP/rezoning along with the lessons learnt:

1. What was the role of science and scientists in the policy reform process?
2. What was the role of leadership in the policy process?
3. What was the role of the wider GBR community in the policy process?
4. What was the broad political context and the role of politics in the RAP/rezoning?
5. To what extent could the policy reform be considered to be transformative and/or successful?

The relative importance of the four key factors in questions 1-4 was examined in detail, considering the contribution of each to the policy reform. The interrelationships within, and between, these factors were also assessed. These analyses were then used to identify lessons that have potential to contribute to environmental policy processes elsewhere, considering those aspects that worked well in the RAP/rezoning, and those that were less effective.

The overall conclusion of the research was that the four key factors were significant in achieving the policy reform; however, the four factors were not equivalent in their influence. The political factor was shown to be the most significant because the policy would not have been approved without strong political support, and this support in turn depended upon each of the other three factors. Furthermore, gaining the support of politicians was particularly complex. A key part of this complexity was the Federal-State interface, with its implications for GBR governance. The relative importance of the role of science in the policy process was found to be less influential than is commonly assumed by many scientists and environmental managers.

Examining the RAP/rezoning in detail revealed many lessons. These lessons have implications for other environmental issues, especially those involving complex governance, such as Australia's Murray-Darling Basin or California's San Joaquin Valley. Similarly, these lessons should also be considered where a transformative policy reform might be contemplated, such as tackling climate change impacts through integrated land-sea solutions. This research therefore contributes to the theory and practice of complex/transformative environmental policy reform, conservation, and multiple-use resource management. It provides an integrated analysis of the planning process, governance arrangements, and the policy reform process for complex, extensive, and multiple use areas. In addition to a systematic analysis of a major policy reform, the thesis complements the existing historical record, increasing our understanding of the complexities in developing and implementing the GBR rezoning.

Today, the RAP/rezoning in the GBR continues to influence environmental policy and the planning of marine protected areas, both in Australia and around the world. This thesis provides an opportunity for managers, scientists and policymakers concerned with potential environmental policy reform to reflect on the experiences from the RAP/rezoning. This reflection includes the limitations of the process, acknowledging that new influences will need to be considered in future major policy reforms in the GBR. As a case study, the RAP/rezoning is a significant example of real-world, system-wide transformative policy reform, and provides lessons that might be applicable for more effective resource management and conservation around the globe.

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STATEMENT OF CONTRIBUTIONS BY OTHERS

Primary supervision for my thesis was provided by:

- Professor Bob Pressey, ARC Centre of Excellence for Coral Reef Studies, James Cook University (JCU), Townsville, Australia
- Professor Helene Marsh, College of Science and Engineering, JCU, Townsville, Australia
- Professor Tiffany Morrison, ARC Centre of Excellence for Coral Reef Studies, JCU, Townsville, Australia

Additional support and assistance during my candidature were provided by:

- A/Prof Elizabeth Tynan, Graduate Research School, JCU, Townsville, Australia
- Dr Nadine Marshall (previously CSIRO, Townsville, Australia)

Chapter	Publications during my PhD candidature upon which parts of these chapter are based	Nature and extent of the intellectual input of each author, including the candidate (* PhD advisors)
1	**Day, J. C.** (2016). The Great Barrier Reef Marine Park – the grandfather of modern MPAs. Chapter 5 (pp. 65-97) in *Big, Bold and Blue: Lessons from Australia's Marine Protected Areas*, (Eds) Fitzsimmons and Wescott. CSIRO Publishing.	I developed the first draft and then revised it following comments from Helene Marsh*, Richard Kenchington, Graeme Kelleher, Trevor Ward, John Tanzer, Di Tarte and Erik Olsen. Liz Tynan* provided editorial assistance.
2	--	
3	--	
4	--	
5	**Day, J. C.** (2017a). Effective Public Participation is Fundamental for Marine Conservation – Lessons from a Large-scale MPA. *Coastal Management,* 45(6): 470-486 + Supplementary	Much of Chapter 5 is adapted from this paper, which in turn, built upon several GBRMPA staff papers in which I was involved, i.e., Thomson et al. (2004), and Day et al. (2004). I developed the first draft of the paper which was then revised following comments from Leanne Fernandes, Tiffany Morrison*, Nadine Marshall*, Chris Cvitanovic, Richard Kenchington and two anonymous referees.
6	--	
7	**Day, J. C.** (2017b). How effective is the management of the Great Barrier Reef? *ICES Journal of Marine Science,* 75(3), 1188-1190.	I developed the first draft of this paper; it was then revised with editorial input from Tundi Agardy and the journal editors.
7	Vince, J. & **Day, J. C**. (2020). Effective integration and integrative capacity in marine spatial planning. *Maritime Studies* 19: 317–332.	Joanna Vince developed an initial draft outline that was then edited by me and Joanna Vince.
8	**Day, J. C.,** Kenchington, R. A., Tanzer, J. M. & Cameron, D, S. (2019). Marine zoning revisited: How decades of zoning the Great Barrier Reef has evolved as an effective spatial planning approach... *Aquatic Conservation: Marine & Freshwater Ecosystems,* 29 (S2):9-32.	I developed the first draft of the paper which was then revised with editorial input from co-authors Richard Kenchington, John Tanzer and Darren Cameron. Helene Marsh*, Kirstin Dobbs, April Hall (nee Boaden), John Baxter and two anonymous referees provided further comments. Rhonda Banks (GBRMPA) assisted with many of the figures.

Nature of Assistance	Contributions by others	Names and Affiliations of Contributors
Intellectual support	Editorial assistance	Prof Bob Pressey, Prof Helene Marsh, Prof Tiffany Morrison, and A/Prof Liz Tynan (all JCU); Ron Store; Dr Cathy Day; Pam Davis, Suzie Davies.
	Scholarly debate about the research	Prof Bob Pressey, Prof Helene Marsh, Prof Tiffany Morrison, The Hon Dr David Kemp, John Tanzer (WWF); Prof Hugh Possingham (UQ); Darren Cameron (GBRMPA), Dr Nadine Marshall (previously CSIRO), Dr Cathy Day.
Technical support	Cartography (for most maps)	Rhonda Banks (GBRMPA)
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Data collection	Advice re interviews and loan of iPad for recording interviews	Dr Nadine Marshall (previously CSIRO)
	Interview transcriptions	Adrian Van Rossum (JCU)
Administrative/ IT support	Administrative Support	Janet Swanson, Vivian Doherty, Olga Bazaka, Jenny Lappin (all ARC Centre for Coral Reef Studies, JCU)
	IT support	Andrew Norton (JCU)

ETHICS APPROVAL

The proposed research study received ethics approval from the JCU Human Research Ethics Committee; Approval Number H5606, approved 4 July 2014.

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ABBREVIATIONS USED IN THE THESIS

ACF	Australian Conservation Foundation
AGBR	Amalgamated Great Barrier Reef Section
AIMS	Australian Institute of Marine Science
AMCS	Australian Marine Conservation Society
AMPTO	Association of Marine Park Tourist operators
APS	Australian Public Service
BACI	before-after-control-impact
CAFNEC	Cairns and Far North Environment Centre
CBD	Convention on Biological Diversity
CEO/Chair	Chief Executive Officer/Chairperson
CITES	Convention on International Trade in Endangered Species
CRAC	Conservation Reef Advisory Committee
Cwlth	Commonwealth
EEZ	Exclusive Economic Zone
ENGO	Environmental non-government organisation
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRWHA	Great Barrier Reef World Heritage Area
GIS	Geographic Information System
IGA	Inter-Governmental Agreement
IMO	International Maritime Organisation
IT	Information technology
IUCN	International Union for the Conservation of Nature
JCU	James Cook University
LMAC	Local Marine Advisory Committee
LTMP	Long-term Monitoring Program
N/A, n/a	Not applicable
NGO	Non-Government Organisation
NTZ	No-take zone
MP	Member of Parliament
OUCH	Order of Underwater Coral Heroes: a volunteer group in the Whitsundays
QCC	Queensland Conservation Council
QCFO	Queensland Commercial Fishermen's Organisation *(precursor to the QSIA)*
QFS	Queensland Fisheries Service
QLD, Qld	Queensland
QPWS	Queensland Parks and Wildlife Service
QSIA	Queensland Seafood Industry Association
Ramsar	Ramsar Convention on Wetlands of International Importance
RAP	Representative Areas Program
RMM	Reactive Monitoring Mission *(from UNESCO)*

SAP	Structural Adjustment Package
SELTMP	Social Economic Long-Term Monitoring Program
SMF	Senior Management Forum *(within GBRMPA)*
Sunfish	Sunfish QLD (one of Queensland's recreational fishing groups)
Suntag	Fishing tag produced by Sunfish (above)
TEK	Traditional ecological knowledge
TWS	The Wilderness Society
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WH	World Heritage
WHA	World Heritage Area
WPSQ	Wildlife Preservation Society of Queensland
WWF	World Wildlife Fund
ZP	Zoning Plan

KEY LEGISLATION AND CONVENTIONS MENTIONED IN THE THESIS

Title of legislation or international convention	Abbreviation (if abbreviated in this thesis)
GBR Marine Park legislation	
Great Barrier Reef Marine Park Act 1975 https://www.legislation.gov.au/Details/C2017C00279	*the Act*
Great Barrier Reef Marine Park Regulations 2019 https://www.legislation.gov.au/Details/F2020C00665	*the Regulations*
Great Barrier Reef Marine Park Zoning Plan 2003 http://www.gbrmpa.gov.au/__data/assets/pdf_file/0015/3390/GBRMPA-zoning-plan-2003.pdf	Zoning Plan 2003
Other Federal legislation mentioned in the thesis	
Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) https://www.legislation.gov.au/Series/C2004A00485	EPBC Act
Native Title Act 1993 (Cwlth) https://www.legislation.gov.au/Details/C2017C00178	
(Australian) *Public Service Act* https://www.legislation.gov.au/Details/C2019C00057	
Queensland legislation relevant to the GBR	
Marine Park Act 2004 (Queensland) https://www.legislation.qld.gov.au/view/pdf/inforce/2016-05-25/act-2004-031	
Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004 https://www.legislation.qld.gov.au/view/pdf/inforce/2019-09-01/sl-2004-0240	
Environmental Protection (Great Barrier Reef Protection Measures) and Other Legislation Amendment Bill 2019 https://cabinet.qld.gov.au/documents/2018/Dec/GBRBill/Attachments/ExNotes.PDF	
International agreements and conventions relevant to the GBR	
Convention concerning the Protection of the World's Cultural and Natural Heritage. 1972 https://whc.unesco.org/en/conventiontext/	WH Convention
Convention on Biological Diversity, 1992 https://www.cbd.int/convention/text/	CBD
United National Convention on the Law of the Sea, 1982 https://www.un.org/depts/los/convention_agreements/texts/unclos/UNCLOS-TOC.htm	UNCLOS

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SUMMARY OF PUBLICATIONS 2014-2020

	Related to my PhD	Unrelated to my PhD	TOTAL
Peer-reviewed papers	**11**	8	19
Books/book chapters	**7**	1	8
Technical reports	**-**	7	7
Online articles *(e.g., The Conversation)*	**4**	12	16
TOTAL	**22**	**28**	**50**

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Chapter 1 – Setting the Scene

1.1 Introduction

The rezoning of Australia's Great Barrier Reef (GBR) provides a significant case study of environmental policy reform. This chapter sets the scene by introducing the GBR and the Representative Areas Program, which became well known by its acronym 'RAP'. The RAP was a major planning program that occurred between 1999-2004 in parallel with a simultaneous rezoning of the entire GBR. The context for the case study is outlined and the chapter explains why the RAP/rezoning provides an excellent exemplar of transformative policy reform. Environmental policy is introduced, together with the research questions that were posed, and some of the complexities that were influential during the policy process. These complexities included the complementary roles of the Commonwealth[1] and State (Queensland) governments that are both involved in the management of the GBR. The chapter concludes with an overview of the structure of the thesis.

1.2 Background for the case study

1.2.1 What is transformative policy reform?

Transformative policy reform in the field of environmental policy has received increasing global research interest in recent years (Carey et al., 2019; Chaffin et al., 2016; Herrfahrdt-Pähle et al., 2020; Olsson et al., 2014; Patterson et al., 2017; Walker et al, 2004; Westley et al., 2013). Adapting a definition in Walker et al. (2004, Art. 5), transformation in such recent research relates to the capacity to create a fundamentally new system when the current ecological, economic, or social conditions make the existing system unsustainable. Notwithstanding this recent research, '…little is

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[1] In Australia, the national or federal government is usually referred to as the Commonwealth Government. Australia has a federal democratic system that involves the Commonwealth Government along with the state and territory governments.

known about how processes of policy layering and institutional legacies play out in (relatively rare) system-wide and transformative policy reforms…' (Carey et al., 2019, p. 491).

In recent years, the concept of social-ecological transformations has received greater focus in sustainability research and related policy discourse. Such research has shown sustainability transformations are multi-level, multi-phase, and cross-scale processes (Olsson et al., 2014) which corresponds to what occurred in the RAP/rezoning. The RAP/rezoning therefore provides an opportunity to examine transformative policy reform in detail and has the added advantage that the rezoning also affords a rare system-wide real-world example. I have chosen the following definitions in my research to clarify what I mean by the term 'transformative policy reform':

- *Transformative*: policy reform that can be defined by several of the following descriptive adjectives or terms, many of which have been garnered from the literature (e.g., Dietz & Rogers, 2012; Sen, 2014):
   - innovative, original, pioneering, large scale, system wide, science based, comprehensive, thorough, bold, complex, multifaceted, coherent, paradigm-challenging, radical, unconventional, exploratory, creative, 'difficult to recognise at the time of creation', high-risk, revolutionary, and/or effective over time.
- *Policy:* '…a statement of government intent, and its implementation through the use of policy instruments… ' (Bridgman & Davis, 2004, p. 184) that is, the means, such as implementing a zoning plan, by which a policy is put into effect.
- *Reform:* when used in conjunction with 'policy', reform means a *major* policy change. This is distinct from most policy changes that occur as incremental shifts in changing an existing policy or bringing in a new policy (Bennett & Howlett, 1992).

Published research to date about the RAP/rezoning focuses mostly on the scientific or technical aspects of conducting the zoning program (e.g., Day et al., 2004; Fernandes et al., 2005, 2009). Various benefits subsequently shown to have occurred as a result of the zoning have been published (e.g., Harrison et al., 2012; Mellin et al., 2016; Russ et al., 2008; Webster et al., 2008). In addition, various socio-economic implications of the GBR zoning have been addressed (e.g., De Freitas et al., 2013; McIntosh et al., 2010; Morrison, 2017; Sutton & Tobin, 2009). However, surprisingly little has been written about the actual policy process or the key factors that led to the successful policy reform. Only limited documentation of the GBR rezoning mentions such significant issues as leadership and the political complexities (e.g., Evans et al., 2015; Olsson et al., 2008). My primary research objective, therefore, was to investigate and document the complexities of the RAP/rezoning process, concentrating on the key factors that led to the zoning outcome. The questions posed were:

1. What was the role of science and scientists in the policy reform process?
2. What was the role of leadership in the policy process?
3. What was the role of the wider GBR community in the policy process?
4. What was the broad political context and the role of politics in the RAP/rezoning?
5. To what extent could the policy reform be considered to be transformative and/or successful?

The reasoning behind my decision to focus my research on the four factors listed (i.e., 1- 4 above) is outlined in Chapter 2 (Sections 2.2 and 2.3). The significance of these four factors in isolation is not new. My research, however, was novel in that it investigated the importance, and the inter-dependence, of the factors to a level not previously undertaken in the GBR. In addition to examining the inter-relationships between these four factors, I also examined the intra-relationships within each factor. In assessing these factors, I identified a number of lessons that, from my experience and

supported by the interview data, should be considered in any major environmental policy process. These key factors have wider implications beyond the GBR. This approach also affirmed aspects that were done well in the GBR and highlighted those aspects that could have been done better. Finally, I conducted an overall assessment of the policy reform, to determine whether the RAP/rezoning was a transformative policy reform and a policy success.

My research was more than an academic assessment of a major policy reform; it also adds to the historical record, detailing some of the specific intricacies of developing and implementing this system-wide example of environmental policy reform. The valuable lessons for future environmental planning and conservation policy reform in the GBR are outlined, alongside the lessons relevant for marine protected areas (MPAs) elsewhere in Australia and around the world.

1.2.2 What is marine zoning and how does it differ from marine spatial planning?

Marine zoning is a spatial planning tool, derived from concepts developed in land-use planning. Zoning is able to provide a sound legal framework for spatial management by allocating rights and responsibilities for use and entry to marine areas. Day et al. (2019) noted:

> ...zoning can separate competing uses or regulate uses to protect sensitive, ecologically valuable or recovering areas. Different zones may allow different uses, or different levels of use based on a determination of an area's suitability for those uses, with the added aim to minimize conflicts between incompatible uses … (p. 10).

Many contemporary texts about managing marine areas refer to ocean or marine zoning (e.g., Agardy, 2010; Crowder & Norse, 2008; Douvere, 2008; Edwards, 2008; Foley et al., 2010; Halpern et al., 2008; Jones et al., 2016; Katsanevakis et al., 2011; Mcwhinnie et al., 2015; Norse, 2002; Portman, 2007; Santos et al. 2019; Yates et al., 2015). In some of these publications, the terms 'zoning' and 'marine spatial planning' (MSP) are used interchangeably. However, I do not consider the terms 'MSP' and 'zoning' are the same. Some planners also have the mistaken belief that marine planning is undertaken in only two dimensions. The GBR is well regarded in the global literature as a pioneering example of MSP, and Chapter 8 (Section 8.8) explains how multiple layers (one layer of which is zoning) are applied in three dimensions. I consider, therefore, that the terms MSP and zoning should be viewed as different tools in the three-dimensional context of marine waters. In the marine environment, zoning can act in three dimensions (e.g., encompassing the overlying water column and the seabed within an MPA), but zoning remains a single legal layer for management. In contrast:

> ...MSP may comprise multiple layers of spatial planning comprising different spatial plans or planning layers, with each layer having its own legal framework. Zoning may be one layer or one component of MSP; however, MSP is still confined only to the marine environment (i.e., the waters or the seabed).... (Day et al., 2019, p. 11).

This is illustrated by series of maps in Day et al. (2019, p. 19) depicting various spatial layers that overlay, and complement, the underlying zoning within the GBRMP. Differing management layers such as Plans of Management, Designated Shipping Areas, Defence Training Areas, are also shown in Figure 8.1 (Chapter 8) overlying the zoning within the same area. All these management layers have specified spatial extents (i.e., the area they cover is specifically defined), most have a statutory basis (i.e., they have a legal foundation), and a few of them (e.g., some of the Defence Training Areas) are also *temporal* management tools in that they are only in force for a specified time. Applied together, it is these multiple layers of management that collectively comprise MSP within the GBR. Zoning continues to play a very significant role in the GBR as one component of MSP. As such, the

focus of this thesis is on the specifics of the RAP/rezoning and the various lessons learned while recognizing that zoning remains a very significant component of MSP.

No-take areas are an important component of marine zoning and MSP. No-take areas aim to effectively protect marine or coastal environments from uses that remove animal or plant species or alter marine habitats. These areas are being increasingly applied around the world; however, they are known by different terms. In the UK, no-take areas are called marine sanctuaries; in the USA, they are called marine reserves; and elsewhere they may be termed 'closed areas', 'harvest refugia', 'no-take reserves' (Sale et al., 2005) or no-take marine reserves (Sweatman et al., 2015). In September 2020, about 3.5% of the global ocean was within no-take areas (UNEP-WCMC & IUCN, 2020).

Rather than the words 'no-take area', I have used 'no-take zone' (and the abbreviation NTZ) in the thesis as that was the wording used during the RAP/rezoning. There is, however, an emerging view among MPA practitioners that the term *fully protected zone* is more appropriate than the wording no-take zone for several reasons. Firstly, because it is self-explanatory and therefore clearly defined; secondly, protection encompasses more than just limiting extractive activities, and thirdly, it emphasizes the positive intent of the action (versus 'no take' which emphasizes a negative intent).

1.2.3 Context for the Great Barrier Reef as the case study

The GBR is arguably one of the richest and most complex natural systems on Earth (discussed further in section 1.2.5), and it has undeniable scientific, cultural and conservation significance (Day, 2016). The GBR ecosystem supports a wide range of species and habitats (GBRMPA, 2012; Hutchings et al., 2019; Pratchett et al., 2019), and ecological connectivity occurs across all its dimensions (e.g., cross-shelf connectivity, longshore connectivity, and vertical connectivity between shallow coastal and deep oceanic waters).

The Great Barrier Reef Marine Park (GBRMP) is also one of the best known MPAs in the world and was the largest MPA globally for decades, although that recognition was lost in 2006 when various larger MPAs were declared. In addition to its global reputation, the GBR is regarded by countless Australians as a part of their heritage (Marshall et al., 2019). Since 1975, the GBRMP has evolved as a multiple-use MPA, and today covers an area of 344,400 square kilometres (Figure 1.1). To put its size into context, the GBRMP covers about the same area as each of the following countries: Italy, Japan, Malaysia. Closer to home, the GBRMP is about the same size as Victoria and Tasmania combined. If overlaid on the west coast of the USA, the GBRMP would stretch from Vancouver to the Mexican border. The outcomes of the RAP/rezoning and the various lessons learnt have enhanced the reputation of the Great Barrier Reef Marine Park Authority (GBRMPA) and GBRMPA's global leadership in MPA planning and management (e.g., Agardy, 2010; Davis et al., 2004; Ruckelshaus et al., 2008). Consequently, many MPA practitioners globally look to the GBR for guidance on planning and management.

1.2.4   A brief history of the Great Barrier Reef and the GBR Marine Park

For thousands of years, Aboriginal and Torres Strait Islander peoples have used the coastal waters, islands and reefs for traditional resources and customary/spiritual practices in the area that today is known as the GBR. Early explorers such as Louis de Bougainville (1768), James Cook (1770), William Bligh (1789) and Matthew Flinders (1801) navigated their way through the Reef's uncharted waters. The pioneering botanists, Joseph Banks and Daniel Solander, were the first to systematically document the marine and terrestrial species collected from the GBR during Cook's first great voyage of discovery in 1770 (Banks, 1770). Flinders, a remarkable explorer, named the Great Barrier Reef in

1801 and was one of the first to write about its underwater beauty, marvelling at the '…vivid tints of every shade betwixt green, purple, brown and white; equalling in beauty and excelling in grandeur the most favourite … florist' (Flinders, 1814).
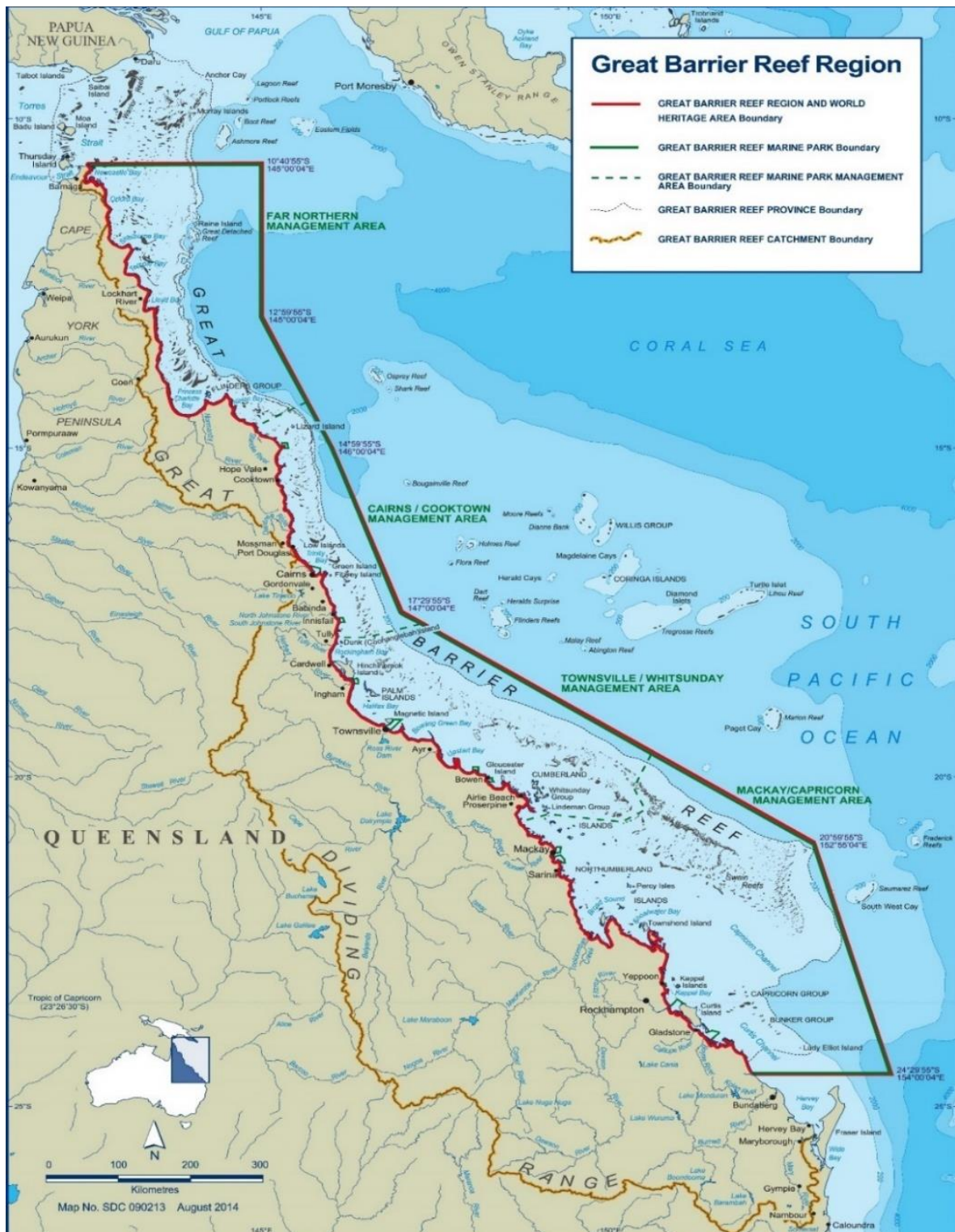
Figure 1.1 Map of the Great Barrier Reef Marine Park and World Heritage Area

Note: The GBR World Heritage Area (= red boundary) is at low water mark* along the coast of mainland Queensland; the slightly smaller GBRMP (= green boundary) has a similar coastal boundary but excludes key areas such as port waters and internal waters of Queensland and most islands within the outer boundary. The extent of the adjoining catchments is shown by the yellow boundary *[* the complexities of low water mark are explained further in section 1.2.7]*   © Commonwealth of Australia (GBRMPA)

Chapter 1

In the late 1800s, European settlers saw the economic potential of the coastal areas and several of the islands; however, they thought little of the reefs other than as a navigation hazard (Daley, 2014). Numerous coastal population centres developed over the next 150 years around industries such as commercial fishing, ports, shipping, agriculture, mining, and in more recent times, tourism. Gradually the significance of the reefs and adjoining marine areas was recognised and acknowledged (McCalman, 2013). A British Museum expedition by Dr Maurice Yonge and his colleagues to the Low Isles (north-east of Port Douglas in north Queensland) in 1928-29 was the first comprehensive scientific study of a coral reef anywhere in the world (Bowen & Bowen, 2002). The GBR has continued to appeal to scientists, and substantial scientific knowledge has since been generated from GBR-based studies (GBRMPA, 2013). Tourism at a number of GBR islands and cays began to flourish in the 1950s, and reef-walking and shell-collecting were both popular activities in those early years (Pocock, 2006). Technological advances soon followed, including glass-bottomed boats, underwater observatories, and scuba diving, opening up the wonder of the coral reefs to rapidly increasing numbers of visitors.

Since the early 1960s, the GBR's condition and management has been subject to political controversy and conflict (Bowen & Bowen, 2002). Economic growth along Queensland's coast, countered by the strong connection of the Australian public to the GBR, has contributed to such controversies. Proposals for limestone mining of certain coral reefs by farmers and the issuing of leases for oil drilling by the Queensland Government in the 1960s and early 1970s provided a focus for a campaign by conservationists for greater protection of the GBR (Wright, 1977).

Vocal public concern led to a Royal Commission (1970-74) that resulted in the passing of Commonwealth legislation providing for the protection and management of the GBR, the *Great Barrier Reef Marine Park Act 1975* (Royal Commission, 1974). That legislation (*the Act*) established the Great Barrier Reef Region and the Great Barrier Reef Marine Park Authority (GBRMPA), a 'special statutory authority' with responsibilities including recommending to the Minister: which parts of the GBR Region should be declared as Marine Park; preparing zoning plans for the relevant sections of the Marine Park; providing educational, advisory and informational services; and managing the Marine Park. When the GBR Region was proclaimed, the tip of mainland Australia was chosen as the northern extent of the GBR Region, and hence became the northern extent of the GBRMP and GBR World Heritage Area.

The Act was considered pioneering legislation for its time, providing for both 'conservation and reasonable use' of natural resources, and introducing the concept of multiple-use spatial management. *The Act* also specifically mentioned zoning as a tool for managing the GBRMP within a clear objective-based regulatory framework. The legislation included a comprehensive and systematic planning process to develop spatially explicit zoning plans including mandatory requirements for public participation during specific phases of the planning[2]. The primary objective of the legislation developed specifically for the GBRMP has been amended over the years, and today provides for '... *the long-term protection and conservation of the environment, biodiversity and heritage values of the GBR Region'*[3].

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[2] In the current version of *the Act*, the specific zoning requirements are set out in ss. 32-37A of *the Act*

[3] *The Act,* Section 2A, https://www.legislation.gov.au/Details/C2018C00453. There are also subordinate objectives, and *the Act* stipulates they must be consistent with the primary objective.

Currently the Commonwealth GBRMP covers 99.5 per cent of the GBR Region. The area that is zoned and managed extends from the 'northernmost extremity of Cape York Peninsula'[4] to just past Lady Elliot Island in the south (Figure 1.1). The western boundary of the GBRMP is generally the mean low water mark on the mainland coast of Queensland, and the GBRMP extends seaward between 80 and 250 kilometres offshore, outside the outer coral reefs into deep oceanic waters (Figure 1.2). Within the GBRMP there are some 3000 separate coral reefs that are a major drawcard for the area, however, they comprise less than 10 percent of the overall extent of the GBRMP (GBRMPA, 2012a). An additional 550 coral reefs that occur within the Torres Strait are part of the same reef ecosystem as the GBR, although they are situated outside both the GBRMP and the GBRWHA (see Figure 1.1).

While not part of the GBRMP, the adjoining catchments on the mainland are strongly linked with the 'downstream' GBRMP (GBRMPA, 2012; Waterhouse et al., 2016). The catchments collectively total 424,000 square kilometres (Figure 1.1) and include a wide range of terrestrial, freshwater, and estuarine ecosystems (several of which are feeding and breeding grounds for marine species), plus a variety of land uses including ports and population centres. The GBR zoning is not able to regulate activities that occur outside the GBRMP, so other management approaches are used to minimise the impacts upon the GBRMP (Commonwealth of Australia, 2018).
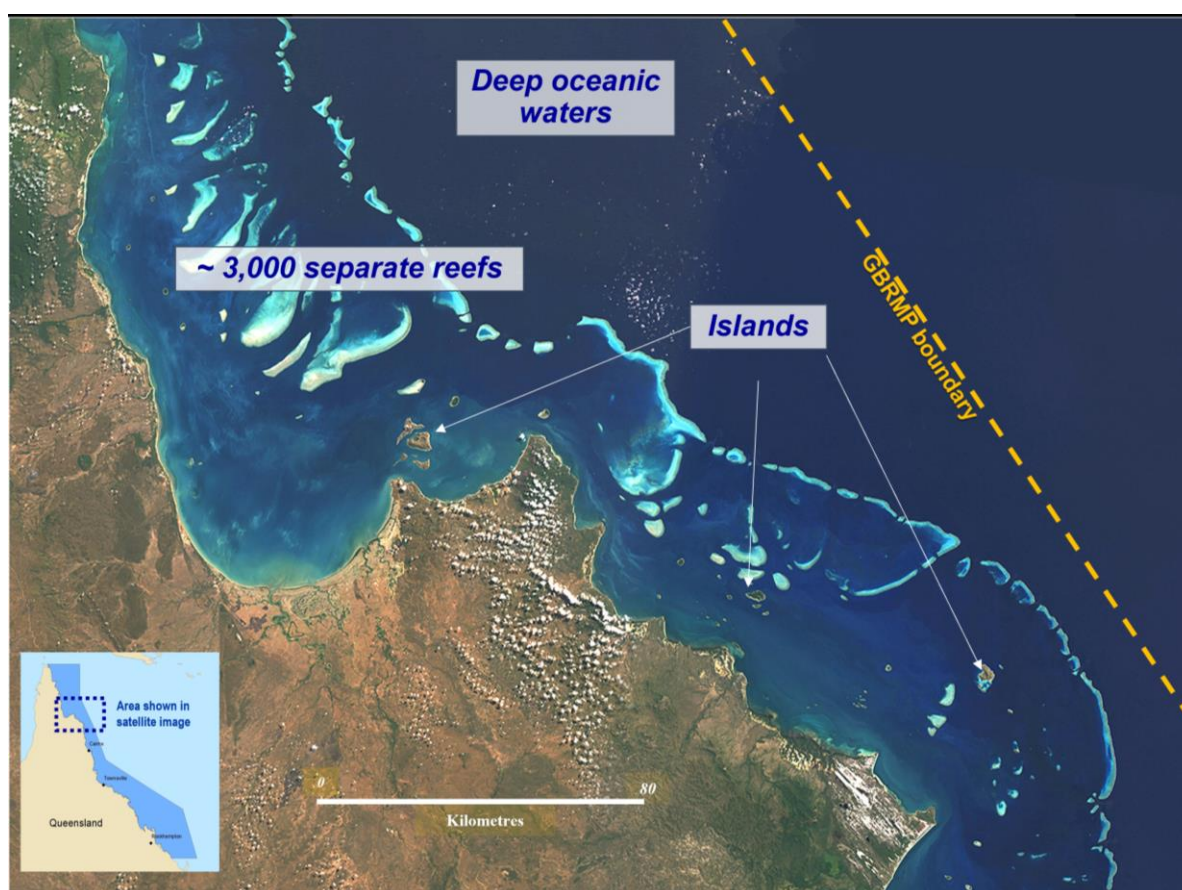
Figure 1.2 Satellite image of part of the Great Barrier Reef Marine Park
(Source of underlying image, unknown)

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[4] Refer to the boundary description, Schedule 1 in *the Act* https://www.legislation.gov.au/Details/C2018C00453

1.2.5 Global significance of the GBR

The GBR is the largest coral reef ecosystem on the planet (Pratchett et al., 2019) and is often referred to as one of the seven wonders of the natural world (Asquith, 2020; Seven Natural Wonders, 2020). The global significance of the GBR was formally recognized in 1981 when the World Heritage Committee acknowledged that the GBR was of 'Outstanding Universal Value', inscribing an area of 348,000 km^2 on the World Heritage List. The evaluation by the International Union for Conservation of Nature (IUCN) at the time stated, '…If any coral reef in the world were to be chosen for the World Heritage List, the Great Barrier Reef is the site to be chosen…' (IUCN, 1981). Extending over 14 degrees of latitude, the expansive latitudinal and cross-shelf diversity means the GBR World Heritage Area contains arguably the greatest species biodiversity of any World Heritage property on the planet (Day, 2016), including:

- 56 percent of the world's hard coral species
- one third of the world's soft coral and sea pen species
- six of the world's seven species of marine turtles
- 54 percent of the world's mangrove diversity
- 23 percent of the world's seagrass diversity
- 13 percent of the world's species of starfish, sea urchins and sea cucumbers
- seabird breeding colonies on islands of world significance; and
- one of the world's most important populations of dugongs.

Given this extraordinary biodiversity, people may be surprised that certain activities that usually are considered damaging to the marine environment, are allowed to occur in specific zones within the GBRMP. For example, trawling, sea dumping, aquaculture, or defence activities using high explosives may be allowed to occur within certain zones in the GBRMP as these activities are considered 'reasonable uses'. Because the GBRMP is such a large multiple-use area, zoning is able to separate these conflicting activities, enabling them to occur under specific conditions and often with a permit that needs to be assessed by the managing agency. In the decades since the 1980s, the management of the GBRMP, and particularly the zoning, has provided guidance and precedence for MPAs around the world (Burke et al., 2011; Day et al., 2015; Hilty et al., 2020; Lewis et al., 2017).

1.2.6 Zoning in the GBR

The statutory *Great Barrier Reef Marine Park Zoning Plan 2003* (GBRMPA, 2004) is subordinate Commonwealth legislation under *the Act* and provides the foundation for the management of the GBRMP (Day et al., 2019). The Zoning Plan is the fundamental component of the integrated marine spatial planning approach ensuring high levels of protection for significant areas of the GBR, while also allowing for sustainable use. The GBR Zoning Plan prohibits most threatening activities and manages the impacts of acceptable human activities and competing uses by means of various zones and associated management tools (e.g., permits).

The initial focus for zoning in the 1980s was primarily on coral reefs, with less consideration of the associated ecosystems in the non-reef areas. Between 1979 and 1988, various zoning plans for smaller sections of the GBR Region were progressively proclaimed and zoned[5] within the GBRMP. Contrary to the assumption that the entire GBRMP was established when *the Act* was proclaimed in

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[5] Various sections of the GBR were zoned in 1979, 1981, 1983, 1986, 1987, 1988, 1992, 1997, 2002, with two instances (1992 and 1997) being revisions of earlier zoning plans of specific sections (see Day, 2016, pp. 72-74).

1975, it took 13 years from the date the outer boundary of the GBR Region was declared in 1975 before the majority of the GBRMP was proclaimed and then zoned. By 1988, zoning plans had been completed for sections covering virtually the entire GBRMP (note various exclusions are addressed in section 1.2.7).

In the early days of zoning, there was limited baseline information on non-reef communities, and the concept of excluding fishing from large areas was highly contentious. The first large single zone that prohibited extractive activities including fishing, was a remote and 'pristine' cross-shelf transect of (Marine) National Park Zone in the Far Northern Section in 1985. Until the 2003 Zoning Plan came into effect, this single zone alone comprised 72% of the total extent of no-take zoning in the GBRMP (see Figure 1.4). For over 40 years, marine zoning has played a significant role while evolving as part of the adaptive management of the GBRMP (e.g., Day, 2002, 2016; Day et al., 2019; Kenchington & Day, 2011), with the RAP/rezoning being the most significant change. Other changes have included amended zone names, improved zone objectives, and improved zone boundaries (Day et al., 2019). Today, the eight different zones each have clear zone objectives, a number of which have a tiered structure within the definition (refer to Table 1.1). These explicit zone objectives are an important aspect of the GBR management approach.

Table 1.1   Great Barrier Reef Marine Park zones and zone objectives
(adapted from Day & Dobbs, 2013)

Zone name *(colour)*	Statutory objective(s) of the zone	IUCN category
General Use Zone *(light blue)*	to provide for the conservation of areas of the Marine Park, while providing opportunities for reasonable use.	VI
Habitat Protection Zone *(dark blue)*	(a) to provide for the conservation of areas of the Marine Park through the protection and management of sensitive habitats, generally free from potentially damaging activities; and (b) subject to (a), to provide opportunities for reasonable use.	VI
Conservation Park Zone *(yellow)*	(a) to provide for the conservation of areas of the Marine Park; (b) subject to (a), to provide opportunities for reasonable use and enjoyment, including limited extractive use	IV
Buffer Zone *(olive green)*	(a) to provide for the protection of the natural integrity and values of areas of the Marine Park, generally free from extractive activities; (b) subject to (a), to provide opportunities for: (i) certain activities, including the presentation of the values of the Marine Park, to be undertaken in relatively undisturbed areas; and (ii) trolling for pelagic species	IV
Scientific Research Zone *(orange)*	(a) to provide for the protection of the natural integrity and values of areas of the Marine Park, generally free from extractive activities; and (b) subject to (a), to provide opportunities for scientific research to be undertaken in relatively undisturbed areas.	Ia
Marine National Park Zone *(green)*	(a) to provide for the protection of the natural integrity and values of areas of the Marine Park, generally free from extractive activities; and (b) subject to (a), to provide opportunities for certain activities, including the presentation of the values of the Marine Park, to be undertaken in relatively undisturbed areas.	II
Preservation Zone *(pink)*	(a) to provide for the preservation of the natural integrity and values of areas of the Marine Park, generally undisturbed by human activities.	Ia
Commonwealth Islands Zone *(cream)*	(a) to provide for the conservation of the natural integrity and values areas of the Marine Park above low water mark; and (b) to provide for use of the zone by the Commonwealth; and (c) subject to (a), to provide for facilities and uses consistent with the values of the area	II

In the GBR, the best-known zone is the Marine National Park Zone (known locally as green zones), and the zone objective effectively means it is a no-take area (i.e., all fishing or collecting are prohibited without a special research permit). Other zones also are regarded as no-take areas e.g.,

the Preservation Zone (pink zone) which is also a 'no-go' zone, and the Scientific Research Zone (orange zone) as shown in Table 1.1.

Zoning today remains the foundation for GBR management, and it is complemented by a comprehensive integrated management regime that includes cross-jurisdictional arrangements involving the Federal and Queensland Governments (discussed in next part).

1.2.7 The roles of the Queensland and Australian Governments in the GBR

Many Queenslanders are aware that the Commonwealth and Queensland governments are both involved in managing the GBR (Marshall et al., 2019). Few, however, fully understand the complexities of these arrangements or the resulting management implications for the GBR. For example, in a review of the GBR legislation undertaken by the Commonwealth in 2006, explaining Queensland's role in the GBR required five pages of text (Commonwealth of Australia 2006, pp. 118-22). Some of these complexities are based on historical precedents (Bowen & Bowen, 2002), including:

- the assertion by Queensland that the State always maintained jurisdiction over most of the GBR islands (however, islands or parts of islands that had lighthouses or defence training areas were recognized as being under Commonwealth jurisdiction).
- the proposal by Queensland in 1974 for a Queensland Marine Park within the three-mile limit along the east coast of Australia and around each of the Queensland islands; and
- one of the recommendations of the Royal Commission led to the passing of the *Great Barrier Reef Marine Park Bill* in 1975 that subsequently led to the passing of *the Act* as outlined in section 1.2.4.

Despite what is often believed, the proclamation of *the Act* in 1975 did not result in the Commonwealth Marine Park being immediately declared across the GBR. *The Act* established the GBR *Region* and the Marine Park Authority (GBRMPA) whose functions included recommending to the Minister which parts of the GBR Region should be declared as Marine Park. Around the time of the Royal Commission, the Commonwealth and the States undertook negotiations resulting in the *Offshore Constitutional Settlement* (Commonwealth of Australia, 1980; Attorney-General's Department, 2014). These negotiations were followed by a High Court decision in late 1975 that **confirmed full jurisdiction on the part of the Commonwealth up to the low-water mark** in the GBR. However, this is complicated in that the definition of 'low water' applied by the Commonwealth is 'Mean Low Water', whereas Queensland's definition refers to 'Lowest Astronomical Tide' (Day, 2016, p. 70).

The complexities of the differing jurisdictional boundaries are shown for a small part of the GBR coast in Figure 1.3. The boundary of the GBRMP in Figure 1.3 excludes the islands, port limits, internal waters[6] of Queensland and tidal lands and tidal waters. The GBRMP can therefore only be declared within the GBR Region, noting this precludes the internal waters of Queensland and the waters around all Queensland islands (Kaye, 2009; Rothwell & Jessup, 2009). These exclusions need

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[6] For the purposes of national and international law, any waters on the landward side of a defined baseline are usually considered to be 'internal waters' (Rothwell & Jessup, 2009). Where the coastline is deeply indented (e.g., long narrow bays that are deeper/longer than they are wide, extending far inland), or where there is a fringe of islands along the coast, the baseline is usually defined by a system of straight lines joining discrete points at low-water between 'straight baseline end points'. Similarly, long narrow channels, such as that between Curtis Island and the mainland in Figure 1.3, are also normally considered to be 'internal waters'.

to be considered alongside the High Court decision that confirmed that '…the Commonwealth held title to all waters from the low water mark of all land…' (Bowen & Bowen, 2002, p. 354).

The current inter-governmental arrangements between the Commonwealth and Queensland governments enable all the waters from the high-water mark out to the seaward edge of the GBRMP, up to 250 km offshore and well outside the coral reefs, to be managed in a complementary way. The majority of these same waters (plus all the islands within the outer boundaries of the GBRWHA) are within the area listed as World Heritage, the difference being the GBRWHA, and the GBRMP, both commence at low water mark on the mainland coast. Complementarity means the laws are virtually the same, and the zones are 'mirrored' on either side of the jurisdictional boundaries, seaward from the high tide mark. Without such complementary arrangements, the management of the GBR would potentially be exceedingly complex, requiring the majority of the waters to be managed by the Commonwealth, whereas the tidal lands and tidal waters around each of the 950 Queensland islands would be managed by Queensland (complicated by a contentious boundary around each of these islands and along the mainland coast that may be legally challenged).
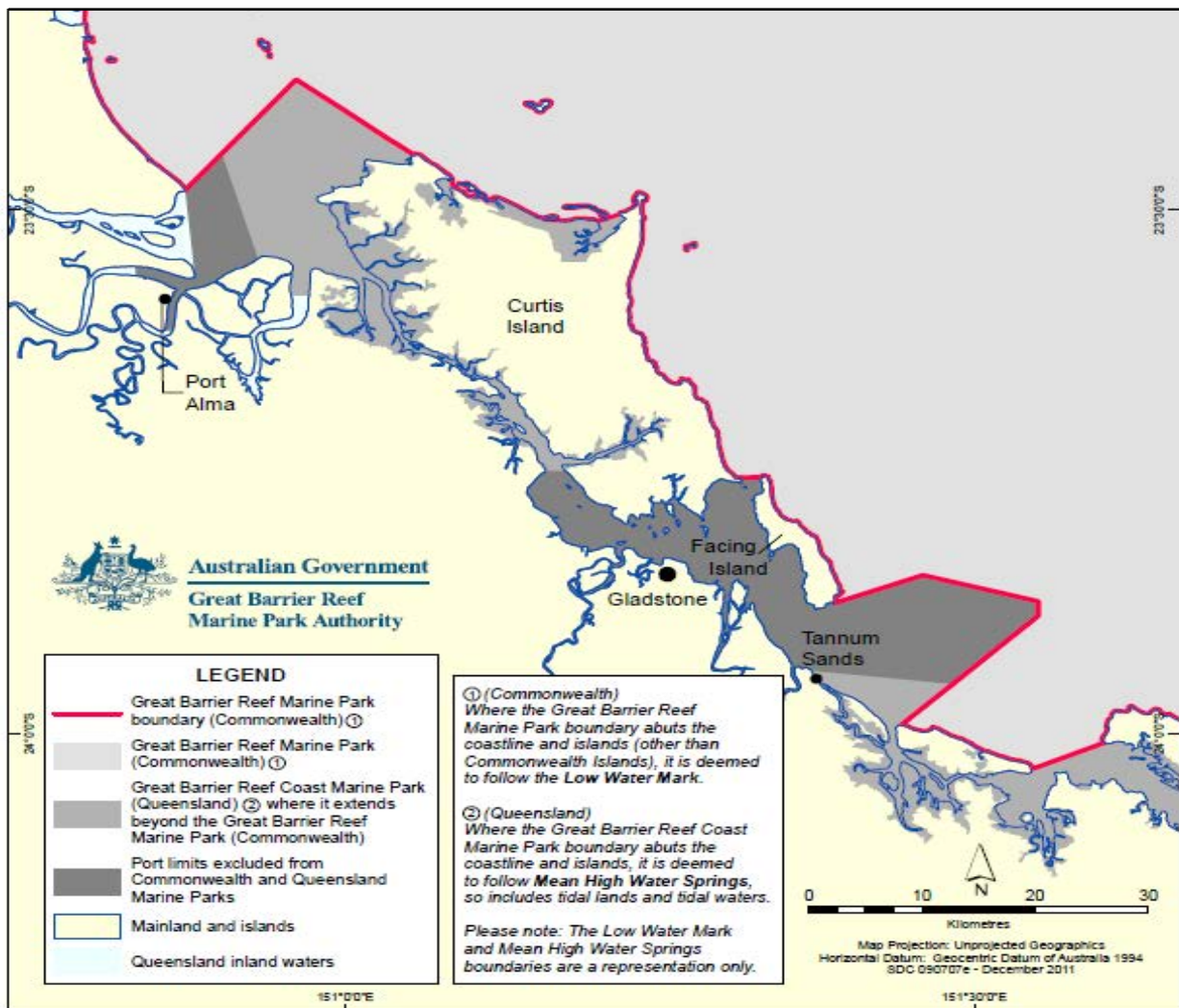
Figure 1.3 Part of GBR coast showing how the Commonwealth Marine Park boundary does not include most islands, port areas or internal waters of Queensland
© Commonwealth of Australia (GBRMPA)

The zoning outcome that exists today is a consequence of the RAP/rezoning program and provides complementary zoning in both the Commonwealth and Queensland waters through the (Commonwealth) *Great Barrier Reef Marine Park Zoning Plan 2003* and the (Queensland) *Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004*. The fact that Commonwealth and State waters are managed in a complementary way is a critical part of the success of the management regime that exists in the GBR; however, this added to the complexities of the RAP/rezoning as explained further in Chapters 3 and 7. The complementary Commonwealth-State arrangements that exist in the GBR do not occur in MPAs elsewhere around Australia and are not known to occur in marine areas elsewhere around the world[7].

1.3 An overview of the RAP/rezoning

In the mid-1990s, scientists recognised the zoning plans that were in place for different sections of the GBRMP did not adequately protect the range of biodiversity known to exist across the GBR (see Chapter 4 for details). As a result, a highly publicised, extremely contentious, and comprehensive planning program was undertaken between 1999-2004. The term 'Representative Areas Program' or RAP, was considered a suitable name that related to what the program was about, that is, protecting 'representative' examples of all the different types of biodiversity across the GBR. The initial objective was to provide better protection for the full range of biodiversity throughout the GBR by developing a network of no-take zones to represent all the habitat types (Day et al., 2004; Fernandes et al., 2005). As the RAP process progressed, a concurrent comprehensive rezoning of the entire GBRMP commenced. These two planning programs (the RAP and the GBR rezoning) merged into one combined planning process so throughout the thesis, they are jointly referred to as the RAP/rezoning.

Table 1.2 addresses a number of key questions about the RAP/rezoning program that became a major policy reform (e.g., Why did it start? What were the objectives of the RAP?). In Chapter 8, Table 8.1 provides similar short answers about the outcomes of the policy reform.

Table 1.2 Questions and brief answers about the RAP/rezoning process

Question	Brief answer
How or why did the Representative Areas Program (RAP) start?	A call to protect representative biological communities in the GBR was initiated by scientists in 1994 as part of the 25 Year Strategic Plan for the GBR (GBRMPA, 1994). Around this time, obligations under the World Heritage Convention brought greater focus on the world heritage values within the GBR. In particular, there was a requirement to define what made the GBR so special (i.e., its Outstanding Universal Value), and many of the component values were recognised as needing greater protection (Richard Kenchington, personal communication, 2014).

(Table continued on next page)

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[7] In the Florida Keys (USA) and in the State of Massachusetts (USA) there are arrangements between the Federal marine managing agency (NOAA) and the relevant States (Florida and Massachusetts respectively); however, they are not the same as the complementary State-Commonwealth management arrangements that occur in the GBR.

Question	Brief answer
What were the objectives of the RAP?	The primary objective of the RAP was to help: • maintain biological diversity; • allow species to evolve and function undisturbed; • provide an ecological safety margin against human-induced disasters; • provide a solid ecological base from which threatened species or habitats can recover or repair themselves; and • maintain ecological processes and systems. RAP was to be undertaken by increasing the extent of no-take zones (i.e., green zones), ensuring they included examples of all habitat types. A secondary aim was to minimise impacts on the existing users of the GBRMP, including fishers. During the planning process, the aims were broadened to encapsulate a complete review and rezoning of the entire GBRMP rather than solely increasing the extent of no-take zones.
How important was the RAP/rezoning for the GBR?	Zoning has long been a cornerstone for the management of the GBR, separating conflicting uses and prohibiting threatening activities. Any activity occurring in the GBR must comply with the requirements of the statutory Zoning Plan. However, zoning is only one of many tools in the management toolkit (see Day et al., 2019, pp. 17-19, and Chapter 8).
How did the objectives of the RAP and the rezoning differ?	The RAP was about better protecting biodiversity and the development of a representative network of no-take zones across the GBR. During the planning process, the aims were broadened to encapsulate a complete review of all the existing zones across the entire GBRMP. The subsequent declaration of the *GBRMP Zoning Plan 2003* achieved the objectives of both planning programs, exceeding the expectations of all those who were involved.
What was the legal basis to undertake such a major planning process?	*The Act* sets out the specific process[8] for the development of, or review of, a Zoning Plan. *The Act* therefore provided the legal basis to conduct the RAP/rezoning; and the resulting *GBRMP Zoning Plan 2003* is subordinate legislation under *the Act*. Consequently, a zoning plan can only be amended (other than for typographical errors) by following the same legislative process.

Figure 1.4 compares the GBR zoning prior to the implementation of the RAP/rezoning with the Zoning Plan which came into effect 1st July 2004 and which remains current today. Comparing these two maps shows the major expansion of the network of no-take (green) zones in the 2003 Zoning Plan. What is not obvious, but was significant, however, was that the revised zoning network protected examples of the full range of biodiversity across the GBR.

The RAP/rezoning was the first time that virtually the entire GBR was covered by a single zoning plan. Today, zoning remains the cornerstone of the integrated management approach across the GBRMP. GBR zoning is complemented by a comprehensive management regime that includes cross-jurisdictional arrangements involving both the Commonwealth and Queensland Governments and a range of management tools.

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[8] See sections 32-35 in *the Act* at https://www.legislation.gov.au/Details/C2018C00453
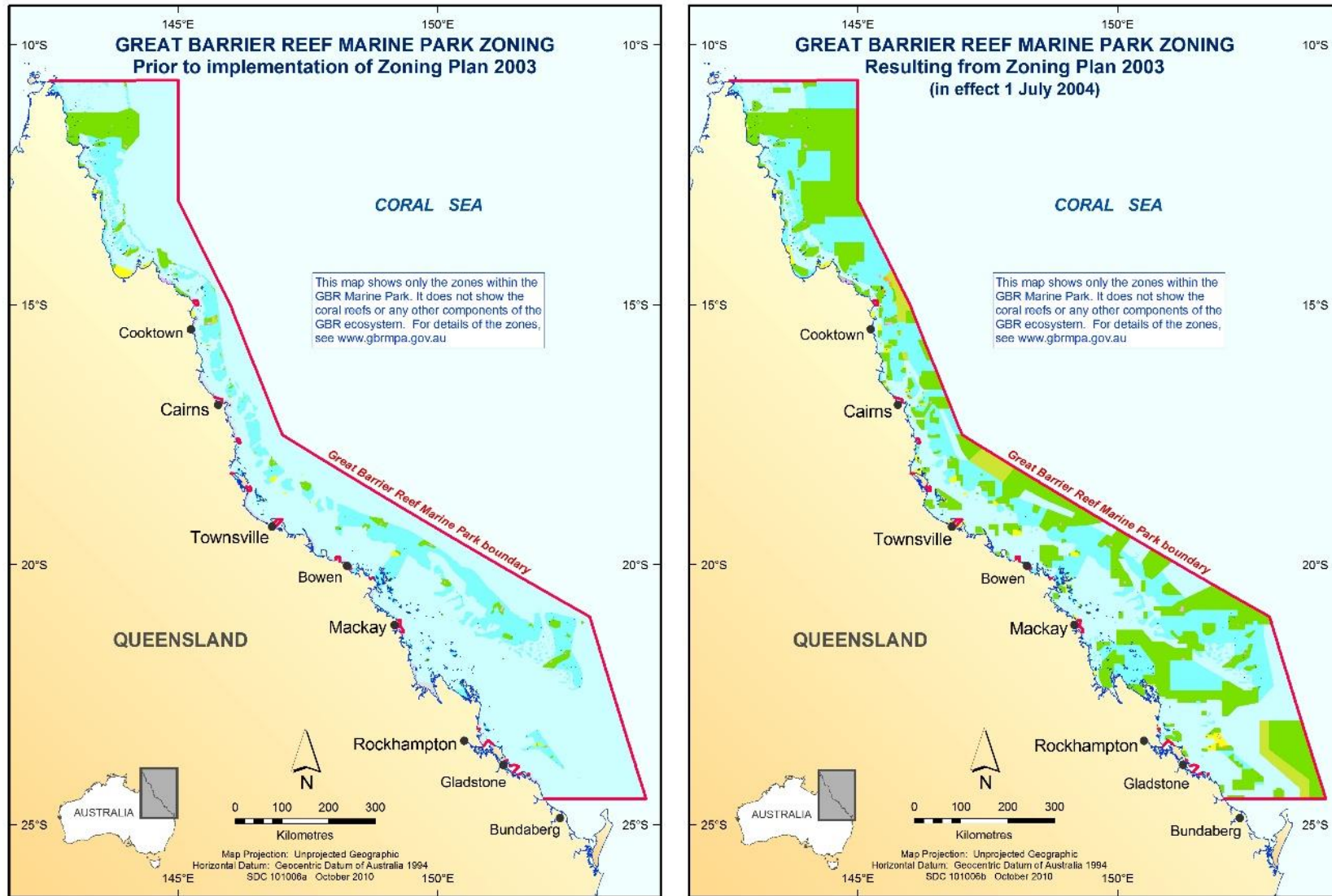
Figure 1.4   Comparison of GBRMP zoning prior to implementation of the 2003 Zoning Plan *(left hand map)* **with the zoning in effect after 1 July 2004** *(right hand map).* For an explanation of the different coloured zones, see Table 1.1.   © *Commonwealth of Australia (GBRMPA)*

1.4 Environmental policy reform

1.4.1 The RAP/rezoning as an example of policy reform

The RAP/rezoning provides a comprehensive example of a multi-jurisdictional policy reform and an environmental policy outcome. In the Australian Government's key piece of environmental legislation, the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the legal definition of 'environment' includes: '…ecosystems and their constituent parts, including people and communities; natural and physical resources; the qualities and characteristics of locations, places and areas heritage values of places; and the social, economic and cultural aspects of the above…' (Commonwealth of Australia, 1999, EPBC Act, Volume 2, Section 528)

The definition of 'policy' provided in section 1.2.1 (that is, a statement of government intent, and its implementation through the use of one or more policy instruments), is only one of numerous definitions. Bridgman and Davis (2004) maintain, '… there have been many attempts to define public policy, but its meaning and boundaries remain ambiguous…' (p. 3). As Bridgman and Davis (2004) point out, '…policy is ultimately about achieving objectives … a course of action by government designed to attain certain results…' (p. 6). Environmental policy is usually contentious, mainly because the consequences inevitably create economic winners and losers (Greve & Smith, 1992).

Policymaking is usually considered as process-oriented, comprising a number of logically ordered sequential steps (Everett, 2003). Edwards et al. (2001, p. 4) modified a framework developed by Bridgman and Davis (2000) to present '…a framework found most useful in practice…' comprising a number of discernible stages. Table 1.3 shows the phases and key components of the RAP process aligned against the stages of policy development described by Edwards et al. (2001). Such a staged approach enables a complex process to be broken down into manageable steps, enabling a focus on the different issues and needs of each step. As Bridgman and Davis (2004) point out, '… Australian experience suggests a policy cycle is likely to begin with issue identification, and then proceed through policy analysis…' (p. 26), following the successive stages as shown in Table 1.3. In theory, this is how policy is meant to be developed; however, as numerous authors suggest (e.g., Colebatch, 2005; Everett, 2003; Mucciaroni, 1992), in practice, policy development does not always occur this way.

1.4.2 How does policy reform differ from policy change?

Distinguishing 'policy change' from 'policy reform' is important as the terms are sometimes used interchangeably in the literature. As outlined in section 1.2.1, policy reform usually refers to a major policy change, and includes '…the process of improving the performance of existing systems and of assuring their efficient and equitable response to future changes…' (Berman, 1995, quoted in Cerna, 2013, p. 4). The RAP/rezoning was not simply a rehash of the existing zoning process set out in the legislation that had produced the previous zoning across the GBR. Nor was it solely a more thorough application of that existing zoning process. The systematic approach utilised during the RAP/rezoning included many pioneering and innovative aspects such as the use of the bioregions to ensure a representative outcome and the comprehensive application of systematic planning principles (Section 3.5.2), as well as many new planning and engagement techniques (Section 7.6). Furthermore, there were no precedents at this scale anywhere in the world and the level of public engagement that occurred was far greater than for previous environmental issues in Australia. Consequently, the RAP/rezoning is considered to be a good example of policy <u>reform</u> rather than a policy change, demonstrating all the elements necessary to achieve an effective system-wide policy reform.

Table 1.3 Stages of policy development as they relate to the RAP/rezoning

Stages of policy development *(as identified in Edwards et al., 2001*	Aspects that were relevant to RAP*	Red numbers in Figure 1.5	Broad phases of RAP/rezoning
Identify issues/define the problem	• The 25 Year Strategic Plan (GBRMPA 1994) identified the need for 'a representative approach' • Realization existing zoning was not protecting the full range of GBR biodiversity • *Australia's Oceans Policy* (Commonwealth of Australia 1998)	1 2	**Phase 1:** Preparatory stages prior to formal commencement of the RAP/rezoning program
Policy Analysis • Collect relevant data • Clarify objectives • Develop options	• Collation of data sets (1999-2000) • Identification of bioregions (Chapter 3) • Development of the biophysical and social, economic, cultural and management operating principles (Chapter 3)	3 4 5	
Undertake consultations	• Community Participation Phase 1 (CPP1: May-Aug 2002) followed by release of Draft Zoning Plan in June 2003 (Chapter 5) • Community Participation Phase 2 (CPP2: June-Aug 2003) • Analysis of submissions (Chapter 5) • Preparation of Final Zoning Plan	6, 7 8 9 9	**Phase 2:** Formal part of the RAP/rezoning
Move towards decisions	• Regulatory Impact Statement (Nov 2003) • Revision of final Zoning Plan • Submission to Minister (December 2003) followed by cabinet approval and tabling in both Houses of Federal Parliament	9 9	
Implement	• Preparation of educational material prior to formal commencement date of 2003 Zoning Plan (i.e., 1st July 2004) (Chapter 5) • Structural Adjustment Package for fishers (2004-2008) (Chapter 6)	10	**Phase 3**: Post the RAP/rezoning when the new zoning was being implemented
Evaluate	• Research - evaluating zoning (e.g., Harrison et al., 2012; Mellin et al., 2016; Russ et al., 2008) (Chapter 7) • GBR Outlook reports (GBRMPA, 2009, 2014, 2019a)		

*A detailed timeline for the RAP/rezoning is at **Appendix A2.**

The stages of the RAP/rezoning are depicted in Figure 1.5. The red circled numbers on Figure 1.5 equate to the red numbers in Table 1.3 above.

Old Zoning Plans

Collation of 40+ datasets ③

Map of Bioregions ④

Realization zoning was not protecting biodiversity ②

1999

Seagrasses
Bathymetry
Sediment type

1999-2000

2000

1980s-1990s ①

Development of planning principles ⑤

1st formal Community Participation Phase ⑥

Revised Zoning Plan

Draft Zoning Plan

FINAL

New Zoning Plan in effect mid 2004 ⑩

2nd formal Community Participation phase ⑧

DRAFT

Nov 2003 ⑨

June 2003 ⑦

Figure 1.5   The key stages of the RAP/rezoning process

Several of the distinct stages of the RAP/rezoning process as shown in Figure 1.5 are stipulated in the GBR legislation[9]. For example, *the Act* is prescriptive outlining matters that must be considered when preparing a zoning plan: stipulating the release of a draft zoning plan for public comments must be for at least a specified period and outlining the process for submitting zoning plans to the Minister. The right-hand column in Table 1.3 shows the three phases of the RAP/rezoning that were referred to in the interview questions and are discussed in more detail in Chapters 4, 5 and 6.

While Table 1.3 and Figure 1.5 might imply a linear planning process, policy development is rarely a linear process; often there are significant feedbacks and divergences along the way. Bridgman and Davis (2004) also observe, '...objectives may be overtaken by unintended consequences – side effects discovered only after the policy is implemented, and which … create new complex problems…' (p. 7). The Structural Adjustment Package for the GBR that commenced after the revised Zoning Plan was tabled in Parliament is a notable example of 'unintended consequences' (Macintosh et al., 2010; also explained more fully in Chapter 7).

1.5   The 'why' and 'how' of my research

While the outcomes of the RAP/rezoning have been widely praised, surprisingly little has been written about the actual policy process or how the zoning was achieved. Most of the key factors that led to the successful policy reform (an outcome that many of those who were involved in the RAP/rezoning thought was not achievable), have not previously been examined in detail. What has been published to date concentrates on the technical and scientific aspects, while the complexities of the GBR zoning process as a real-world example of policy reform have not previously been assessed. Documenting how the RAP/rezoning occurred and the lessons learnt is therefore important, especially given the outcome has been described as '... a role model for policy development elsewhere...' (Olsson at al., 2008, p. 9493). Within this context, my primary research objective, therefore, was to investigate the key factors that contributed to the policy outcome and to examine the extent to which they may provide lessons for environmental policy reform in the GBR, elsewhere in Australia and for the rest of the world.

The following five research questions were therefore developed to investigate what may have been significant during the RAP/rezoning:

1. What was the role of **science and scientists** in the policy reform process, how influential was science in the process, and what were the lessons learnt?
2. What was the role of **leadership** in the policy process, what was the nature of that leadership, and what were the lessons learnt?
3. What was the role of the wider GBR **community** in the policy process, how did the engagement occur, and what were the lessons learnt?
4. What was the broad **political context and governance** around the RAP/rezoning, referring specifically to the various roles of the Commonwealth and Queensland governments, given that both have long been involved in the management of the GBR?
5. To what extent was the policy reform **transformative and/or successful**, and how did the above key factors combine to produce the policy outcome?

It is now over 16 years since the laws that implement the RAP/rezoning came into effect. Consequently, this assessment provides a good opportunity to look back and be critically reflective,

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[9] Refer to the GBRMPA Act, especially sections 32-35D   https://www.legislation.gov.au/Details/C2018C00453

identifying aspects that could or should have been done better. Acknowledging that the RAP/rezoning was time-bound and contextual, an important part of this assessment is a critical but constructive evaluation of the components and any shortcomings. Chapters 7 and 8 highlight those aspects that were less effective or those that should be improved for any future policy reform.

1.6 Policy-related Australian literature

In section 2.2, various references are cited that mention all four factors that I chose to examine. However, only a few of these publications mention environmental policies. As outlined below, several Australian reference books do provide guidance for developing policy, but again, environmental considerations are given scant attention and examples of environmental policies are not often cited (although Doyle & Kellow (1995) and Thomas (2007) are obvious exceptions). Interestingly, none of the following reference books consider all four key factors that I identified in my research nor their inter-dependencies. The following books, however, do refer to the importance of appropriate research and policy analysis before commencing a policy process:

- *'Environmental Politics and Policy Making in Australia'* (Doyle & Kellow, 1995) provides an overview of Australian environmental policies drawing upon some of the best-known examples (e.g., South-west Tasmania, Murray-Darling Basin). It has a useful section on the role of environmental groups (and their leaders), although it does not address leadership in detail.
- *'Social Policy, Public Policy: from problem to practice'* (Edwards et al. 2001) refers to various factors '...that affect successful outcomes at some, if not every stage, of the policy framework...' (p. 9); these include the key players, consultation and the politics relevant to the various case studies.
- *'The Australian Policy Handbook'* (Bridgman & Davis, 2004) has an entire chapter on 'consultation'; however, the handbook has only a small piece on leadership (e.g., it briefly mentions those who have a stake in the policy cycle and the role of the CEO) and provides only minimal advice regarding the political side of policy making (e.g., discusses Ministerial responsibilities, how to prepare a Ministerial briefing and the role of Cabinet).
- *'Environmental Policy: Australian Practice in the Context of Theory'* (Thomas, 2007) has a short section on political parties and an even shorter piece on community involvement and does not mention the role of leadership.

1.7 Structure of the thesis

Following this introductory chapter, the seven further chapters in the thesis are outlined below:

Chapter 2: Methodology. The methodological approaches used to address the research questions are examined in this chapter. The 38 semi-structured interviews are introduced as a fundamental component of the research, as well as the qualitative and quantitative methods used for the analyses. My role as a participant in the RAP/rezoning is examined, along with the issues associated with being an 'insider researcher', and other research challenges.

Chapter 3: The role of scientists and science in the RAP/rezoning. The role of science in environmental policymaking is the focus of this chapter. The fundamental aspects of the biophysical and social sciences that were foundational for the planning process in the GBR are outlined, including the use of analytical decision-support tools. The analysis demonstrates that the best available science was adequate for the RAP/rezoning process despite considerable scientific

uncertainty. The chapter concludes that, while science played a foundational role, that role was less influential than is commonly assumed compared with the other key factors considered in the thesis.

Chapter 4: The role of leadership in the RAP/rezoning. Chapter 4 discusses the fundamental role of effective leadership in the achievement of the policy outcome. Rather than a single leader, the concept of a 'lattice of leadership' is developed, recognising complementary leadership traits and leadership styles at different times during the planning process. The importance of effective inter-relationships between leaders and the role of followership within the agency are also addressed.

Chapter 5: Public engagement through participation. Targeted, effective, and sustained public engagement was a significant factor in achieving the policy outcome. Chapter 5 summarizes the various methods used for public engagement (e.g., community information sessions, specific media engagement) throughout the RAP/rezoning process. The lessons learnt about public participation are identified including those methods that were considered to be most effective and innovative.

Chapter 6: The roles of politics and governance. Chapter 6 examines the various levels and types of politics involved in achieving the successful outcome of the policy reform. These include inter-governmental politics, inter-agency politics, party politics, and sectoral politics. The political factor is shown to be the most significant for the policy outcome, whilst being dependent to varying degrees upon each of the other three key factors. The complexities of two jurisdictions with responsibilities for the management of the GBR and the implications for the RAP/rezoning are highlighted, focusing on the significant roles played by politicians and the complex governance issues. Three instances where different political elements could have derailed the entire policy process are examined.

Chapter 7: Assessing the policy reform. This chapter brings together a range of evidence to analyse the extent to which the RAP/rezoning is recognised as a transformative policy reform and a policy success. This analysis highlights both the limitations of the process and those elements that led to the successful policy outcome including its durability. Triangulation is applied using multiple sources including assessments against various theoretical frameworks as well as the views expressed in the interviews. A brief discussion is provided about the level of innovation in the RAP/rezoning before the chapter concludes with a justification as to why the RAP/rezoning was both a transformative policy reform and, on balance, a policy success.

Chapter 8: Conclusions. The final chapter outlines various limitations and shortcomings with the approach applied in the RAP/rezoning. I summarize how my five research questions were addressed in the thesis, highlighting the respective roles that the scientific underpinning, the community, leadership, and politics, played in the transformative policy reform. This leads to some considerations for the future along with some research gaps and policy questions. What marine zoning can and cannot achieve for marine conservation is identified, particularly in the light of new and emerging threats such as climate change. I then discuss why a rezoning in the GBR in the future will necessarily be different and conclude by summarising the contributions of my research, highlighted aspects such as the lattice of leadership and the relative influence of the science compared to the politics.

Appendices A1-A8 provide supplementary information including a copy of my interview questionnaire, a detailed timeline for the RAP/rezoning, those involved in the RAP/rezoning, and summaries of many of the key lessons learnt during the research.

Chapter 2 – Methodology

2.1 Introduction

Chapter 2 explains the methodological approaches used in the research including the overall objective and research questions, the research assumptions, and the justification for a mixed methods approach. Significant research challenges included my preconceptions and role as an 'insider researcher'. As an insider, I gained knowledge as a participant throughout the RAP/rezoning process and was influenced by that knowledge during the research. Multiple lines of enquiry are explained, including the semi-structured interviews, triangulation from various sources, literature reviews and targeted searches of relevant documents. The semi-structured interviews were undertaken with a diverse range of participants to ascertain their perspectives about the environmental policy reform (i.e., the RAP/rezoning). These in-depth interviews were a key component of the research, providing significant contributions for the four data chapters. My observations as a participant in the rezoning process, along with the interviewees' recollections, also contributed to the analyses. The chapter summarises various research challenges and concludes by addressing the validity of the research and its transferability to other situations.

2.2 Background to the research: preconceptions and gaps

Choosing the RAP/rezoning policy reform process and the key factors as the basis for this research was influenced by ideas developed over various planning experiences during my career (see section 2.4.1). Several key factors, such as the role of public participation, the scientific underpinning, and

the political influences, had been apparent in the achievement of policy outcomes in previous planning processes in which I had been involved. During, and following the RAP/rezoning, these factors were recognised as important, and consequently I referred to them in various publications about the GBR. For example, in Day (2002, p. 153), the importance of public participation was highlighted; Day et al. (2002, pp. 688-90) emphasized the importance of science in detail; Day et al. (2004, pp. 255-260) explained the significance of science and public participation; Day et al. (2005) highlighted the relative roles of science, public participation and political support in the GBR rezoning; an on-line article in Day (2011) included a box *'The Critical Role of Politics in the Rezoning Process',* and Day (2016, p. 87) included a box *'The importance of leadership in the Great Barrier Reef'.* Leadership, however, was not examined in any detail in any of these publications, despite its potentially important role in the RAP/rezoning. The inter-relationships between or within any of these factors were also not previously examined, so all these subjects were important for my research.

I had long considered the RAP/rezoning would be a good case study for a comprehensive research project. As noted by Flyvbjerg (2006), '...case studies often contain a substantial element of narrative. Good narratives typically approach the complexities and contradictions of real life... (p. 21). The rationale for this research was also premised on a paper by Olsson et al. (2008), which analysed various strategies and actions that applied in the RAP/rezoning, discussing the transition toward ecosystem-based management in the GBR. These strategies included '... internal reorganization and management innovation, leading to an ability to coordinate the **scientific community** [emphases added], to **increase public awareness** of environmental issues and problems, to **involve a broader set of stakeholders**, and to **manoeuvre the political system** for support at critical times...' (Olsson et al., 2008, pp. 9489-9490).

I examined a wide range of literature from the period 2003-2020 that discussed successful examples of policy development. In doing so, my focus was on examples that related to MSP, MPAs or environmental management. The following authors mentioned all four factors that I had chosen to examine: Ban et al., 2013; Gunderson & Light, 2006; Jones et al., 2016; Lubchenco et al., 2019; Luetjens et al., 2019; Olsson et al., 2008; and Osmond et al., 2010. Various other publications cited three out of the four factors I addressed in my research (e.g., Arkema et al., 2006; Backstrand, 2003; Lundquist & Granek, 2005; Vince, 2015). In a few cases, other reasons for policy success were mentioned (e.g., diligence, making the most of an opportunity, political will, trust), but the four factors I chose to address were commonly cited in the literature, although very few addressed their interdependencies.

Leadership, surprisingly, received far less attention in the policy literature. Olsson et al. (2008) had identified the role of leadership as a specific and significant component of the RAP/rezoning but did not examine it in any detail. Indeed, around that time (2006-2010), the role of leadership was only just emerging as an important factor in environmental science and resource management (e.g., Bodin & Crona, 2009; Bodin et al., 2006; Evans et al., 2015; Fabricius et al., 2007; Folke et al., 2010; Manolis et al., 2009; Olsson et al., 2006).

The research for my PhD was an opportunity to examine in more detail the four factors mentioned by Olsson et al. (2008), and to further analyse these factors by bringing in the perspectives of others who had been involved in the RAP/rezoning. I was particularly keen to investigate the importance of leadership in the policy reform process given that few publications had analysed the role of leadership in environmental policy. I was, however, mindful of the advice from Flyvbjerg (2006):

...The goal is not to make the case study be all things to all people. The goal is to allow the study to be different things to different people...describing the case with so many facets... ...that different readers may be attracted, or repelled, by different things in the case. Readers are not pointed down any one theoretical path or given the impression that truth might lie at the end of such a path... (p. 23).

2.3 Research objectives and research questions

My overall research goal was to assess whether the RAP/rezoning was an effective example of transformative environmental policy reform and, in doing so, investigate the key factors that helped achieve that policy reform. Within this context, my primary research objective was to investigate the key factors of the policy outcome and to examine the extent to which the RAP/rezoning policy reform was: (a) transformative, and (b) successful. A secondary objective was to develop lessons for other environmental policy reforms, thereby strengthening policy formulation and planning in the GBR as well as in other MPAs around the world. Both these objectives were addressed through the five research questions outlined in Chapter 1.

Most publications about the RAP/rezoning to date had focussed on the scientific underpinning of the GBR rezoning and the consequent benefits of the revised zoning network (e.g., Fernandes et al., 2005; McCook et al., 2010). Comparatively little had been written about the other key factors (i.e., leadership, politics/governance, and the role of the community) or their inter-dependence. Addressing these research questions drew upon the literature from diverse fields such as marine conservation, policy development, scientific practice, leadership, community engagement, intergovernmental relations, environmental management, and environmental history. As a multi-disciplinary investigation, the research integrated natural science, political science, social science, and environmental science.

2.4 An 'insider researcher'

I came to this research as a participant who had been involved in most aspects of the RAP/rezoning. Thus, I was an 'insider' researcher (e.g., Asselin, 2003; Dwyer and Buckle, 2009; Malterud, 2001). An insider researcher is a researcher sharing an identity, language, and experiential base with the study participants (Asselin, 2003). Finlay (2002) noted that '...the researcher is a central figure who influences, if not actively constructs, the collection, selection and interpretation of data... research is co-constituted, a joint product of the participants, researcher and their relationship...' (p. 212).

Being an insider researcher added to the complexity of undertaking qualitative research. As noted by Dwyer and Buckle (2009):

...The process of qualitative research is very different from that of quantitative research. As qualitative researchers we are not separate from the study, with limited contact with our participants. Instead, we are firmly in all aspects of the research process and essential to it. The stories of participants are immediate and real to us... we carry these individuals with us as we work with the transcripts. …. We cannot retreat to a distant "researcher" role…. The intimacy of qualitative research no longer allows us to remain true outsiders ... and, because of our role as researchers, it does not qualify us as complete insiders. We now occupy the space between, with the costs and benefits this status affords... (p. 61)

An insider who was closely involved in the subject matter examined in a case study is considered too subjective by some researchers, a situation which may put the trustworthiness or validity of the

study at risk (e.g., Asselin, 2003; Dwyer & Buckle, 2009; Field, 1991; Råheim et al., 2016). Peshkin (1988), however, argued that subjectivity can be '... the basis of researchers' making a distinctive contribution, one that results from the unique configuration of their personal qualities joined to the data they have collected...' (p. 18). If researchers identify their subjectivity in their research, '... they can at least disclose to their readers where self and subject become joined...' (Peshkin, 1985, p. 276). My insider perspective was undoubtedly influenced not only by my role during the RAP/rezoning, but also by my background and experience gained before the RAP/rezoning. Being an insider, these aspects influenced what I choose to investigate, the methods I chose for my research, the findings I considered most appropriate, and my conclusions (Malterud, 2001; Peshkin , 2000). It also meant that I came to the research with some preconceptions; however, as Malterud (2001) also observed, '...preconceptions are not the same as biases, unless the researcher fails to mention them...' (p. 484). As outlined below, the contextual factors of my background were relevant to this research.

2.4.1 Background and previous experience related to the RAP/rezoning

Prior to recommencing with GBRMPA as a senior manager in 1998, my previous positions[10] and related experience undoubtedly influenced how I approached the RAP/rezoning task. These positions included:

- Research Officer, Land Conservation Council, Victoria (1977-78) and Planning Co-ordinator, Grampians National Park, Victoria (1984-85). Both these positions specifically reinforced the importance of effective public engagement, and the need to effectively engage the local community to achieve a good planning outcome.
- Planning Officer, GBRMPA (1987-89). Coordinating the Cairns Section rezoning enabled me to introduce various 'new' planning aspects into the GBR (e.g., improved zone names, use of three-dimensional planning/overlays).
- QPWS Area Manager/Regional Manager (1990-1997). This confirmed that an integrated approach to planning adjoining State and Federal jurisdictions was essential. Similarly, the importance of complementary zoning and the importance of effective zone boundaries was reinforced.
- Whilst on 'sabbatical' in Canada (1997-98), I worked as a consultant for WWF Canada and co-authored a report with Prof. John Roff titled *Planning for Representative MPAs* (Day & Roff, 2000). John Roff introduced me to various aspects that I subsequently took into the RAP/rezoning (e.g., the value of a representative approach, mapping bioregions, the benefits of key principles for designing a system of MPAs).

Following my sabbatical in Canada, I returned to GBRMPA in mid-1998 and was appointed as one of the four 'critical issue' [11] Directors, responsible for the group tasked with conservation, biodiversity, and heritage matters within the agency. The primary task for the group at that time was to address the issues raised in the *25 Year Strategic Plan* (GBRMPA, 1994) concerning the need for greater protection of biodiversity in the GBR; this subsequently led to the RAP/rezoning.

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[10] After 11 years in terrestrial national parks, I transitioned to the marine realm, commencing with GBRMPA in 1986. I then worked in the GBR for 28 years (in Federal and Queensland agencies) until I retired in 2014.

[11] At that time (1998), the four issues considered to be the most critical for the GBR were (i) water quality, (ii) fisheries, (iii) tourism, and (iv) conservation, biodiversity, and World Heritage.

2.4.2 Research assumptions

My research is based on a number of assumptions and limitations associated with interdisciplinary research. Some of these assumptions influenced the way I approached the analysis of the policy reform. The primary research assumption was that an adequate understanding of the key factors and their role in the policy process would be obtained by interviewing a carefully chosen group of people who had been involved in the RAP/rezoning. The research participants were therefore purposefully chosen (Table 2.2) and invited to participate. They were selected to ensure they presented a range of perspectives on the RAP/rezoning. Several had been extremely supportive of the rezoning, others were less supportive, and a few were known to be strongly opposed. The assumption was that this broad selection would provide a wide-ranging overview of the policy process. I deliberately sought to hear the perspectives of both Federal and the State (Queensland) representatives involved in the GBR rezoning. This aspect proved to be important, and a topic about which little was known with respect to this policy reform. Similarly, a wide range of sectoral and associated actors were interviewed including scientists, environmental NGOs, tourist operators, fisheries managers, local government and GBRMPA's Advisory Committee Chairs. Interviews also occurred with a variety of GBRMPA staff who were directly involved in the RAP/rezoning, ranging from the Executive level in the agency to base-grade planners.

A number of other assumptions/suppositions behind my research are listed in Table 2.1.

Table 2.1 Additional assumptions behind my research

I assumed....	Comments
.... the interviewees provided sufficient observations of, and recollections about, the entire policy process from inception through to implementation	The RAP/rezoning policy process took place over five years and involved tens of thousands of participants. A few of those interviewed were present throughout the entire RAP/rezoning; others played specific roles at various times in the process. While I was involved throughout the RAP/rezoning, there were instances in which I was not involved. I needed to rely on the recollections of others and as well as any records (formal and informal) for details. Consequently, much of the information was anecdotal or hearsay. I assumed that the range of views amongst those interviewed offset any biases of the interviewees (e.g., reactive bias).
... the interviewees' recollections remained sound given their involvement happened 15 or more years ago	A few interviewees initially admitted they were struggling to recollect what happened years ago (between 1999-2004). However, once the interviews were underway, most had good recollections about the extent of their involvement and several subsequently backtracked during the interview as more recollections became apparent.
... those who were interviewed gave true and honest answers.	I specifically requested honest and as-detailed-as-possible answers, stressing they were important for the validity of the research. This was followed by the assurance of anonymity and confidentiality. The issue of participant confidentiality was important and may have encouraged some participants to speak more openly, knowing they would not be identified in the thesis or any subsequent publication without their express permission, as required by the conditions of the JCU Ethics Approval.

2.5 Mixed methods approach

Social phenomena are complex, generating research challenges as explained by Onwuegbuzie and Leech (2005):

> ...in the natural sciences, many properties ... can be measured with near-perfect reliability; [whereas] in the social sciences, the vast majority of measures yield scores that are, to some degree, unreliable. This is because constructs of interest in the social science fields typically represent abstractions (e.g., personality, achievement, intelligence, motivation, locus of control) that must be measured indirectly ... (p. 377).

Table 2.2 summarises the range of both qualitative and quantitative methods used in my research listed against the relevant chapter.

Table 2.2   Summary of the methods used in each chapter

Chapter	Research questions	Qualitative methods	Quantitative methods	Triangulation
3. Science	What was the role of *science and scientists* in the policy reform process, how influential was science in the process ...?	Semi-structured interviews Participant and direct observation Member checking[12] Documentary analysis (GBRMPA files, and grey literature)		Inductive and deductive categorising (theme based, generative) Participant and direct observation
4. Leadership	What was the role of *leadership* in the policy process, what was the nature of that leadership ...?	Semi-structured interviews Participant and direct observation Member checking[12]	Identifying leaders Ranking leaders and leadership traits	Qualitative interviews interpreted Quantitative rankings Participant and direct observation
5. Public participation/ community engagement	What was the role of the *wider GBR community* in the policy process, how did the engagement occur...?	Semi-structured interviews Participant and direct observation Documentary analysis (GBRMPA files, media reports and grey literature)		Inductive and deductive categorising (theme based, generative) Participant and direct observation

(Table continued in next page)

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[12] Member checking is '... a process in which the researcher asks one or more participants in the study to check the accuracy of the account...' (Creswell, 2014, p. 283).

Chapter	Research questions	Qualitative methods	Quantitative methods	Triangulation
6. Politics and governance	What was the broad *political context and governance* around the RAP/rezoning, given that both Commonwealth and Queensland governments have long been involved in GBR management ... ?	Semi-structured interviews Member checking[12] Documentary analysis (GBRMPA files, RAP submissions, Hansard, and grey literature		Inductive and deductive categorising (theme based, generative)
7. Assessing the overall policy reform	To what extent *was the policy reform transformative* and/or *successful* ... ?	Semi-structured interviews Direct observation Documentary analysis (GBRMPA files and grey literature	Ranking success	Qualitative interviews interpreted Quantitative rankings Inductive and deductive categorising

I therefore undertook a range of both qualitative and quantitative methods, drawing on the strengths of each method. As Sechrest and Sidani (1995) noted, both methodologies are:

> ... dependent on observation... and consequently, the ways in which [researchers] go about collecting and making sense of the data, their ultimate tasks and aims are the same: describe their data, construct explanatory arguments from their data, and speculate about why the outcomes they observed happened as they did... (p. 78).

Being an insider researcher, I was aware of, and able to draw upon, considerable documentary material that would not be evident or perhaps even available to an outside researcher. For example, file notes/records, draft proposals, unpublished investigations, media clippings/reports collated at the time of the RAP/rezoning, and relevant Hansard transcripts, were all extremely relevant to my research. Such material proved to be exceptionally useful in the analyses of the RAP/rezoning policy reform and therefore was an integral part of my methodology.

Mixed methodological studies have various purposes, including triangulation (i.e., seek convergence and corroboration of results using different methods or different data sources; Stake(2013)), complementarity (i.e., seek elaboration, enhancement, illustration, and clarification of the results from one method with results from the other method); and development (i.e., using the results from one method to help inform the other method) (Greene et al., 1989). Triangulation can positively affect the inference quality and transferability of conclusions as noted by various authors (e.g., Miles et al., 2014; Patton, 2015; Tashakkori & Teddlie, 2009). Quantitative and qualitative methodologies have different strengths as well as presenting instances of conflicting findings. Miles et al. (2014) maintain that inconsistencies or conflicts can be seen as '...a blessing because the different data collection methods used gather different facets of data, and their combined effects build on each other to compose a more three-dimensional perspective of the phenomenon...' (p. 300). Mixed

methods research questions embed aspects of both quantitative research and qualitative research within the same question (examples are questions 4, 5, 8-10 in Table 2.3).

Prior to commencing the research, ethics approval was obtained from the Human Research Ethics Committee at James Cook University (Approval number H5606, approved 4 July 2014). The approval ensured the procedures undertaken during the research complied with the requirements for informed consent, associated confidentiality, anonymity, and ethical behaviour. Given the issues of confidentiality and anonymity in the Ethics approval, section 2.8.1 explains written agreement was sought and obtained from those interview participants who are named in the thesis.

2.5.1 Choosing the interviewees

Participants were purposefully selected using criteria based on 'relevance' [to the central focus of the study], 'diversity' [a variety of type and geographical contexts] and 'opportunities to learn' (Stake, 2013). As Alvesson (2010) noted, '... it is important to have breadth and variation among interviewees so that they allow the covering of the social category one aims to address. A holistic selection of voices of the group being studied is vital ...' (p. 49).

Within each of the stratified groups shown in Table 2.3, deliberate choices were made to ensure a diverse range of views. For example, within the group of elected politicians (six interviewees) and across the various sectors and use groups (12 interviewees), I purposely chose some who were extremely supportive of what was proposed by GBRMPA. Similarly, I also chose several in each group who I knew from their actions and statements during the RAP/rezoning were strongly opposed to what was proposed. This provided opportunities for a range of good quality data across multiple perspectives while simultaneously facilitating a shared focus.

Table 2.3   Stratification to ensure interviewee diversity

Interview type	Code	Interview codes	Number of interviews	Comments
Pilot interviewees	T	T1-T3	3	Pilot interviews to refine the interview approach
Elected politicians	P	P1-P6	6	Federal (Commonwealth) politicians (ranging from Ministers to local MPs)
Political advisers	A	A1-A3	3	Queensland & Federal political advisors
Interest groups	S	S1-S12	12	Scientists, environmental NGOs, tourist operators, peak-body representatives, local government, Local Marine Advisory Committee Chairs
Federal agency officials	R	R1-R11	11	GBRMPA officials at all levels (Executive Director to base-grade planners) who were involved in RAP/rezoning
State agency officials	Q	Q1-Q3	3	Key State agency officials involved in the complementary Queensland rezoning
		TOTAL	**38***	

*Two additional invitees did not return my invitation emails or calls so were not interviewed.

2.6 The semi-structured interviews

The interviews were a central part of the research bringing data together in the participants' own words whilst providing me with comparative views across a range of topics as well as quantitative data. Each interview provided a unique perspective about the RAP/rezoning process and enabled me to compare differing views. It is important, however, to recognise that interviewing 'fractures the stories' being recollected (Miller & Glassner, 1997); the story must be partial because no one can recollect everything that occurred. Furthermore, conducting the research itself (i.e., transcribing, coding, and categorizing), '... commits further fractures in the story' as well. By following a systematic interview structure, a consistent approach ensured the interactions with all interviewees were similar. This provided comparative information viewed through the lens of each interviewee.

2.6.1 Developing the interview questions

A summary of the 15 interview questions is provided in Table 2.4 and the full interview questionnaire is provided in **Appendix A1**.

Table 2.4   Summary of my interview questions (Appendix A1 provides the specific questions).

Focus of specific interview question	Qualitative	Quantitative	Relevance to specific thesis chapters							
			Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
Q1 & Q2. These were 'Icebreaker' questions to determine their role during the rezoning	YES	-		Y		Y	Y	Y	Y	
Q3. What were your main recollections of RAP?	YES		Y		Y	Y	Y	Y	Y	Y
Q4. Who were the key actors in the RAP?	YES	YES				Y	Y		Y	
Q5. Prioritise the order of importance of key actors during each phase of RAP	YES	YES					Y			
Q6. Explain why the role of these key actors in RAP was critical	YES	-				Y	Y	Y	Y	
Q7. Key roles in the deliberations/ negotiations developing the final RAP network	YES	-					Y		Y	
Q8. Leadership traits of key actors during RAP	YES	YES					Y			
Q9. The importance of leadership of those you listed above	YES	YES					Y		Y	
Q10. Your view of success (or otherwise) of RAP	YES	YES								Y
Q11. The reasoning behind your views in Q10?	YES	-								Y
Q12. Did your opinion or perspective of RAP change over the planning period?	YES	-								Y
Q13. Has your opinion or perspective of RAP and its outcomes changed in more recent years?	YES	-								Y
Q14. What lessons from RAP do you think need to be learned?	YES	-								Y
Q15. Do you have any final comments?	YES									Y

Soon after commencing of my research, I referred to relevant literature to help draft some specific interview questions (e.g., the leadership traits in Q. 8 were modelled on wording in Evans et al., 2015). A variety of questions were initially developed, with Q1 and Q2 being 'ice-breakers', and the main questions being a combination of different types of requests designed to prompt the recollections of the interviewees. Prior to the initial questionnaire being piloted, I sought feedback on the draft interview questions from two of my advisors with backgrounds in social research.

A number of the interview questions were specifically worded to ensure a focus on two of the prospective key factors (i.e., leadership and politics) posed in my research questions:

- Six questions (numbers 4-9) were specifically aimed at developing the participants' perspectives on leadership.
- Six questions (numbers 4-7, 11 and 14) enabled the participants' to provide their views regarding the role of politics and politicians in the RAP/rezoning.

These questions also enabled the inter-relationship between leadership and politics to be explored.

All 15 questions had a qualitative component, enabling a range of views relevant to my research questions; five questions were also quantitative as shown in Table 2.4. The five questions that provided quantitative data were designed to draw out specific aspects (e.g., asking participants to rank certain leadership traits for four self-chosen leaders). The associated audio recording enabled the participants to explain their thinking behind their ranking using their own words. This provided me with comparative views across a range of topics as well as comparable quantitative data.

2.6.2 Initially contacting the interviewees

Having purposefully chosen a stratified group (Table 2.3) to ensure interviewee diversity, all potential interviewees were contacted either by email or a phone call. I introduced myself and explained the purpose of the research, along with the reasoning for them being invited to be part of my research. I outlined what would be required if they chose to participate, how the results would be handled, and that anonymity and confidentiality would be assured. It was emphasised that participation was voluntary, and they were able to withdraw at any time. The initial contact was followed by emailing each participant an information sheet that provided an overview of the research, a consent form specific for the research, along with two letters of support (one written by my primary supervisor and the other written by The Hon David Kemp, the Federal Environment Minister who had been heavily involved in the RAP/rezoning). The letter of support from the Minister confirmed the importance of the research and provided a valuable introduction to those political actors with whom previously I had only minimal contact.

Initially, forty participants were contacted. I had professional knowledge of all of them, with approximately 40% being co-workers or work colleagues; the remainder had become known to me during my time at GBRMPA. Two of those who were invited did not answer the request. The remaining 38 individuals accepted the invitation (a 95% acceptance rate). Of the 38 interviewees, ten were female (26%) and seven lived outside Queensland at that time. Initially I was unsure whether the sample size (i.e., number of interviews) was sufficient. It was reassuring, however, to read Mason (2010) who noted, '... the sample size is irrelevant, as the quality of data is the measurement of its value...' (p. 14).

2.6.3 The interviews

All 38 interviews were conducted face to face, ensuring the same opportunities for all participants. The audio tapes ensured all their words and verbal expressions were recorded, and their written answers for the five quantitative questions were also important. Interviews were conducted in a range of locations, the majority of those chosen to suit the interviewee. In addition to 12 interviews undertaken in Townsville, interviews occurred in locations along the GBR coast (e.g., Cairns, Bowen, Mackay, Airlie Beach). Specific trips were also made to Brisbane, Canberra, and Melbourne for further interviews. Some locations chosen for the interview proved to be less conducive for an effective interview than others; this is addressed in the lessons outlined in Table 2.6. For several interviews, it took months to find a mutually acceptable time (particularly those that occurred interstate) and one interview occurred overseas at an international conference when one participant (fortuitously) agreed to be interviewed. The 38 interviews therefore took place over a period of two years (2015-16).

Prior to commencing each interview, in accordance with my JCU Ethics Approval, I reiterated the purpose of the research, the importance of confidentiality and anonymity, and what would happen with the data I gathered. I restated that the interviewee's participation was voluntary, he/she could withdraw at any time, and a participant's name would not be revealed without express permission. Interviewees were then requested to read and sign the consent form; this included consent to be interviewed and for the interview to be audio-taped, as all interviews were recorded using an iPad.

While a standardised approach to all interviews was adopted, there was variability in the level of cooperation and recollection. I consciously endeavoured to conduct each interview in an impartial and consistent manner. As far as possible, the same questions were asked in the same way (recognising flexibility was required in a few instances). Once each question was posed, clarifying remarks were sometimes required. My aim was to allow each interviewee to answer with minimal interruptions; however, they were prompted when more detail seemed appropriate. If there was a need to encourage additional information, this was done, as far as possible, using neutral, impersonal encouragement. My personal opinions were withheld, and any responses from me were restricted to cursory comments, other than clarifying questions when asked or requesting additional comments on matters for which participants clearly had useful information.

Occasionally, the participants were prompted to bring the conversation back on track, but most of the speaking was left to the participants. Consequently, I listened and wrote far more than I spoke. I took comprehensive written notes during the interview, enabling me to confirm and reinforce key points during the interview and to readily revert to a previous answer for clarification purposes. My notetaking was primarily to ensure that I was fully engaged and enabled me to recall key points made earlier in the interview; this reinforced to the interviewees that I was listening attentively. Notetaking also enabled me to limit eye contact while the participants gave their answers. Given I was aware of the different views many of them had of the RAP/rezoning process, I consciously controlled my body language and eye contact to minimise how they might perceive my response to their answers. My notetaking was not aimed, however, at capturing the nonverbal elements of the interview.

Most participants were happy to engage and undertake both the verbal exchange and the form-filling parts of the interview. The majority of participants had different perspectives given their different roles in the RAP/rezoning which influenced the way they answered. Interviewing has been likened to 'prospecting for the true facts', leading to '...the generation of rich data as the

interviewees are guided in accessing multiple layers of experience...' (Schultze & Avital, 2011, p. 5). Where it was desirable, the interviewees were encouraged to expand on their answers as much as they felt comfortable. Not all the interviews went according to plan. One interviewee (Political P2) decided the completion of the tables and ranking their answers was not something he felt comfortable doing, so that was an awkward moment. In that instance, I had to revert to a modified form of the interview to gain useful answers. We completed the interview, albeit in a modified form, but that resulted in one set of quantitative answers being omitted from my analysis. All the remaining interviewees completed the tables, although it was clear that some interviewees were more thorough than others in the way they undertook those tasks. The values and beliefs of all interviewees were respected, and the challenge was '...extracting information as directly as possible, without contaminating it...' (Miller & Glassner, 1997, p. 153).

The differing relationships between each participant and me undoubtedly influenced the way they answered in the interview. It is hard to determine how much the interview answers were influenced by my interactions during the RAP/rezoning process with each interviewee. Judging from the responses I received, most interviewees spoke candidly about the situation they experienced at the time of the RAP/rezoning. Sufficient time had passed for most interviewees to speak openly without too much resentment or culpability. It is possible that some interviewees may not have been so open if they had not known me or my role in the RAP/rezoning process. Conversely, knowing these aspects may have meant some participants were more guarded with their responses. In several interviews, mutual experiences with the RAP/rezoning experience were shared with interviewees. This had several advantages; for example, a more relaxed beginning to the interview, mutual understanding of the topic being discussed, and a better understanding of nuanced reactions of the interviewees (Kacen & Chaitin, 2006; Padgett, 2008). Such informal exchanges or interactions, however, were not the norm and the majority of interviews followed a similar, standard format.

The length of the interviews varied depending on how engaged and talkative the interviewees became; the longest interview was 2 hours 38 mins; the shortest interview was 52 mins (the average duration over the 38 interviews was 1 hour 27 minutes). A total of 53.6 hours of interviews were recorded comprising the 38 interviews. The quantitative tables completed by each participant during the interview were on yellow paper, whereas my notetaking was on a version of the questionnaire on standard white paper with sufficient space for notes. These yellow-coloured pages minimised confusion during the interviews and helped to facilitate the subsequent analyses. Three methods of recording answers during the interviews ensured the research was as rigorous as possible and provided a sufficient range of good quality data (Mason, 2010):

1. The recorded transcriptions provided a substantial amount of valuable information, allowing the key excerpts/quotes to be highlighted to illustrate the critical points and explained the reasoning behind their quantitative scores or rankings.
2. The tables completed by the interviewees ensured that the data used for the analysis was accurate.
3. My notes taken during the interviews also proved useful in the analysis as they helped to focus on the key points.

Upon the completion of each interview, the relevant documents were stapled together to produce a separate 'package' for each interview; that is, the signed consent form, the completed (yellow) sheets filled in by each interviewee, and my detailed notes. Each package was then given an

interview code related to the interview type (see Table 2.2). This ensured anonymity when analysing or presenting the data. Following the interview or as part of the analysis, answers that seemed contradictory were cross-checked using triangulation.

2.7 Methods of analysis

2.7.1 Interview transcriptions

The digital recordings from all interviews were converted into written transcripts to assist with a more detailed analysis of specific comments from each participant. Transcribing and coding of all the interviews was undertaken solely by me as the researcher. With assistance from JCU's Directorate of Learning, Teaching and Student Engagement (Mr Adrian Van Rossum), a licence for *Transcriptor* was purchased (USD$299). *Transcriptor*, in conjunction with *Speechmatics*[13] were both used, and Adrian Van Rossum subsequently provided support both in time and expertise using other software programs to help reduce background noise on the audio tapes and reconfiguring the audio files into a format that was better recognised by the *Transcriptor* software. Initial auto-transcriptions were therefore undertaken for all interviews.

Despite various improvements suggested by the software company, all the initial transcriptions continued to have errors that needed to be manually corrected to ensure the transcripts made sense. Certain words were consistently mis-interpreted (for example, acronyms like GBRMPA that were frequently used in the interviews were transcribed as 'Grandpa') and the differing accents and enunciations of the interviewees produced some amusing parts of the transcriptions. The level of corrections required remained higher than I had hoped; approximately 40-50% of the words in each interview transcription needed correction. Manual correction of the transcripts was a slow and tedious process. I undertook this while repeatedly listening to the audio tapes for the analysis. There were, however, benefits, as I heard numerous times what the interviewees were saying, which reinforced the main points and enabled verbatim transcribing of the key aspects. Repeated playbacks reinforced the key topics and concerns. It also enabled me to reflect on what was said in each interview, to assess how the points raised related to other interviews and helped me develop the main points for each chapter.

2.7.2 Data analysis

The five research questions were addressed separately, informed by sequential qualitative and quantitative data analyses. Initially I considered using a qualitative analysis software program (e.g., NVivo). A discussion with NVivo trainers and my advisors led me to recognise that a systematic approach to the analysis could provide an effective and much cheaper result, especially as I could spend as much time coding for NVivo as I would undertaking a manual analysis. I therefore chose to carry out the analysis 'by eye and by ear', which enabled me to be '...close to the data and have a hands-on feel for it without the intrusion of a machine...' (Creswell, 2014, p. 264).

Greene (cited in Tashakkori et al. 2020), proposed four phases of data analysis: data transformation; data correlation and comparison; analysis for inquiry conclusions and inferences;

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[13] *Transcriptor* (https://digitalanarchy.com/transcribe-video/transcriptive.html);
Speechmatics (https://www.speechmatics.com/)

and, using aspects of the analytic framework from one methodological approach within the analysis with data from another approach. In the early stages of the research, both qualitative and quantitative data contributed, although in certain chapters (e.g., Chapters 4, 6, 7), the qualitative data were predominant and greater weight was attributed to them in terms of their contribution to the overall findings. However, this did not mean that the quantitative data had less value where they were available and relevant.

Relevant excerpts from the interviews were copied initially into separate files for each of the four key factors, noting some interview excerpts addressed multiple factors. For my qualitative analysis, I adopted a deductive reasoning approach. Having collated the data, I used a thematic analysis to explore some preconceived themes that I was expecting based on a review of relevant literature or pre-existing knowledge. I then explored whether the data challenged or resonated with those theories or accepted approaches, or whether it provided a new perspective. For example, the concept of 'a lattice of leadership' referred to in Chapter 4 initially came from the literature, but the interviews led me to apply this existing concept in a different way.

Sorting and categorising excerpts from the transcripts provided an opportunity for '...indexing or categorizing the text in order to establish a framework of thematic ideas...' (Gibbs, 2007, p. 38). My thematic groupings were related to the key factors and their associated words (e.g., leadership, leader, CEO, director, teambuilder, strategic, inspirational). Successive cycles of categorising, re-categorising, and codifying '... further manages, filters, highlights and focuses the salient features of the qualitative data record for generating categories, themes and concepts...' (Saldana, 2013, p. 8).

Searches of the WORD transcripts were undertaken using key words/phrases, based upon the research questions and the relevant literature. This was an iterative process, going back and forth from the transcripts, copying appropriate quotes into the relevant parts of the analysis. Through the analysis of the transcripts and listening to the audio recordings multiple times, I identified where interviewees referred to the key factors contained in my research questions. This is expanded in Chapters 3, 4, 5 and 6 where specific quotes are used to highlight key aspects of the relevant theme. It was important that the views and perspectives of the participants in the case study were deliberately and clearly highlighted throughout the relevant chapters to elucidate the findings. Some parts of the transcriptions that were not used in this thesis were not totally corrected. However, any key aspects of the interviews and all quotes used in the thesis were listened to repeatedly and checked to ensure the words were transcribed verbatim.

As expected when interviewing a wide range of people from diverse backgrounds with differing motivations, it became apparent during the interviews that some of the participants knew specific parts of the RAP story in detail. Few, however, demonstrated they had a thorough understanding of the entirety of the RAP/rezoning policy process. Their knowledge of different components of the process showed considerable variation compared to their knowledge of the full story. A few interviewees confirmed a minimal understanding of the process, while others demonstrated a comprehensive knowledge, but only for a specific aspect of the complex policy process. Understanding those aspects of the RAP/rezoning that fell outside their area of interest/expertise was (mostly) far less or negligible, and in several instances misinformed. For example:

- Many interviewees had minimal comprehension of the complexities of the boundary between State and Federal waters in the GBR and the problems if a complementary approach to management was not maintained.

- Most politicians had a poor understanding of how the GBR ecosystem 'functioned' or was managed, or why 100% scientific certainty was unrealistic in a dynamic natural ecosystem.
- A few politicians focused their attention on aggrieved constituents from just one sector, trusting those constituents and their perspectives. Those politicians seemed to be unaware of, or were unwilling to acknowledge, other perspectives.
- A few scientists assumed they knew more about the political processes than how it unfolded in reality and were disappointed that the 'centrality' of the science was not more influential throughout all stages of the rezoning.

Quantitative data from the tables completed by the interviewees were entered into Excel spreadsheets to assist in identifying key patterns and subsequent analyses. I used a variety of means for coding and codifying – for example, colours, numbers, and generic types of actor (in place of individual's names as shown in Chapter 4, Table 4C). Examples of some of the data and how they were analysed are provided in Chapters 4 and 7.

As the researcher, I had to accept and deal with mixed and sometimes contradictory views, feelings, thoughts, or recollections in the interviews, recognising they were the perspectives of those individuals and a reality of the interview process. The process of corroborating evidence from different individuals was used to gain confirmation and to show commonality of perspectives. I was able to triangulate and reinforce various aspects based on the interviews and personal knowledge. In addition, I was also able to develop a better understanding of various aspects about which I was previously not aware, including a number of the political aspects. For these reasons, triangulation was important when analysing the data.

Checking with interviewees, referred to as 'member checking' (see footnote for Table 2.2), was also undertaken to enable participants to check their quotes and see the context where their quote has been used. This enabled the participants to check their wording as well as my interpretations, and how I had applied their perspective in the research (Buchbinder, 2011). I appreciated the importance of member checking, having previously participated in interviews myself. Consequently, eight of those interviewed (21% of the original interviewees) were consulted again as I finalised draft chapters to either check their quotes and/or to confirm the correctness and the context of what had been drafted. This had unexpected benefits as several participants not only thanked me for checking, but also provided additional supporting information that was pertinent to my research.

Following the thematic analyses, the analysed data were depicted in various ways (e.g., in Chapter 4, Word Clouds were chosen to best portray the relative roles of the major actors in the three phases of the RAP/rezoning; whereas Table 4.6 appears as a color-coded 'patchwork' that seemed to best illustrate the concept of a 'lattice of leadership').

2.7.3 Data retention

Copies of the transcriptions and audio files have been retained at the ARC Centre for Coral Reef Studies at James Cook University in a locked filing cabinet. As the audio files form part of the oral history of the GBR, it has been suggested to me that copies should also be lodged with an appropriate library. The implications of doing this will be investigated once the PhD is completed.

2.8 Discussion relating to the research approach

2.8.1 Pros and cons of being an insider researcher

Table 2.5 explains the advantages and disadvantages of being an insider for research. As most participants knew me, it was important for me to consciously limit the way any personal biases or

preconceptions might hamper any interactions with those I interviewed. In my research, bias was minimised in various ways, including the choice of a wide range of participants for the interviews (see section 2.5.1), being as objective as possible while undertaking and coding the interviews, and keeping an open mind during the analyses. Dwyer and Buckle (2009) also highlighted an important caution:

> ...It is possible that the **researcher's perceptions might be clouded by his or her personal experience** [emphases added] and that as a member of the group he or she will have difficulty separating it from that of the participants. This might result in **an interview that is shaped and guided by the core aspects of the researcher's experience and not the participant's**. Furthermore, its undue influence might affect the analysis, leading to **an emphasis on shared factors between the researcher and the participants and a de-emphasis on factors that are discrepant**, or vice versa... (p. 58).

The interviews provided an effective way for the interviewees to give their perspectives without being influenced by my experience. In doing so, however, the interviewees confirmed many aspects about which I was aware as I had been involved in those aspects directly or indirectly during the RAP/rezoning. Furthermore, various interviewees provided new information about certain aspects of the RAP/rezoning for which I was not directly involved or had less experience. For example, a number of the interviewees were more involved in the political negotiations and specific aspects of agency leadership than me, as these areas were not my direct responsibility during the RAP/rezoning program. Undertaking the interviews, and listening again when transcribing, filled in various important details of which I was previously unaware.

Assurances were given at the commencement of each interview that confidentiality was critical to this research; confidentiality was also one of the conditions on the *Informed Consent Form* signed by each participant. However, I also stressed prior to each interview that it was possible that some quotes would be extremely pertinent to my research, and I may subsequently seek some interviewees' approval to use specific quotes along with their names in my thesis. All interviewees agreed with this approach.

Following my analyses of the interviews, there were various quotes that I was keen to use verbatim, as they conveyed significant parts of the RAP/rezoning story. While most interview quotes could be anonymised, there were instances where it was obvious who said the quote (for example, when the interviewee said he trusted Virginia Chadwick and that gave him the confidence to therefore approve the commencement of the RAP/rezoning). In the 12 instances in the thesis where it was obvious who said a specific quote, it seemed pointless trying to anonymise those quotes. Consequently, specific written approval was obtained from the six interviewees who are named in the thesis; this approval confirmed their endorsement of the publication of their particular quotes along with their name.

Table 2.5   Pros and cons of being an insider for the research, and how I dealt with them

Issue	Pros/cons of the issue	How the issue was addressed during my research
My background did influence what I chose to investigate, and how I went about it, including the analysis. These biases and beliefs inevitably influenced the research conclusions. It is also possible that some preconceptions also helped me to better understand what I was researching.	A detailed knowledge of the rezoning process (albeit not all aspects equally) enabled me to understand the points that were raised in the interviews, to recognise what were significant points and to focus on those most relevant for the analysis of the policy reform. At the same time, my role, and association with those who were discussed in the interviews had the potential to cause a few participants to modify what they otherwise might have said.	It was important for me to remain as objective as possible during the research. This included maintaining an awareness of any biases, preconceptions, and perspectives throughout my research. My reflexivity included systematically thinking through the issues at each stage of the research process, and recognising any preconceptions, assumptions, and beliefs as clearly as possible.
An ability to learn more and modify some preconceptions.	The interviews provided a broad awareness of all aspects of the policy reform process and addressed my knowledge gaps and preconceptions.	I developed an increased understanding of some aspects of the RAP/rezoning during the interviews and this was reinforced during the analyses; these led me to modify some preconceptions.
Whether any answers provided in the interviews were influenced by my presence	My role in the RAP/rezoning was mentioned by many participants, and some interviewees chose to discuss that role in their answers	Despite my specific request that all answers be totally candid without any consideration of my role, it is likely that a few interviewees chose their wording carefully or deliberately chose to modify or curtail their answers considering my role or association with others.
Several comments made by participants during the interviews contradicted the views of other participants or my own perspectives	When comparing all the interviews, there were mixed, and sometimes contradictory views, recollections, feelings, and thoughts provided. All the statements presented in the interviews needed to be accepted at face value, irrespective of whether I considered them to be correct or otherwise.	During the interviews, I refrained from eye-contact for much of the interview, instead writing copious notes as the interviews progressed. When conflicting views were provided, I subsequently cross-checked by triangulating against what was stated in other interviews and personal knowledge.
Confidentiality during the interview	Several interviewees mentioned certain aspects in confidence; this may not have happened if I had been an outsider or was not trusted.	Prior to the interview I stressed that all comments made were confidential; this was respected throughout the research. In finalising the thesis, I sought express agreement to use any names or quotes that were identifiable.

Issue	Pros/cons of the issue	How the issue was addressed during my research
All the interviewees understood I was involved in the RAP/rezoning process, although some knew more about my role than others. Several of those interviewed were in more senior positions at GBRMPA and some were, at various times, my direct supervisor. Other interviewees were my peers while some were subordinates during the RAP process.	My role in the RAP rezoning was not something I could change or ignore during the research. One positive aspect was that access to some interviewees (especially those outside the agency) might not have been obtained if they had not been aware of my role in the process. They were able to be convinced that it was worth their time and effort to be interviewed.	I conducted all interviews in exactly the same manner, irrespective of whether the interviewee was a previous supervisor, a subordinate, or the Minister. If an interviewee began to mention my role in the RAP/rezoning, I specifically reminded them that any answers should be candid. All agreed to be candid. See also Section 2.8.2 on 'Minimising subjectivity and bias through reflexivity'.
Impartiality during the analysis	Some researchers might consider that I was not impartial in the analyses, '...leading to an emphasis on shared factors ... and a de-emphasis on factors that are discrepant...' (Dwyer & Buckle, 2009, p. 58)	I consciously tried to minimise any bias by being as objective as possible while analysing the interviews, keeping an open mind in the data analyses, and choosing the most appropriate quotes across a range of views where relevant. However, it would be naïve to assume that such a research process is not subject to some personal research bias.

2.8.2 Minimising subjectivity and bias through reflexivity

There is considerable debate in the qualitative methodological literature about concepts such as 'objectivity', 'subjectivity', and 'bias' (e.g., Finlay 2002; Peshkin, 1985, 1988, 2000; Preissle 2008; Roth & Breuer, 2003; Roulston & Shelton 2015). Those who adhere to foundationalist perspectives believe researchers should be 'neutral', 'objective', 'impartial' and 'dispassionate'. In contrast, new-

paradigm researchers are encouraged to be '...explicit about their subjective positions and points of view, and actively manage these through reflective practices... ' (Roulston & Shelton 2015, p. 338). Bias is considered a lack of objectivity, and may take various forms, such as observation bias, selection bias, investigator bias, confirmation bias and response bias (Chenail 2011; Ogden 2008; Roulston & Shelton 2015). Various authors (e.g., Berger 2015; Finlay 2002, 2008; Finlay and Gough 2003; Olive, 2019) advocate for self-reflection or 'reflexivity' in qualitative research, where researchers '...can and should use [reflexivity] to legitimize, validate, and question research practices and representations...' (Pillow, 2003, p. 175). As Olive (2019) explains, '...reflexivity helps us remain engaged with our subjective assumptions and experiences, and negotiate how the experiences, ideas, conversations, theories we have gathered through our research have all folded into and through us...' (p. 123). Reflexive approaches can be applied years after data collection to re-examine investigations and to find new insights (Olive, 2019).

I undertook self-reflection in various ways during the research. These included identifying opinions and observations at the start of the research, and then reflecting, sensing, and thinking about what I heard during each interview (this equates to 'introspection' in Finlay, 2002). When interviewing, being self-aware and reflective helped me to identify issues or content that needed to be avoided or emphasized with certain interviewees knowing their attitudes towards the RAP/rezoning. When undertaking the content analysis, I deliberately chose to '...keep thinking conceptually; translating sentimental or interpersonal thoughts into more theoretical ones...' (Miles et al., 2014, p. 298). I was reassured by the comment in Flyvbjerg (2006) that stated, '...the case study contains no greater bias toward verification of the researcher's preconceived notions than other methods of inquiry. On the contrary, experience indicates that the case study contains a greater bias toward falsification of preconceived notions than toward verification...' (p. 21).

The analysis also reinforced that various methods that were used and considered appropriate at that time of the RAP/rezoning (e.g., a reliance upon hard copy written submissions), are now likely to be outmoded and need to be updated.

2.8.3 Research challenges and limitations

During the research, various challenges or limitations were encountered, especially while interviewing, transcribing or during the subsequent analyses. These challenges are outlined in Table 2.6 below, along with lessons learned if similar challenges are faced by other researchers.

Table 2.6   Research challenges, limitations, and the lessons I learned

Instance	Challenge	Lessons I learned
Researcher effects	Miles et al. (2014) describe two sources of researcher effects, that is, '...the effects of the researcher on the case and the effects of the case on the researcher...' (p. 296).	My position during the RAP/rezoning had advantages but also disadvantages during the interviews. I was known by most participants and had a good understanding of the complexities of the rezoning. At the same time, my position, and my working relationships with some of those who were mentioned by interviewees, may have influenced how some interviewees spoke about the RAP/rezoning or about others who were involved.
Recording interviews	Using a tape recorder or iPad on a desk can be problematic, particularly if there is a lot of background noise or if the interviewee periodically turns away. Any background noise makes transcription so much harder.	There is a need to choose a location that is relatively quiet if audio recordings are being made. The background noise in a coffee shop or restaurant is often more intrusive than expected and can hinder transcriptions. Using a lapel microphone would have helped to address these problems. In addition, the noise reduction techniques applied to the raw audio files by Adrian Van Rossum (JCU) were extremely helpful.

(Table continued on next page)

Instance	Challenge	Lessons I learned
Limitations of audio recordings	A limitation of an audio recording is its ability to capture only a partial representation of the complete interview. Non-audible aspects (such as body language, facial expressions, etc) are not recorded.	If I had used a video camera/recorder, then non-audible aspects of each interview would have also been recorded. However, analysing video recordings including all non-verbal aspects would have been much harder and resource intensive.
Auto - transcribing (#1)	Different accents may mean that different transcribing tools are needed; it was not until I used an Australian language version of the software that I obtained far better success with more accurate transcriptions.	I learnt that different language versions of *Transcriptor* do exist (e.g., audio files can therefore be assessed using an Australian, American or UK language version).
Auto - transcribing (#2)	Frequently used acronyms may not be easily transcribed (e.g., GBRMPA was auto-transcribed as 'Grandpa': RAP was variously transcribed e.g., 'wrap').	Minimise as far as possible the use of acronyms in interviews – use the full names whenever possible.
Concerns about recording the interview	Some interviewees were less comfortable knowing their answers were being recorded, whereas others indicated they had no concerns about what they said for the tape. Most interviewees quickly forgot they were being recorded.	I stressed the recordings were for my research only and that while I hoped to use key quotes, any individual would not be identified beyond a broad label (e.g., Interviewee P4) unless permission was given. I also confirmed I would check any quotes specifically attributed to an individual before publication.
Analysis of leadership traits (#1)	The question on traits assumed that all interviewees equally understood all traits. From the responses I received during the interviews, some traits were well understood by all (e.g., 'Securing political support'), whereas other traits were less obvious (e.g., 'Ability to switch thinking between 'big' picture and detail') and may have been interpreted differently by the interviewees.	In hindsight, I should have provided a short description to define each of the traits or else provided synonyms. It is possible that would have ensured more effective assessments of the skills for each individual (and possibly between certain individuals?). Possible examples of synonyms are provided in the right-hand column of Table 4.5 in Chapter 4.
Analysis of leadership traits (#2)	The comparison across individuals against various leadership traits as shown in Table 4.5 assumed all the traits were equal.	There is a danger in rigorously applying quantitative analysis for qualitative social sciences; consequently, comparisons about leadership traits (e.g., Table 4.6) should be seen as relative ranking of skills for an individual, rather than as conclusive comparison between individuals. Asking interviewees to allocate a predetermined weighting to different traits for an individual rather than just ranking the traits may be informative, provided the dangers of using quantitative scores are not misinterpreted.

Instance	Challenge	Lessons I learned
Analysis of leadership traits (#3)	While each interviewee was asked to choose four leaders to assess (and one would assume they had knowledge of the four people they chose), clearly some interviewees had a better understanding of certain individuals or what the role of those leaders in RAP entailed (e.g., Table 4.4 shows 30 interviewees chose the GBRMPA CEO, compared to five who chose the ENGO Campaign manager).	Some answers about various leadership traits were undoubtedly well informed whereas others were only a guess (several interviewees indicated they did not know, while others took their best guess, so there were differing levels of certainty in some answers). Comparisons between individual leaders should not be made solely based on these numbers.
Time between the date of involvement and the interviews	It is important to remember the interviews occurred in 2015 and 2016, in most cases more than 15 years after RAP/rezoning occurred over the period 1999-2004. The passage of time undoubtedly influenced the awareness and recollection of some interviewees.	Little can be done to address this dilemma; clearly a few interviewees undertook preparations prior to the interview, refreshing their memories, while others did not. I used triangulation and double-checking against other sources whenever possible to confirm the validity of inconsistent data.
Recollections influenced by previous questions/ answers	Names chosen by interviewees to answer Q. 6 (which led to the six most identified leaders) were likely influenced by their earlier answers given in Qs. 2 and 3.	The names chosen by some interviewees were based on their recollections, while other names were likely to have been prompted from previous questions, or possibly, because I was sitting opposite.
Checking draft quotes with key interviewees	It is important to confirm that any quotes used in the thesis or in subsequent publications have been transcribed and attributed correctly.	Member-checking (see Table 2.4) was important, noting there are likely to be differing opinions on various issues. All those I contacted for checking their quotes were happy to do so, and often provided additional useful information.
Making more from the interviews	A lesson learned (only in hindsight) was the opportunity to make more from an interview. Rather than just going through the interview transcripts looking for quotations that related to my research topic(s) and then grouping those quotes together, my analyses would have been improved if I had also considered *position* (i.e., what was said, and how, in response to my questions).	This is explained by Silverman (2017) who noted ' ...A robust analysis of interview data must attend to the way in which interviewees *position* what they say in relation to the actions (or inactions) of the interviewer... [whereas many researchers] list features of what interviewees say and ignore positioning...' (p. 152). Holstein and Gubrium (2016) noted, '...the challenge ... is to carefully consider what is said in relation to how, where, when, and by whom narratives are conveyed, and to what end...' (p. 79).

2.8.4 Validity and transferability of the methodology

As part of my research, I assessed various aspects of 'validity' and 'transferability' of the methodology, along with the implications for the research. Table 2.7 outlines these issues, some of which may prove useful for other researchers.

Table 2.7   Issues of validity or transferability

Issue	Explanation	Implications
Validity of the methodology	The research techniques applied (e.g., semi-structured interviews, triangulation, literature reviews and web-based searches) are all standard approaches in this type of mixed methods qualitative research.	The interview procedure was systematic and transparent, and the overall methodology used in the research was appropriate and valid. Wherever possible and as far as was practicable, I cross-checked the validity of the data.
Sufficient sample size and variability to ensure 'quality data'	Ensuring a purposeful list of interviewees spread across the wide variety of interest groups ensured sufficient quality data was provided. As noted by Mason (2010), '... the sample size is irrelevant as the quality of data is the measurement of its value...' (p. 14).	Purposefully developing a list of interviewees spread across the range of interest groups was important to ensure all aspects of the policy reform were considered and a range of good quality data were provided. Similarly, the breadth of the interview questions (both closed and open questions) and the available time for comprehensive answers contributed to the good quality data.
Research costs	The most expensive aspect of the research was travel to undertake the interviews (24 interviewees lived outside Townsville). Telephone interviews would have been easier and cheaper; however, they would have lost the benefits of face-to-face interviews.	Oltmann (2016) compared face-to-face interviews and telephone interviews, showing both have their strengths and weaknesses. Researchers should select the interview mode most appropriate and logistically feasible for their specific project.
The time and effort taken to undertake transcription corrections	Repeatedly listening to the audio recordings for corrections was tedious. It did, however, enable a greater appreciation of the views of all participants, and ensured the quotes used in the thesis were verbatim.	The 'final' transcriptions were not corrected in their entirety; however, the audio recordings remain available if further exploration of the topic is proposed.

Issue	Explanation	Implications
Transferability	Inference transferability is '...the degree to which the conclusions from a mixed-methods study may be applied to other settings, people, time, periods, contexts and so on...' (Tashakkori & Teddlie, 2009, p. 27).	The four key factors are widely applicable so the research approach could be readily transferred. In broad terms, the overall results are transferable elsewhere, whether it be for the purposes of conservation or resource management. However, specific results are unlikely to be readily transferred elsewhere as the interviewees spoke solely about the GBR situation. One unknown is the relevance (or otherwise) of my role in the RAP/rezoning process, and how the response might differ for someone who was not involved in the process or who was unknown to most interviewees.
Interviews are more than just what the interviewee says	'... Regardless of how interviewers try to restrain their presence in the interview exchange, and no matter how forthright respondents are in offering their views, the resulting narratives are interactional accomplishments, not communicatively neutral artifacts ...' (Holstein & Gubrium, 2016, p. 68).	Silverman (2017) suggests that '... analysis of interview data must begin with a transcript that preserves the basic features of interviewer-interviewee talk including 'response tokens' ("mmm"), pauses and overlaps...' (p. 149). The absence of such features means the reader can only speculate about the interactional basis for the interview. In hindsight, my analysis should have considered the wider aspects of the interviews, not just identifying and grouping excerpts that illustrated the key points I wanted to emphasize.
Repeatability	Is the methodology repeatable in the GBR, and if so, what might be the implications?	Assuming there is another major policy reform in the GBR, then I foresee no reasons why approaches similar to those I used in this research should not be considered.
How useful/valid are lessons learned from a policy process undertaken decades ago?	The legislation that guided the RAP/rezoning process has been updated, and the planning process today is basically similar. Many challenges comparable to those addressed in the RAP/rezoning are likely to face any future major policy reforms undertaken in the GBR.	Certain aspects (e.g., the scientific knowledge, the need, and ways to engage the public) have evolved over the decades although the fundamental planning processes and challenges remain the same. Similarly, the relative importance of politics has not changed over the decades. The methods applied in the RAP/rezoning to engage the community were appropriate for the time. Some methods, however, are now dated given today's knowledge, and need to be updated.

2.9 Conclusion

In this chapter, the rationale for the methodology used in the research has been explained. The semi-structured interviews were a fundamental part of the research methodology, and these led to audio recordings and comprehensive transcripts. The qualitative and quantitative data from those interviews provided a wealth of information. The data were used to address my five research questions and provided a comprehensive analysis of the policy reform process that comprised the RAP/rezoning. In the following four data chapters (i.e., assessing science, leadership, public engagement, politics), excerpts from the interviews are used to illustrate important points within each chapter (for example, section 3.7 provides quotes from 15 interviews to illustrate different perspectives about the role of science in the RAP/rezoning).

Chapter 3 – The role of science and scientists in the RAP/rezoning

3.1 Introduction

Chapter 3 focuses on the role of science in environmental policy, especially as it applied in the RAP/rezoning. A literature review highlighted aspects relevant to this topic such as scientific uncertainty in policymaking, and the recognition that attributes such as drivers, timeframes, and expectations of scientists differ from other key groups involved in developing policy. Biophysical and social sciences both provided fundamental underpinnings for the RAP/rezoning, so this chapter explores their respective roles in environmental policy, and specifically in the GBR. Various applications of science used in the GBR planning process are examined, including the role of the scientists in developing the map of GBR bioregions and the planning principles applied during the RAP/rezoning. Other aspects include the application of social science principles and the available fisheries data, the use of surrogates when planning and the usefulness of decision-support tools in marine spatial planning. These aspects are considered when addressing the first of my research questions; what was the role of science and scientists in the GBR RAP/rezoning?

3.2 Science, scientists, and environmental policy

3.2.1 What is the role of scientists in policy processes and how is that changing?

Most environmental managers and scientists today would agree that science and scientists can, and should, play an important role in any environmental policy process. Three ways that this might occur are outlined by Levien (1979):

> … First, science and scientists can provide a clear understanding of the basic dimensions of environmental problems, identifying both what is known and what is uncertain. Second, science and scientists can then describe and identify options for the appropriate solution of those problems, some of which might not be considered by political decision makers. Finally, science can contribute to the resolution of environmental problems by estimating the economic, social, environmental, and political consequences of proposed solutions through time and space, and across population groups... (Levien 1979, as cited in Steel et al., 2004, p. 3).

This was reinforced by Lackey (2007) who raised a dilemma for scientists wishing to interact with policymakers and stakeholders:

> ...[a scientist's] role is not described adequately under the current and simplistic rubric of providing the best available science or good science ... scientists are often asked to contribute scientific information in the midst of clashing values, differing preferences, and opposing, often mutually exclusive, societal priorities ... (p. 13)

Bowler (2005) noted that managers do not 'manage' natural systems. They do manage the human activities that influence those systems, and it is these human/ecosystem interactions upon which policies and management strategies need to be focused:

> ...decision-making is always a negotiation among a variety of agents involving societal choices, trade-offs, and value judgments... In this context, the views and values of natural scientists are no more valid than those of other stakeholders. So, when it comes to making management decisions, all stakeholders are, or should be, equal participants. The management plan that reflects the values and desires of as many stakeholders as possible is also the one most likely to work... (p. 3).

Carr et al. (2019) explain the interaction between science and policy is often iterative: policy defines the need for scientific information, and the resulting science shapes future policy. Watson-Wright (2005) describes how environmental policy making is often an evolutionary process that begins with a science 'push' but is punctuated with policy 'pulls'. Once the policy makers (initially the managers and subsequently the decision makers) become engaged, they increasingly seek two particular aspects from science. Firstly, scientific advice that actions will improve the situation, showing benefits of the proposed policy; and secondly, scientific support to make the policy more credible to the public. Scientific credibility is important so the public will support the adoption of the policy and compliance once it has been adopted. A fundamental role of scientists during MPA planning therefore is to assist the management agency so that the agency's decisions are more defensible. Such assistance includes identifying what is known, and also what is unknown or uncertain. Steel et al. (2004) suggest the traditional role of science and scientists in the policy process is:

> ...to provide relevant expertise about scientific data, theories, and findings that others in the policy-making process can use to make decisions, not to make the decisions themselves or to be advocates of particular policy positions. The assumption is that they are neither policy experts nor trained in the intricacies of environmental management… (p. 4).

Steel et al. (2004) propose that individual research scientists should get involved in public decision-making, '… providing expertise and even promoting specific strategies that they believe are supported by the available scientific knowledge …' (p. 4). The ability of scientists to influence the policy process, either through more traditional methods or a more integrative approach, is

dependent on factors such as competence and integrity (Underdal (2000) cited in Steel et al., 2004). An additional skill should also be added, being the need to understand how decision making occurs, including the political process. The involvement of scientists in environmental policy processes therefore necessitates the development of additional skills to those required within the scientific realm. These skills include political awareness and an ability to communicate scientific concepts in a way that may be understood by a person who does not have a scientific background; '...to contribute effectively, scientific information must be accessible, understandable, relevant, actionable, and credible...' (Sullivan et al. 2017, p. 3).

3.2.2 Differences between scientists, managers, and politicians

Whilst improved interaction between research scientists and environmental managers is encouraged, the philosophical and practical differences between the two groups are not well understood, adding to the complexities for interaction. These differences are explained by Lawrence et al. (2002) against eleven differing goals, views, drivers, expectations, and time frames listed for scientists and managers. Lawrence et al. (2002) observed the relationship between GBR managers and scientists had at that time (i.e., midway through the RAP/rezoning), '...matured to a point where the collaboration is now formalised and productive...' (p. 136).

Building upon the differences outlined in Lawrence et al. (2002, pp. 137-138), Table 3.1 shows that politicians (who are usually the decision makers) also have significant philosophical and practical differences when compared with scientists and environmental managers. While Chapter 6 is where I concentrate on the politics of the RAP/rezoning, Table 3.1 is introduced here to highlight the differences between scientists and the other two groups, recognising that all three groups played important roles in the overall policy reform process.

Table 3.1 Philosophical and practical differences between scientists, environmental managers, and politicians/decision makers

Note: the first three columns in the table (Factor, Scientists, Environmental Managers) are taken directly from Lawrence et al. (2002); the right-hand (coloured) column for Politicians/decision makers is my wording.

Factor	Scientists	Environmental Managers	Politicians/ decision makers
Status	higher education valued and equated with status; peer opinion valued	practical experience valued more than higher education; public and political opinion valued	political 'experience' or 'nous' and position in political hierarchy valued over practical experience or education level
Skill base	technical and intellectual skills, individual skills emphasized	communication, problem-solving, team working, integrating skills emphasized	intellectual, problem-solving, communication and networking skills valued
Valued action	intellectual thinking, conduct of research, sound experimental design: valid statistical analysis, good sampling techniques	practical doing, decision making, finding solutions, problem solving, satisfying clients	outcomes focused; conflict avoidance and management, ability to influence (both up and down); satisfying party (primarily) and constituents (secondary)

Factor	Scientists	Environmental Managers	Politicians/ decision makers
Time frame	whatever is needed to gather information, and which will allow reasonable confidence in interpretation - usually long-term	relates to nature of problem usually immediate short-term	usually immediate or short-term; rarely outside the political/election timeframe (3 years?)
Primary goals	increase understanding; acquire knowledge; increase funding for objectives; scientific research; achieve concrete results	solve immediate problems; implement statutory achieve philosophical or esoteric concepts such as ecologically sustainable development'	outcomes focused, satisfying party values (primarily) and constituents (secondary); occasionally philosophical, patriotic goals
Language	scientific shorthand for concepts and statistical terms; cautious phrasing: tends to be exclusive: complex terminology; reluctance to simplify	bureaucratic terminology; extensive use of acronyms; more inclusive; aim of language is clarity of understanding but within a complex bureaucratic and political culture	aim of language is persuasion; tends to be cautious, rarely making a firm commitment up front; may be bureaucratic
Basis for Decision Making	data, concrete scientific evidence	information extracted from science but generally reinterpreted within management's own cultural milieu: values and opinions have strong position	political philosophy/credo' political correctness; what fits in the party-platform? (unless it is a new policy initiative). Personal/party implications often the basis for decisions.
Expect-ations	knowledge and understanding never complete; more science and information leads to better decisions	requires clear advice from science, and specific answers to questions, more science and information does not necessarily lead to better decisions	usually expects a lot (especially if a Minister or Ministerial advisor!) Expects/wants deliverables ASAP to be able to show constituents or his/her political leader
Intellectual direction	*economists*: cost benefit analysis and efficiency, financial control, *natural scientists*: environmental protection and quality, ecological processes, an understanding of the workings of nature *anthropologists and psychologists*: community viability, social and cultural uniqueness, social change, and adaption *sociologists and political scientists:* equity, social structures, and social justice, understanding political dynamics	environmental conservation balance of resource use economic efficiency sustainable development multiple-use, pragmatism	core values; understanding the political dynamics (what is in it for me and the party?) What are the economic costs and benefits? (rarely considers the intangible costs/benefits). May be interested in aspects such as social change, but usually only if it can happen quickly

(Table continued on next page)

Factor	Scientists	Environmental Managers	Politicians/ decision makers
Focus	focus is on details, contradictions, usually single discipline approach	focus is on broad outline, problems at hand: multidisciplinary approach usually required	focus is on current political problem/issue; periodically focus is on the next election, his/her constituents and toeing the party-line. Political correctness is often a focus
Worldview	primacy of biological physical, chemical mechanisms, rational logical views	primacy of political, social, interpersonal mechanisms; mixture of subjective and objective views;	primacy of political/party and personal; might consider a worldview, however, rarely thinks globally or regionally; often inward focused and sometimes subjective

Certain individuals fulfil roles in more than one of the above columns. Furthermore, several of the above 'differences' are generalisations that do not recognise, for example, that there are various types of scientists. Nevertheless, the key point is that scientists and managers usually bring their personal perceptions, peer influences and primary goals into policy deliberations. Certain scientists have a relatively narrow and focused perspective developed within their field of research, especially if it is focused within a single discipline. Similarly, most managers who need to work within the limitations of their agency and the relevant political context, also bring a constrained perspective, albeit due to different constraints. There is, therefore, a continuing need to inform both managers and scientists about the other's perspectives including the differing timeframes and contexts in which each operates so they understand the limits of their contributions. Similarly, they both need to understand how they differ from relevant politicians who are the ultimate decision makers for major policies to which they might contribute.

While deliberations about environmental policy may seem to sit appropriately within the domain of environmental scientists, the environment is far more complex and interconnected than the level at which most scientists undertake their research. Adding to this complexity, Pielke (2002) suggests that when questioning how much biodiversity protection is desirable, the argument is '...often less about science than about different philosophical approaches to ecosystem management, which includes how different people value the aesthetic, spiritual and ethical aspects of biodiversity...' (p. 367). Lubchenco et al. (2019) point out informing decisions is not the same as dictating specific outcomes. Scientists therefore need to recognise that their information is only one of various inputs that need to be weighed up when making policy decisions. Consequently, community values, economics, history, and politics all need to be considered in the decision-making.

A colleague who is a conservation scientist recently outlined his perspective based on decades of real-world experience; '... as scientists, we need to remember and advocate that conservation is 98% politics (in the broadest interpretation) and 1% science and 1% good luck. That means the 1% science has to be solid and beyond reproach, and we [as scientists] also need to devote more time to understanding the role of politics...' (Rod Salm, personal email communication, 23/08/20).

Dowie (2005) suggests that scientists are sometimes tempted to collude with the desires of policy makers (who themselves often reflect the desires of their constituents), by offering 'science-based' decisions and policies. As pointed out by Sarewitz (2004), '... the most important decisions in the real world are made with a high degree of uncertainty, but they are justified by a high level of commitment to a set of goals or values...' (p. 398). Dowie (2005) reinforces this, stating, '... value

judgements are the logically necessary basis for all decisions, so, irrespective of the amount of certainty and uncertainty in the scientific evidence, the most that scientists can do is inform value-based decision making…' (p. 116). The task for the accountable decision maker therefore is to determine the best course of action despite the uncertainty and the differences in values and expectations (Dowie, 2005).

Holmes and Clark (2008) suggest a number of ways that both scientists and policy makers might improve their interactions. Scientists need to take a broader view to understand what is helpful to the policy maker, not over-inflating the value of their scientific results, and recognising that science is just one factor in the policy decision. Equally, the policy makers need to be more receptive to science, resist the temptation to cherry-pick the results or opinions that back the desired policy line, and overcome being scared of evidence that ''makes life too complicated'' or conflicts with the desired policy line. In a paper titled *Making science relevant to environmental policy,* Cortner (2000) provides several pertinent points:

> …Science itself, although clothed with an aura of independence and objectivity … **is not apolitical. It is very political** [emphasis added]. It is political because it is infused with values, is not exacting, and because much of what passes as fact is, in reality, theory… (p. 23).

> …Many scientists get caught in the trap of believing and advancing the myth of an apolitical, value-free science. Maintaining that science is value free and apolitical ignores reality … yet, when they are overtly thrust into the political world, (scientists) are uncomfortable, bewildered, or dismayed at why factors other than ``objective, value free'' science serves as the basis for decision making... (p. 24).

> ... Science and scientists cannot sit back and lament that the policy world is not more like the scientific world. **More attention needs to be paid to understanding the culture of science and bridging the differences between citizens and scientists, and science and policy** [emphasis added]. Holistic, integrated science and civic science will require rethinking how both citizens and scientists interact in the policy world... (p. 29).

3.2.3 Scientific uncertainty

When an environmental policy is being deliberated, '… science typically lies at the centre of debate, where those who advocate some line of action are likely to claim a scientific justification for their position, while those opposing the action will either invoke scientific uncertainty or competing scientific results to support their opposition ...' (Sarewitz, 2004, p. 386). The reality is that specialists from different localities and in different fields weigh the evidence differently. As Sarewitz (2004) notes, '… scientific uncertainty, which so often occupies a central place in environmental controversies, can be understood not as a lack of scientific understanding but as the lack of coherence among competing scientific understandings…' (p. 386). Despite the assurance that society often seeks, science is rarely able to provide the absolute certainty or irrefutable 'proof', so there needs to be a greater level of public understanding of what science can, and cannot, provide. However, when there are high levels of uncertainty, this makes it difficult to gain political support for controversial policies, and harder still to achieve cooperation in their implementation. The precautionary principle and the reversal of the burden of proof are aimed at neutralizing these political challenges, but they have their limitations when the science is uncertain, and decision-making is based on participation and acceptance (Watson-Wright, 2005).

Even if science is able to bring a clearer focus into such controversies, the conflicts are more often about values and sectoral interests that are rarely able to be resolved by more science (Noss et al., 2012). Cortner (2000) also states:

> …There is no such thing as ``objective'' science. It is a myth… Subjective value interpretations are made by scientists all the time. Defining problems, framing hypotheses, choosing methodological design, making methodological assumptions, selecting criteria for analysis, … and interpreting results all involve value judgments … (p. 23).

Sarewitz (2004) concludes '… progress in addressing environmental controversies needs to come primarily from advances in the political process, rather than scientific research…' (p. 399), and '… science does not thereby disappear from the scene … but takes its rightful place as one of a plurality of cultural factors that help determine how people frame a particular problem or position…' (p. 400). Political controversies with scientific/technical underpinnings are not resolved by technical means, and the science is unavoidably subject to becoming politicised in environmental controversies (Noss et al., 2012; Sarewitz 2004). One of the core competencies of good policy making includes using the '… best available evidence from a wide range of sources and involves key stakeholders at an early stage…' (Holmes & Clark 2008, p. 703). Pielke (2004) clarifies the differences when science is used in policy and when science is used in politics:

> '…when science is used in policy it can help to clarify the scope of available options or even help decision makers set their expectations about the consequences associated with different courses of action. The key linkage between science and policy is a specific course (or alternative courses) of action. When science is used in politics, it is a resource in the process of bargaining, negotiation, and compromise for desired ends …' (p. 414).

The boundaries between science, policy and politics are regularly renegotiated as part of the political process (Jasanoff, 1990). Perhaps the best distinction was made by Sarewitz (2004) who wrote, '… politics helps us decide the direction to step; science helps the eyes to focus …' (p. 400).

3.3 The role of science underpinning marine spatial planning

Numerous publications refer to the need for a sound scientific basis for planning MPAs (for example, Ehler & Douvere 2009; Fernandes et al., 2005; Gleason et al., 2013; Halpern et al., 2012; Lester et al., 2009; Lubchenco et al., 2002; Lubchenco et al., 2003; Lundquist & Granek 2005; Sullivan et al., 2017; Ward & Stewart 2016). Osmond et al. (2010) examined three marine planning case studies, one of which was the GBR, and concluded that in each case, science provided a fundamental underpinning in effective marine spatial planning. Importantly for policy changes, Osmond et al. (2010) concluded that scientists need to recognize that ultimately ecological and socio-economic trade-offs need to be made to achieve a politically acceptable outcome. Osmond et al. (2010) also recognised that in various MPA planning processes, the best available science was usually sufficient to undertake effective planning. In other words, planners should not await 'the next piece of research' before they start, even if they think those research results might be useful; knowledge is always changing and there is a risk if they keep postponing the commencement, that they will never start planning, let alone reach completion.

3.4 Research questions and methods relating to the role of science

The overall question for this part of the research was to investigate the role of science in the GBR RAP/rezoning, to determine how influential science was in the policy reform process and to determine the lessons learnt. To do this, a series of subordinate research questions were considered, seeking to determine the role of science and the role of scientists by addressing the following:

- How easy was it to map the diversity of the GBR given that no additional resources were available for further research?
- How much protection was required to ensure the long-term conservation of the GBR?
- How much dependence was given to decision-support tools in the RAP/rezoning?
- What reliance should a decision maker place on scientific research when there is clearly uncertainty around any recommendations from that research, or the politically acceptable answer seems to differ?
- What were the key lessons learnt about the role of science in the policy reform process?

Question 4 in the interview asked specifically about the role of key scientists (see Appendix 1). Furthermore, over 60% of the interviewees discussed aspects relating to science and scientists when answering the open questions. For this chapter, I analysed those parts of the interviews that were relevant, utilised the grey literature and unpublished records/file notes from my time at GBRMPA, reviewed relevant papers in key journals, and drew upon my insider experience/observations.

3.5 Key aspects regarding the role of science in the RAP/rezoning

The following sections (3.5.1- 3.6) outline the key scientific underpinnings of the RAP/rezoning in the GBR. This provides a combination of historical documentation, relevant interview results and discussion.

3.5.1 The scientists engaged in the RAP/rezoning

As Watson-Wright (2005) postulated, the policy gap was initially identified by scientists. Scientists recognised that the zoning that existed across the GBR in the mid-1990s failed to protect the range of biodiversity that was known and hence did not meet the legislative mandate. Prof. Helene Marsh (JCU) and Dr Terry Done (AIMS) were among a group of scientists involved in a multi-stakeholder process to develop a *25 Year Strategic Plan for the Great Barrier Reef World Heritage Area* in 1993-94 (GBRMPA, 1994). Prof Marsh and Dr Done were advocates for a 5-year objective and related strategies in the 25 Year Strategic Plan (GBRMPA, 1994) that provided, for the first time, formal recognition of the need to protect representative biological communities across the GBR[14] (Table 3.2):

Table 3.2 Excerpt from the *25 Year Strategic Plan for the GBRWHA* (GBRMPA, 1994)

5 YEAR OBJECTIVE	STRATEGIES
1.4 To protect **representative biological communities** throughout the Area to act as source areas, reference areas, and reservoirs of biodiversity and species abundance.	1.4.1 **Identify and protect representative biological communities throughout the Area**.

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[14] The notion of representation of biological communities in terrestrial reserves goes back to Kirkpatrick (1983) in Tasmania; Kirkpatrick was followed by others in the terrestrial realm (e.g., Margules et al., 1988; Pressey, 1994; Pressey et al., 1993). The concept was applied in some Australian states as input into the Regional Forest Agreements and terrestrial reserve systems.

Several interviewees within GBRMPA acknowledged that '…the scientists provided the underpinning information that made the Agency aware that there was a problem that had to be addressed and … gave the Marine Park Authority and the Minister in Canberra the ammunition and evidence to act...' (Interviewee R7). Consequently, the RAP was science-initiated and was undertaken to address a recognised deficiency in the existing management arrangements (i.e., the zoning) for the GBR. In the period 1996-98, preliminary work was undertaken by GBRMPA officers for a proposed representative approach to zoning[15] but for various reasons this approach never progressed. The formation of a 'critical issue' group within GBRMPA in 1998 led to a particular focus on conservation and biodiversity. The GBR-wide comprehensive and representative approach to zoning commenced and was subsequently progressed.

Commencing the RAP was unlike any planning process previously undertaken in the GBR. As there were few marine precedents worldwide, various aspects were created or developed during the planning process. In the early days of the RAP process, there was recognition that a greater level of expertise, particularly in the social science and socio-economic areas, would be helpful in the RAP team within GBRMPA. One of the existing positions was realigned and advertised, and Dr Leanne Fernandes was appointed as the Manager, Representative Areas Program. Leanne had experience in natural science, social sciences and economics, and her primary role was to improve liaison with the scientific community. A concerted effort was therefore made to ensure the scientific communities were supportive, particularly the Australian Institute of Marine Science, James Cook University, and the University of Queensland. Scientists played two main roles; the provision of technical advice and support to the GBRMPA, mainly through advisory committees, and also as independent experts who individually advocated for increased protection for biodiversity. A range of scientists were invited specifically for the RAP/rezoning onto the advisory committees and expert groups listed below and detailed in **Appendix A3**:

- the Scientific Steering Committee (SSC)
- reef experts
- non-reef experts
- an Analytical Working Group (AWG)
- the Social, Economic and Cultural (SEC) Steering Committee

About 25% of those interviewed knew the names of more than a few scientists engaged during the RAP. Only 10% of those interviewed knew about the initial push from the GBR scientists whose concerns led to the RAP planning process. Similarly, only 10% were aware of any previous work from elsewhere upon which the scientific underpinning for the RAP was developed. For example, one senior political player's recollection was:

> …we had lots of debates about what a RAP really meant. It was easy to mouth the language, but we didn't have too many examples elsewhere to work off – as far as I can recall, we didn't have any …..there was a bit of a guidance coming out of the biodiversity convention and other such bodies …but they rarely defined best practice … (Interviewee P2).

One of the scientists interviewed, however, provided a different perspective, outlining that the fundamental concept of representation was well developed in Australia from the mid-1990s and

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[15] Two planners In GBRMPA (Joan Phillips and Leanne Sommer) attempted a more representative approach to GBR zoning in the years 1997-98, building upon methods used in the Regional Forestry Agreements.

embedded in terrestrial planning processes and planning software like SPEXAN[16]. Two significant scientific underpinnings of the RAP/rezoning (the GBR bioregions and the operational principles), unquestionably built upon previous scientific work. As both proved to be fundamental for the RAP/rezoning, they are discussed in more detail below.

3.5.2 Key biophysical inputs to the RAP/rezoning

3.5.2.1 The bioregions

In the early days, the development of the GBR-wide bioregionalization was termed the classification phase. This term was based upon work by Prof. John Roff at the University of Guelph, Canada, who together with WWF Canada, developed a methodology to identify representative MPAs for Canada's oceans (Day & Roff, 2000). Developing a map of bioregions in the GBR built upon Prof. Roff's work and was determined by drawing upon previous efforts in Australia (e.g., Muldoon (1995) and the Interim Marine and Coastal Regionalisation for Australia Technical Group (IMCRA Technical Group, 1998) that subsequently led to an Australia-wide bioregionalization). Details on how the GBR bioregionalization was developed are described by Kerrigan et al. (2010):

> …the requisite data for the Classification Phase were scattered through published and unpublished material dating back fifty years or so. Over 70 scientists and experts were surveyed to identify the information and data on spatial patterns in the distribution and diversity of both biota and physical parameters. ... Over 60 datasets were collated ... spatial patterns of diversity were further described using multi-variate regression tree analysis on the most comprehensive datasets ... (Kerrigan et al., 2010).

Two small groups of scientific experts (see **Appendix A3**) were initially invited to two separate workshops (one reef-focused; the other non-reef focused) and provided the best available data including 60 biophysical datasets; for example, bathymetry, sediment type, seagrass, soft corals/hard corals, reef fish (Kerrigan et al., 2010). They were also provided various existing bioregionalizations (e.g., IMCRA bioregions, reef types, sediment classes, sponges) and spatial analyses (e.g., classification and regression trees (De'ath and Fabricius, 2000; Kerrigan et al., 2010)). The aim was to produce a timely and scientifically defensible bioregionalisation that captured the diversity of the GBR at a scale relevant for subsequent zoning[17], without undertaking any extra field surveys.

Initially, a few of the scientific experts were loath to draw any lines on the map, maintaining further information was needed before they could do so. The GBRMPA officers convinced the experts that if they were unable to do it, GBRMPA would have to, but drawing upon far less knowledge of the GBR than the experts collectively held. Consequently, using their combined knowledge and drawing upon the collated datasets (Figure 3.1), each group of experts did manage over several workshops to collectively develop two separate draft bioregionalizations. One regionalisation was for GBR reefs and the other for non-reef areas, as shown in Figure 3.2.

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[16] SPEXAN: from the words *Spatially Explicit Annealing (see https://marxansolutions.org/about-marxan/)*

[17] The decision was made to choose 10s-100s of kilometres as being a meaningful scale at which zoning could be delineated and at which management would be best applied.

Figure 3.1 Scientists with expertise in the non-reef areas working together to help GBRMPA develop a map of the non-reef bioregions (October 1999)
[L- R: Roland Pitcher (CSIRO), Brigid Kerrigan (GBRMPA), John Hooper (Qld Museum), Warren Lee Long (QDPI)]

Kerrigan et al. (2010) describe the datasets that were used for developing the GBR-wide bioregionalization; for example, the primary datasets for the reef bioregions were reef fish, hard corals, soft corals, reef biota, and macroalgae. Some data were patchy (neither GBR-wide nor uniform), and surrogates were important when data were not available. The data layers themselves did not lead directly to obvious bioregions, so the iterative workshops comprising the experts were critical. There was some scientific uncertainty, and GBRMPA accepted the consensus view for the two draft maps of bioregions. After refinement by GBRMPA officers (e.g., to ensure consistency across the entire GBR), the draft bioregions were distributed to park users, scientists, stakeholders, and community groups to seek comments and further input. Seeking public input proved an important part of the process and the level of local knowledge (especially from fishers and scientists about specific areas) was invaluable to augment what was considered to be the best available data. Of the twenty-one suggested changes to the bioregions, nine were implemented before the final bioregionalization was adopted comprising thirty reef bioregions and forty non-reef bioregions as shown in Figure 3.2 (GBRMPA, 2001; Kerrigan et al., 2010). At the time, the experts acknowledged the forty non-reef bioregions included eight lesser-known deep water offshore areas.

The bioregionalization was considered adequate to depict the diversity across the entire GBR. An independent assessment in 2001 by the (then) CEO of the Australian Institute of Marine Science, Dr Russell Reichelt, determined the 70 bioregions developed for RAP were sufficient as a sound foundation upon which to base the RAP planning. Reichelt concluded, '...To the best of my knowledge, there is no other source of information or analysis that could have been introduced to this phase of the program that would affect the result in any significant way… the multivariate methods, combined with the use of expert opinion when data are scarce or absent, seems to be a very powerful approach that makes the best use of all available information….' (Unpub. assessment, GBRMPA files).
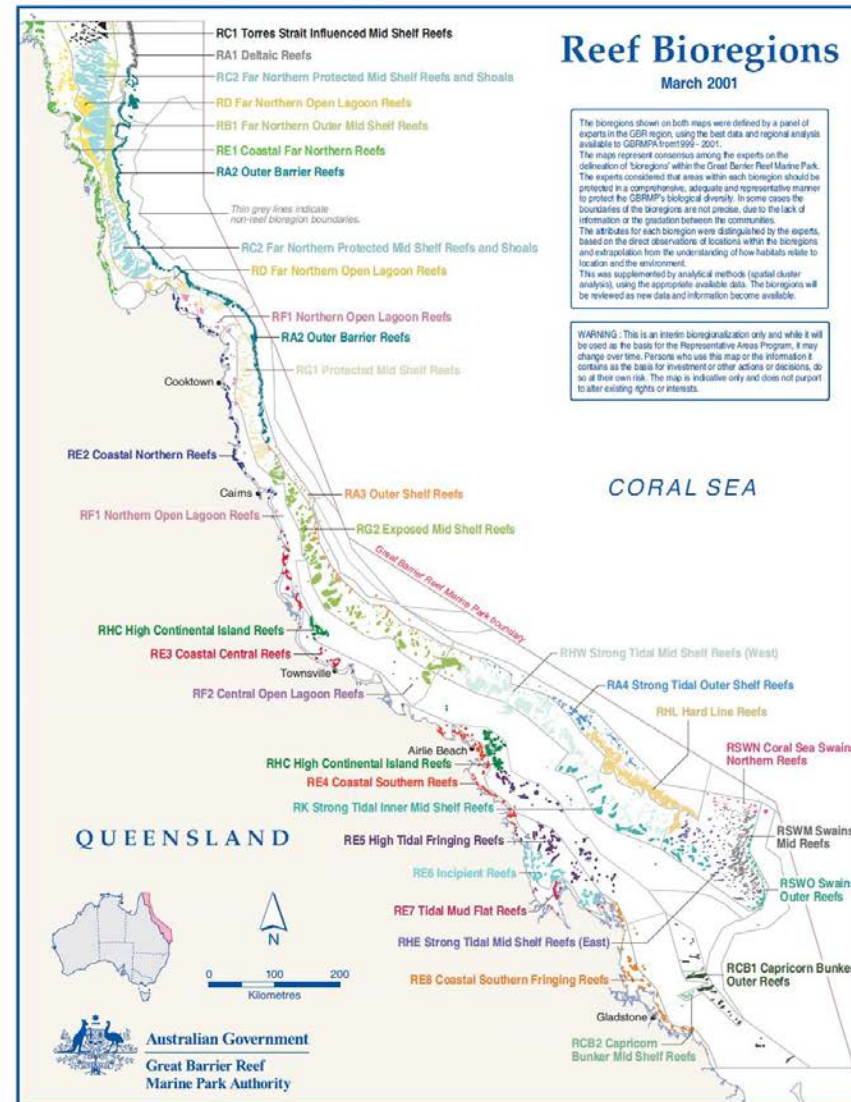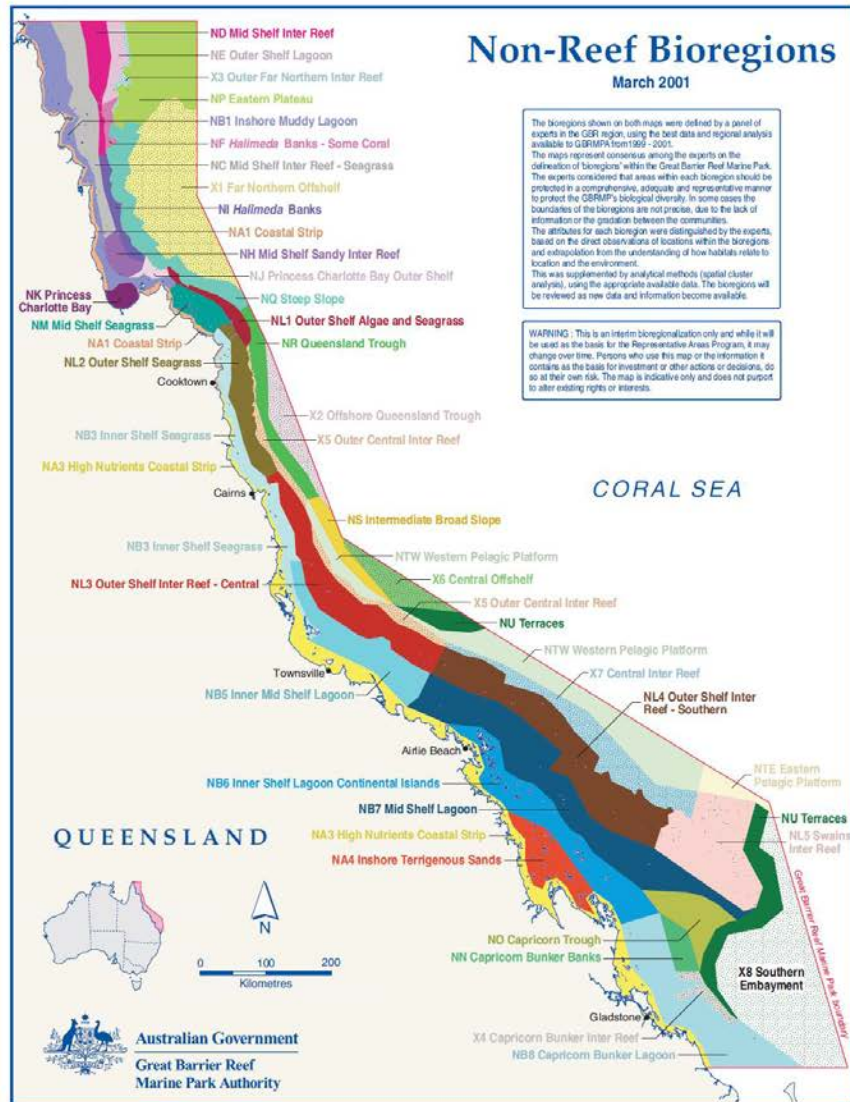
Figure 3.2 Thirty Reef and forty Non-reef bioregions in the GBR; these 70 bioregions provided a key foundational component upon which the RAP was developed, and the new zoning network was built. Note the 'straight-line' boundaries of a number of the non-reef bioregions.

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In the case of the reef bioregions, most of the boundaries of individual reefs were relatively easy to define (although some back-reef areas were less obvious given the complexity of the reef structure). In contrast, most of the non-reef bioregions had boundaries that divided ecological continuum or were imprecise reflecting incomplete data. These 'fuzzy' boundaries were acknowledged by the experts, but a boundary needed to be drawn somewhere, and given that various other factors also influenced the location of no-take zones, precise bioregional boundaries were not essential for a management application and many were shown as specific lines (Figure 3.2).

The public's understanding of the 70 bioregions grew during the planning process to the point where the term 'bioregion' became well known and understood as a key underpinning of the RAP/rezoning. This is illustrated by several incidents that occurred over the period of increasing awareness. Early in the program, the map showing the 70 different bioregions (Figure 3.2) was widely distributed to assist in promoting awareness of the range of biodiversity in the GBR. Initially there was some confusion as a few locals mistook the 70 different coloured bioregions as being the map representing the new zones! The GBRMPA undertook a comprehensive public education program to explain the bioregions and how they formed an important basis for the systematic planning process, resulting in a marked increase in public understanding. During the latter part of the RAP/rezoning, two old fishermen were overheard in a pub debating the location of a proposed 'green zone' for their submission to GBRMPA; one of the fishers said to the other in exasperation, *"Mate, ya can't stick it over there … that's the wrong f**kin' bioregion!".*

As explained in Fernandes et al. (2005), the decision to proceed with the best available scientific knowledge was an important factor in the success of the program. The total timeframe from the initial collation of datasets to the final maps of the bioregions took two years, including numerous iterations and input from the experts, various steering committees, and the public. The result, however, was a fundamental building block for the RAP/rezoning. Over the entire period of the RAP/rezoning, various additional datasets became available. Wherever possible, these were incorporated into the planning (e.g., the deep-water datasets from the National Oceans Office became available after the first phase of public engagement) so there was also 'adaptive-planning' during the planning process.

3.5.2.2 The Biophysical Operational planning principles

In 2002, GBRMPA published a range of Technical Information Sheets relating to the RAP/rezoning. Sheet No. 6[18] was titled *Biophysical Operational Principles* (BOPs) and included eleven planning principles recommended by the Scientific Steering Committee (SSC- see **Appendix A3**). The BOPs were informed by the objectives of the RAP and built upon principles documented by the ANZECC Task Force on MPAs (ANZECC TFMPA 1998), Australia's *Oceans Policy* (AOP), a review of the latest scientific literature on MPA design (Hill & Fernandes, unpublished), input and guidance derived from the earlier survey of scientists, and advice from the reef- and non-reef expert panels. At their core, the BOPs included the comprehensive, adequate, and representative principles (known as the 'CAR' principles), that drew upon previous work (e.g., CALM, 1994; Kelleher & Kenchington, 1991; Thackway & Creswell, 1996), as well as the principles from the National Representative System of MPAs (NRSMPA). The NRSMPA principles (ANZECC TFMPA, 1998, p. 50), however, were not specific enough to be useful for on-the-water planning so more specific operational principles were needed.

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[18] Copy available at http://elibrary.gbrmpa.gov.au/jspui/handle/11017/769

In developing the BOPs, the SSC considered such aspects as the level of uncertainty about the biodiversity of the GBR, the basic level of protection that existed across the GBRMP, and the fact the GBR was internationally recognized as being worthy of listing as World Heritage. In his independent assessment in 2001, Russell Reichelt, wrote:

> ...the BOP figures are supportable - but not strongly. In fact, the figures used in the BOP are extremely weak in a scientific sense... I urge you not to rely on the BOP figures (the other principles in the BOP are good) in circumstances where you are likely to get a scientific critic. The 'more is better' argument is solid. If you do need to defend the BOP figures, I would rely more on the fact that they came from very experienced, expert scientific opinion rather than scientific evidence. I would also be relying on the fact that because we can't say precisely how much to protect, there are good reasons to 'buy as much insurance' as we possibly can, given the threats posed to the GBR right now and in the future…..the real scientific consensus was 'the more you protect, the greater the insurance'… (unpub. assessment on GBRMPA file).

Fernandes et al. (2005) describe the extent to which the BOPs were implemented in the final zoning plan. This included a table (Fernandes, et al., 2005, p. 1740) which showed the degree to which the new zoning plan achieved the BOPs. The extent to which they were achieved was markedly improved in the final plan compared to previous zoning outcomes although not all the principles were entirely met. Fernandes et al. (2005) stressed that they were principles, not targets, and that a broader planning and political process that considered the socio-economic, cultural, and other factors, led to the final result. A few stakeholders, however, were confused about the eleven BOPs, assuming they were targets or rules rather than principles. In particular, two principles that referred to actual percentages ('…protect at least 20% of each reef bioregion'; and '…protect at least 20% of each non-reef bioregion') confused many stakeholders, leading to the belief that GBRMPA required just 20% of the overall GBR area to achieve the final no-take zone network. The SSC recommended that GBRMPA should protect <u>at least</u> these amounts in each bioregion and each habitat but stressed none of these recommendations were for "ideal" or "desired" amounts (GBRMPA, 2002). When the final zoning network was publicly released comprising 33.3% of the GBR, many stakeholders could not understand what had contributed to raise the final total of no-take zones beyond the 20% they thought was recommended. As noted by Fernandes et al. (2005):

> ... the experts gave priority to minimum levels of protection per bioregion. The principles were not further prioritized but the experts recommended they be treated collectively, as a package. The Scientific Steering Committee explicitly stated, however, that ideal or desired amounts of no-take areas required for full protection were likely to be greater than indicated by the biophysical operational principles... (p. 1737)

One important aspect regarding the role of scientists was the significant level of scientific expertise and data that was provided *gratis* to GBRMPA for such aspects as developing the bioregions, the operating principles, and the analytical tools (explained in section 3.5.4) . No monetary value could ever be determined for those contributions. In total, the amount of time, effort and knowledge that was provided by scientists at minimal cost to GBRMPA was a key contributor to the success of the RAP/rezoning program, especially in the early phases.

3.5.3 Key social science inputs to the RAP/rezoning

The following sections provide a brief overview of the social science aspects that were fundamentally important for the RAP/rezoning.

3.5.3.1 The Social, Economic and Cultural Steering Committee

The Social, Economic and Cultural (SEC) Steering Committee (see **Appendix A3)** was established to give the GBRMPA the best possible advice about the social, economic, cultural, and managerial aspects relevant to the RAP/rezoning. The GBRMPA officers compiled a wide range of relevant datasets[19] to assist in the development of the draft and final zoning plans. Four detailed social, economic, cultural and management feasibility operational principles[20] were recommended by the SEC Steering Committee to be applied, as far as practicable, during the development of the revised zoning. These principles were summarised as:

1. Maximise complementarity of no-take areas with human values, activities, and opportunities,
2. Ensure that final selection of no-take areas recognises social costs and benefits,
3. Maximise placement of no-take areas in locations that complement and include present and future management and tenure arrangements, and
4. Maximise public understanding and acceptance of no-take areas and facilitate enforcement of no-take areas.

These principles were intended to maintain or enhance economic benefits, social amenity and values, Indigenous cultural values, non-indigenous cultural values, fulfill national, international and State obligations and optimise management effectiveness.

3.5.3.2 Fisheries involvement prior to, and during, the RAP/rezoning

Fisheries in the GBR are diverse and dynamic (Chin et al. 2019). In the decade prior to the RAP/rezoning, the relationship between GBRMPA and the commercial fishing sector was poor. Previous acrimonious interactions, primarily 'the dugong wars' and 'the trawl war' in the 1990s (Bowen & Bowen, 2002) had contributed to this shaky foundation. There was minimal trust from fishers or mutual respect which undermined any attempts to develop mutually acceptable outcomes. When the RAP was being developed in the GBR, many fishers (commercial and recreational) were critical, calling for evidence that the new zones would benefit fishing, They questioned why existing fisheries management tools such as size limits, in-possession limits or seasonal closures would not be sufficient to achieve the aim of increasing protection of marine resources and associated biodiversity.

Opposition to the zoning by the majority of GBR fishers was supported by a campaign questioning the science behind the RAP/rezoning, led by a marine scientist, Dr Walter Starck[21]. The media chose to publish differing perspectives[22] from anyone who was willing to question the science and raise

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[19] These included data on the existing GBR zoning, fisheries catch and effort (6 minute and 30 minute grid data), fisheries management (e.g., fishery closures), National Parks (including islands), Suntag fishing data, designated shipping lanes and ship reports, Native title claims, port details, coastal developments, historic shipwrecks, boat ramp information, anchorages and mooring data.

[20] Copy available http://elibrary.gbrmpa.gov.au/jspui/handle/11017/780

[21] Dr Walter Starck became a major advocate for those fishers (commercial and recreational) who were against the zoning and argued strongly against the science behind the RAP/rezoning.

[22] See examples of the media headlines in Chapter 5 (Figure 5.5)

any uncertainty, irrespective of whether they had professional credibility and/or had published peer reviewed literature in that field. The response from the GBRMPA to the fishers was that the main aim of the RAP/rezoning was not about managing fishing; rather it was about protecting the full range of biodiversity in the GBR. Consequently, the more 'traditional' fisheries management tools (e.g.. size limits, in-possession limits) were not appropriate for the protection of most non-fishery species. Furthermore, there was a perception of some fishers at that time that the existing fisheries management was failing to ensure fish stocks were sustainably fished in certain GBR fisheries.

When developing the draft zoning plan, GBRMPA officers accessed the best available information to achieve the political expectation of minimising the impacts on fishers. There was, however, minimal fine-scale fisheries data available (a few fishers did provide their own GPS points in confidence) so most of the information was broad-scale commercial log-book data, aggregated at 30-minute grid squares[23]. The Queensland fisheries managers were not particularly cooperative at that time, and as one of the GBRMPA officers recalled:

> … I remember dealing with Queensland Fisheries Service …who firstly said this will never happen...so it was a real balancing act … trying to get access to the logbook data just so we could use it to achieve the zoning objectives, whilst as much as possible minimizing the impact on existing users... (Interviewee R6)

About halfway through the rezoning process, GBRMPA did manage to negotiate with the Queensland fisheries managers to obtain access to fine-scale spatial data from the Vessel Monitoring System (VMS) for the trawl fishery operating in the GBR (at that time no other GBR fisheries had VMS in place). As the VMS data were recorded by satellite using geographical coordinates, they provided much finer spatial data on the main trawling areas compared to the much broader spatial scale of data recorded in logbooks. GBRMPA officers, however, were mindful that the actual spatial footprint of trawl effort varied across years due to a number of factors (e.g., weather patterns and specific weather events) and the VMS data, while valuable, were only available for the last two years. Detailed discussions were therefore required with the trawl fishers to ensure that the VMS data were responsibly considered, in addition to other larger scale trawl data over additional years. Nevertheless, the VMS information was important to demonstrate to the commercial fishing industry and the political decision makers that the provision of good fisheries information enabled outcomes having far less socio-economic impacts while still meeting most of the BOPs. Figures 3.3(a) and 3.3(b) show the benefits of having access to the VMS data to minimise the socio-economic impacts upon the trawl industry.

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[23] Each side of a 30-minute logbook grid square was therefore approximately 54 kilometres long.
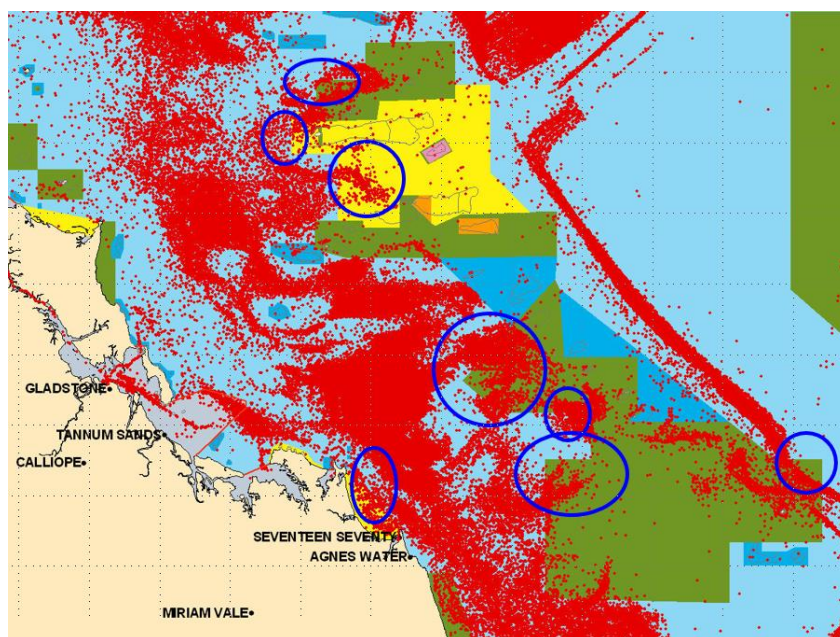
Figure 3.3(A)
The initial <u>draft</u> zoning plan that had been developed using log-book data for the trawl fishery. Subsequently VMS data was made available (depicted by the red dots showing where trawling was being undertaken). Overlaying the VMS data on the draft plan (as indicated in this Figure), shows if the underlying draft zoning had progressed, it would have been precluded trawling, within the areas in the blue circles.
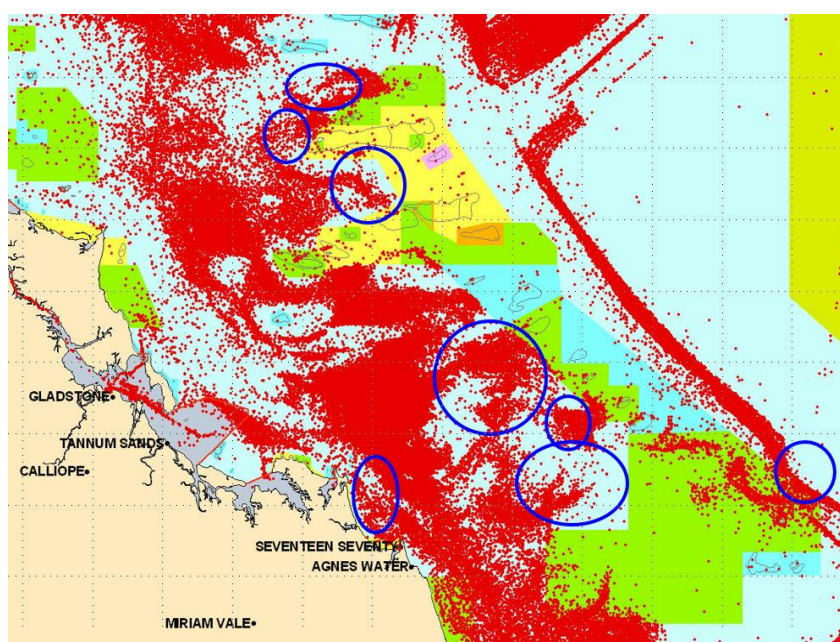
Figure 3.3(B)
Same VMS data overlaid on the <u>revised</u> zoning plan. Numerous changes to the zoning were made to minimise the impacts on popular trawl areas (e.g., compare the areas in the blue circles with the previous figure). However not all trawled areas were conceded, and areas containing minimal levels of bioregional representation remained in no-takes zones (NTZs) to protect the biodiversity (e.g., in the large NTZ in bottom right-hand corner).

Figures 3.3(A) and 3.3 (B) The application of Vessel Monitoring (VMS) data allowed changes between the draft and final zoning plans to minimise the socio-economic impacts on trawling *(Images courtesy of Darren Cameron and Rhonda Banks, GBRMPA)*

During the rezoning process, the Queensland Seafood Industry Association (QSIA) requested that GBRMPA make various changes to the draft plan, implying these changes would ensure their support for the plan. Once GBRMPA revised the draft zoning plan in the light of the public submissions and the new information, including the VMS data, the revised zoning plan was provided to the Minister to enable it to be tabled in Parliament as required by law.

Just prior to the Minister tabling the revised zoning plan, the QSIA raised further concerns. The Minister consequently directed GBRMPA to consider these prior to tabling. A GBRMPA officer recollected:

> …I still remember the last few days prior to tabling …the QSIA had twelve key areas where they still wanted the zoning modified**... we basically conceded on seven and a half of those twelve... but at that stage, I advised the GBRMPA Executive "No more concessions. If we concede any more... the ecological integrity of the zoning plan … we're just eroding it for nothing**" [emphasis added] … We were starting to compromise all the principles … so that's why some things got changed at the last minute, to minimise impacts on existing users while ensuring we got the Zoning Plan over the line … (Interviewee R6).

3.5.4 The use of analytical tools in the RAP/rezoning

During the RAP/rezoning, a Geographic Information System (GIS) and analytical tools, such as Marxan[24], TRADER and ReST, were applied and were pushed to their limits in doing so (Lewis et al., 2007). These analytical tools included GIS-infrastructure to support the use of reserve design software, to digitise and store thousands of map-based submissions, to apply computer-based reserve selection tools, and to publish zoning maps and legal boundary descriptions directly from GIS datasets. One of the spatial reserve selection tools, called Marxan, was developed by Prof Hugh Possingham (University of Adelaide), with his PhD student, Ian Ball. Marxan was originally developed as Spexan (see Footnote 19) and assisted the Regional Forest Agreements, and as such it was considered by some planners to be a terrestrial planning tool. The fact is the fundamental principles of spatial planning are the same for land and sea, and almost all are implicit in the Marxan problem formulation (Hugh Possingham, email personal communication, 25 September 2020).

Initially GBRMPA did not believe that Marxan, a modified version of Spexan, was suitable for their needs. Hugh Possingham and Ian Ball, however, modified it to meet GBRMPA's requirements. Hugh Possingham recollected when GBRMPA asked what he could do:

> ... we said we can do a couple of things …but in the end the main thing we did was rename it from Spexan to Marxan, which made GBRMPA feel more comfortable… (Hugh Possingham, University of Adelaide at the time of the RAP/rezoning, PhD interview, September 2016).

Hugh Possingham and Ian Ball were also asked by GBRMPA to add a minimum reserve size component. Possingham subsequently recalled, '... this was hard to add, was not smart scientifically or operationally, and made the software run much slower...', adding that today most people do not use this feature (Hugh Possingham, email personal communication, 25 September 2020).

Given that Marxan was still developmental, there were various issues in its application, especially as the marine environment introduced new challenges. Lewis et al. (2003) outline a number of these issues, including the seamless progression from Marxan (based on the best available data) to human decision-making (based on expert knowledge). One of the problems with Marxan in those early days was the long running time (basically overnight due to computational limitations

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[24] Marxan is an analytical tool, designed to support a range of conservation planning problems
https://www.gbif.org/tool/81349/marxan-conservation-planning-software

and the minimum reserve size addition to the problem definition). Other problems were the inability to readily incorporate multiple cost layers (e.g., multiple fisheries plus other uses without considerable pre-processing) or to produce results that considered multiple zones[25] given the zoning spectrum in the GBR at the time comprised seven marine zones. Marxan therefore applied various principles adapted from the BOPs (Fernandes et al., 2005) to ensure that conservation targets were met by a network of candidate no-take zones, but manual adjustments were then required (Lewis et al., 2003). Marxan was able to deliver an almost infinite set of options of no-take zone networks, so after Marxan was run innumerable times, the planners chose one option of candidate areas as the basis for a zoning network. The planners then needed to develop the remaining zones using 'more traditional' planning methods. The initial no-take zone network, therefore, required an additional revision process reliant on human knowledge and GIS/spatial analysis to ensure the impacts on most user groups were minimised.

Possingham has subsequently expressed frustration, explaining '...for years, GBRMPA ran the software ignoring costs[26]. The ecologists wanted an ecologically pure starting point which was ... a big waste of time. Once you add in costs, the software is more decisive...' (Hugh Possingham, email personal communication, 25 September 2020).

Figures 3.4-3.7 show various applications of Marxan over a small part of the GBR and how the final zoning network built on candidate areas initially generated by Marxan:

- Figure 3.4 shows an initial network of candidate areas generated by Marxan (shown bright green) using biophysical data only. The underlying bioregions are shown to reinforce how Marxan, for logical reasons, tended to identify sites for candidate areas at the intersection of bioregions because of the 'least cost' algorithm in the software.
- Figure 3.5 shows the same area as Figure 3.4 showing another network generated by Marxan following the inclusion of the best available socio-economic information.
- Figure 3.6 shows the Draft Zoning Plan to show how it was built upon the network of candidate areas generated by Marxan (e.g., Figure 3.5); where it differed was due primarily to the initial public submissions.
- Figure 3.7 shows how the final Zoning Plan differed from the outputs generated by Marxan[27] (e.g., example shown in Figure 3.5) due to other social and political inputs that were not considered by Marxan.

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[25] The subsequent development of 'Marxan with zones' (Watts et al., 2009) has addressed this deficiency, and today Marxan has changed considerably e.g., it is able to consider a spectrum of zoning possibilities.

[26] 'Costs' in this instance refers to the spatial socio-economic information (Ban & Klein, 2009)

[27] Today, the best practice approach advocated when using Marxan is to generate 'selection frequency maps' (showing the percentage of times a planning unit was selected when run in Marxan ~1000 times) as a starting point for negotiations or apply a cluster analysis. Hugh Possingham recollected that '...GBRMPA did not appreciate [at the time of the RAP/rezoning] the importance of selection frequency maps...' (Hugh Possingham, email personal communication, 25 September 2020).
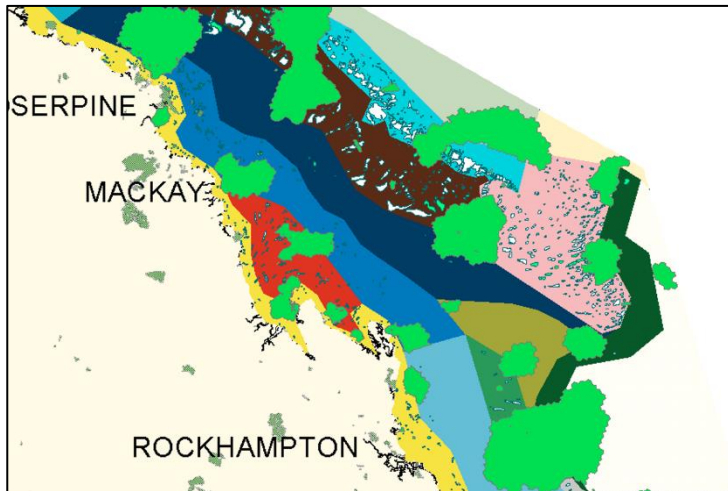
Figure 3.4   Part of the GBR showing an initial network of candidate no-take zones (NTZs) generated by Marxan (shown bright green) using biophysical data only (i.e., the bioregions in background)
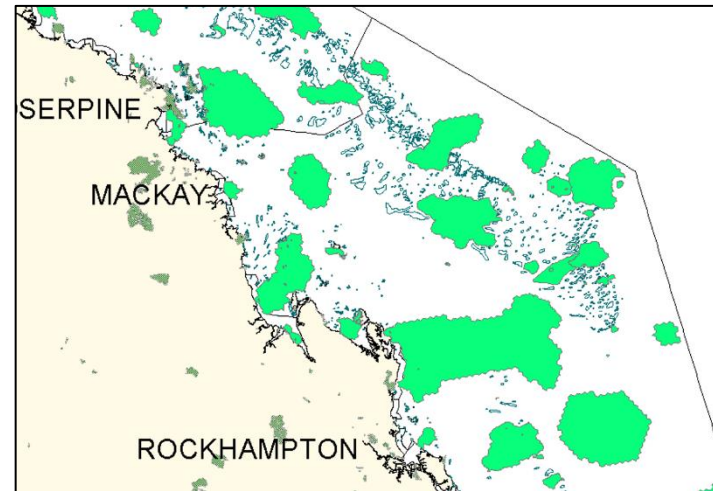
Figure 3.5 Same area as Figure 3.4 showing another network of NTZs generated by Marxan after inclusion of socio-economic information.
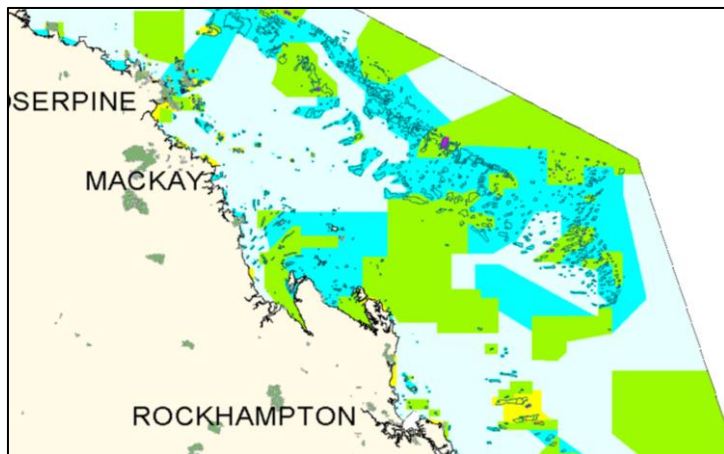
Figure 3.6   Draft Zoning Plan building upon the candidate area network shown in Figure 3.5
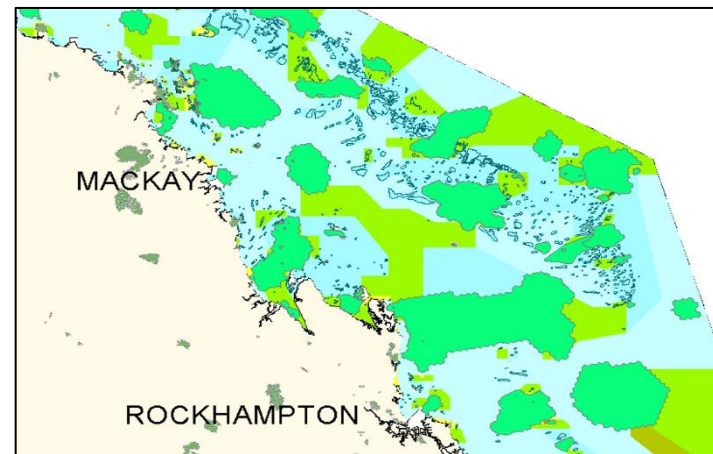
Figure 3.7   Final Zoning Plan (background) overlain with candidate NTZ network generated by Marxan (i.e., areas shown in Figure 3.5)

Although analytical methods were useful in helping to develop the draft zoning plan (compare Fig. 3.5 with Figure 3.6), they are unable to provide a final, pragmatic solution. 'Fine-tuning' using human expertise, knowledge and judgement played a major role[28]. Marxan generated initial options after which other planning methods were then necessary. Also required was a process of boundary simplification to implement 'coordinate-based boundaries', replacing the irregular boundaries formed by the Marxan planning units (as shown in Figure 3.5), with straight-line boundaries that could be defined in terms of a relatively small set of coordinates (e.g., the green zones in Figure 3.6). The (then) Manager of the Spatial Data Centre within GBRMPA developed an algorithm to partially automate the process by generating the coordinates. This complex task could not have otherwise been accomplished for every zone with the necessary high degree of accuracy, and these coordinates formed the key part of the legal boundary definitions (further discussed in Chapter 7, section 7.6).

Another of the benefits from the analytical software was the ability to generate metrics in post-hoc accounting reports to inform how various network options measured against the BOPs and SEC principles. A rapid assessment of the implications of each option in terms of the objectives was produced, allowing a choice of the best possible no-take zone network consistent with the BOPs and SECs. Analytical reserve design methods allowed many layers of data to be applied to achieve stated targets by generating innumerable nuanced options (networks of 'candidate' areas). From these, managers were able to select an informed, impartial starting point for human decision making. During the RAP/rezoning, new information was periodically introduced during the planning process. The results from Marxan changed significantly as each new element of data was added, and a number of the earlier results were consequently regarded as unsuitable (Lewis et al., 2003).

Poor data will lead to poor results; reserve selection applications will not compensate for poor data and may be particularly sensitive to missing and incomplete data. Even the simplest principles of biodiversity conservation (e.g., protection of representative samples or protecting special and unique sites), require comprehensive data: the first to determine what 'representative' is; the second to identify which features are special in the larger context. Pitfalls for users of reserve selection tools include lack of data, failure to represent social and economic values, limited understanding of the embedded algorithms and results, and unrealistic expectations of the tools for real-world planning (Lewis et al., 2007). A combination of a sound approach, adequate data and adequate resources are needed to avoid these pitfalls. Over the four years of the RAP/rezoning, between two and five staff were involved full time in the analytical process. In addition, various external participants volunteered expertise and information. The importance of having competent officers to effectively use a GIS or apply an analytical tool is essential as one of the interviewees noted:

> ...To me, the key thing is that spatial analysis frameworks are difficult and involved, and **you have to have some very specialized and pretty talented people to pull it all together. There is nothing that replaces that** [emphasis added] … so while tools like Marxan give some rudimentary reports, you will always need a lot more than those tools can give…I don't think people understand the depth of the spatial analysis, and the successes we had synthesizing large amounts of information sensibly in short timeframes …

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[28] A comment made frequently by Hugh Possingham is, '... computers do not make decisions, people do...' (Hugh Possingham, personal communication, 25 September 2020).

> ...I am absolutely proud of what we achieved … and I challenge anybody to have done
> anything comparable since... (Interviewee R1)[29].

Subsequent to its application in the RAP/rezoning, Marxan has been modified and today is widely applied as a conservation planning tool supporting the design of marine and terrestrial reserves worldwide. Countless users have obtained the tool hoping that it will generate 'the answer' and hence provide a quick and reliable solution to their planning task. More often than not, such analytical tools produce simplistic results that need to be modified using negotiation and other planning methods for application in the real world. All such analytical tools have limitations and cannot compensate for missing or incomplete data. They can produce unintended side-effects and often are unable to match the complexity of real-world planning problems (Day, 2016), particularly if social, cultural, and economic values are not considered. Ban et al. (2009) showed that planning outcomes using decision-support tools are of little practical value for identifying patterns of conservation importance if social, cultural, and economic values are not included[30]. The reality is, however, that rarely is such data readily available in a form amenable to immediate input into an analytical tool or at an appropriate spatial resolution.

3.6 Determining how much of the GBR should be protected

Throughout the RAP process, a question frequently asked was, 'What was the percentage of the Marine Park that GBRMPA wanted to protect in no-take zones?' There were various reasons why there was not a simple answer to that question. Firstly, the Scientific Steering Committee (SSC) had provided the advice that at least 20% <u>per bioregion</u> should be protected in no-take zones (i.e., the minimum amount of protection per bioregion). The SSC did not advise an upper limit nor a target, so for critical habitats like seagrass beds it was important to protect as much as possible (e.g., 90% or more). Furthermore, it was not to be assumed that the number of species within each bioregion was the same, or that the area required to ensure viability was the same for all species. So, in answer to the frequently asked question about the final percentage in the new network, GBRMPA repeatedly advised that a number of factors needed to be considered including:

- The advice from the SSC who had developed the package of eleven biophysical principles (and if all these principles were implemented in full, it was thought that around 25-30% of the GBRMP would be in no-take zones).
- The advice of local community experts through the two formal phases of public participation.
- The fact that existing levels of no-take zones in any bioregion would not be reduced.
- The aim to develop a comprehensive, adequate, and representative system, based on the best available ecological information, but that also minimized the impact on users.

The final overall percentage of the GBR protected in no-take zones (i.e., 33.3%) was the outcome of implementing all eleven BOPs as a package, and the fact that in various offshore and remote bioregions, where there was little contention, the decision was made to protect much higher percentages.

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[29] Hugh Possingham reinforced this point, noting, '..GBRMPA didn't have much time and I was in Adelaide [so not readily available]...'. Possingham also noted, however, '... the data and tools have come a long way since 2002..', and concluded '...most importantly, GBRMPA ended up with a protected area system with unparalleled representation. Nobody has done this, before or since...' (Hugh Possingham, personal email communication, 25 September 2020).

[30] Today, revised versions of Marxan are readily able to incorporate socio-economic data, and Marxan is periodically improved.

Consequently, the 2003 zoning network resulted in varying levels of protection within each of the 70 bioregions. Figure 3.8 shows that 49% of all 70 bioregions (reef n=16; non-reef n= 18) received a level of protection in no-take zones covering between 21-30% of each bioregion; in 13% of the bioregions (reef n=3; non-reef n= 6), more than 51% of each bioregion was fully-protected in no-take zones, and in one non-reef offshore bioregion, more than 90% of that particular bioregion was protected in no-take zones.
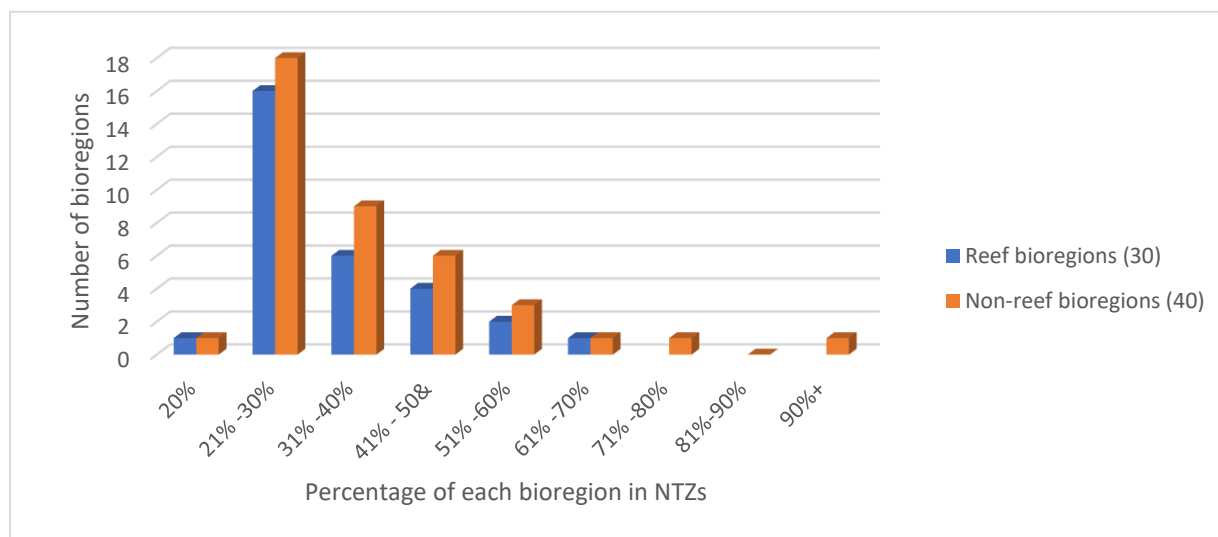
Figure 3.8 Number of bioregions showing differing percentages protected in no-take zones

3.6.1 How much is enough?

An important question for any planning program is *How much is enough?* This has been addressed by many authors (e.g., Noss, 1996; Svancara et al., 2005; Wilhere, 2008). Wilhere (2008) considers there are several myths surrounding the question. The first myth relates to '...**the erroneous idea that the amount of conservation necessary for the survival of species or the integrity of ecosystems can be determined solely through objective, evidence-based science** [emphasis added]...' (p. 514). The second myth is the mistaken belief the same question can be answered by science, but '... free from economic concerns and removed from political discourse...' (p. 515). Wilhere (2008) therefore warns ' ... the fate of biodiversity, however, should not be decided solely through an accounting of costs and benefits...' (p. 515).

Wilhere (2008) recommends that '...scientists should do conservation assessments ... for a range of *a priori* targets. The range of targets should fully inform decision makers, even including targets that might make conservation biologists uncomfortable ...[when scientists]...base a conservation assessment or estimate ... on only one set of subjective *a priori* targets, they should clearly state that it represents just one policy option from a wider range of potential options...' (p. 516). Wilhere et al. (2012) also raise concerns about the conflation of value-based judgments and scientific judgments, especially when recommending targets for conserving biological diversity. Scientists will maintain a target is based on 'best available science', 'the research and expert opinion of scientists', 'scientific studies and reviews' or 'a strict scientific point of view'. These statements are deceptive because all conservation targets are ultimately based on normative value judgments (Svancara et al. 2005; Wilhere 2008). Conservation targets are value-based: '...Ambitious targets are often considered radical and value laden, whereas modest targets are ostensibly more objective and reasonable. The personal values of experts are impossible to escape in either case... ' (Wilhere et al., 2012, p. 943)

'…targets alone are insufficient. Before regional conservation targets can be implemented, they must be subjected to a political process and receive society's sanction. Therefore, an equally important issue is how we as conservation scientists can more effectively inform the ongoing political discourse regarding conservation of biological diversity…' (Wilhere et al., 2012, p. 944)

3.7 Differing perspectives on the role of science in the RAP/rezoning

Excerpts from the interviews, as summarised below, indicate that science was a significant topic for most interviewees, whether they were scientists, politicians, managers, or industry representatives. Of those interviewed, 60% were positive about the role of science and scientists; the remaining 40 % were either ambivalent or rarely mentioned science in their answers. The range of views and perspectives were influenced by the extent to which the interviewees usually interacted with scientists in their normal duties or during the rezoning.

Just over 20% of those interviewed stressed the importance of the science as a critical foundation behind the RAP/rezoning; for example, a senior GBRMPA person I interviewed was adamant:

… **RAP would have been dead in the water if the science hadn't supported it** …. **underpinning it was a sound scientific basis** [emphasis added]… even though, and it is a really interesting thing about the science of RAP, there wasn't necessarily a huge amount of published literature… RAP took the science at hand and used it to the very best extent that it could be used, to produce the product and implemented it. … of course, there was a lot of work that went into bringing the science community on board … (Interviewee R2)

Another senior GBRMPA officer echoed a similar view:

…RAP wasn't going to go anywhere unless there was an agreement on the science …so there was a concerted effort to ensure that the scientific community …[including] our advisory committees were on board… however, the scientific community was very independent… (Interviewee R8)

A senior government adviser summed up the RAP/rezoning process:

…we did the best we could… we had a great product based on pretty solid science and principles … the identification of the principles was fundamentally important, in this case the physical principles. So, we had a robust scientific product. We had …an exhausting process of community engagement and … then the political negotiations that followed, … [so] it was all built on a solid foundation … (Interviewee A2).

The 'solid' scientific basis was largely endorsed by many of those interviewed; however, one of the key scientists pointed out:

…if the science was wrong, then everything would be wrong. …it's like the bottom of the house of cards …and if you haven't got your politics right, it's never ever going to happen … (Interviewee T2)

The term 'based on sound science' is often interpreted differently depending upon the various disciplinary perspectives; the natural scientist usually places the emphasis on the word 'sound' (as opposed to unsound) science, whereas the social scientist places the emphasis on 'based on', recognising there are various other factors that contribute the effective management (Bowler, 2005).

Those in the agency who worked with the Minister's office recognised that he (the Minister), '… had a capacity to move between the science and politics, and he was keen to see how the science worked to get more of it … to help us to address more arguments…' (Interviewee R4). Minister David Kemp himself showed strong support for the science behind the RAP/rezoning:

> … the whole thing rested on its science really … **the science was an absolutely critical underpinning. I don't think the science was all that strong, but I was convinced that it was strong enough to support it** [emphasis added] … (Hon Dr David Kemp, Federal Environment Minister during the RAP/rezoning, PhD interview, December 2015)

Among those interviewed were the two key scientists who briefed Minister Kemp in the last week before the Cabinet decision about the RAP/rezoning; one of those scientists recollected, '…the Minister wanted to know "Is this world's best science?", to which we both answered yes and explained why …' (Interviewee S5)

There were, however, interesting perspectives about science and scientists across the range of those who were interviewed; for example, the view of one of the representatives of an environmental NGO on the role of science in the GBR stated '… enormous trust was built up between the scientists and the conservationists about this program being worthwhile ... these were the world's best coral reef scientists …so it really convinced me that this was something worth fighting for…' (interviewee S6).

Another perspective was that '…at the start (of the process), the scientists and some NGOs were arguing a very purist agenda, whereas '… **Virginia was arguing a very pragmatic agenda .. …and the politics were truly pragmatic** [emphasis added] …' (Interviewee S10).

The differing scientific perspectives put forward by opposing groups led one interviewee to mention the confusion this caused:

> … we always tried to use scientific proof to back up what we were saying, but we didn't always win the hearts and minds of the public with the science arguments … [Dr] Walter Starck got great publicity a few times because he was able to say, "I'm a doctor and I think xx", .. it was the classic white coat against white coat scientist … **science becomes irrelevant to people when they can't tell the difference between arguing scientists** [emphasis added] ... and that sort of argument is especially difficult to have in the media… (Interviewee R4)

A key advocate for the fishers made an interesting statement saying:

> …the most powerful argument for RAP was the precautionary result is a good safety net… so it's a reasonable thing to do and you didn't need to have tremendous faith in the science to make the case that it was the common-sense thing to do... (Interviewee S4).

Interestingly, virtually all the politicians interviewed were adamant that the success of the RAP was more about the political process than about science; as one politician stated, '… certainly some people in GBRMPA, the technicians, believed that the policy, the RAP would succeed because it was based on sound science and computer technology ... my view about that, is that it had no hope of success without the design of a satisfactory political process to achieve the result…' (Interviewee P1).

Also noteworthy is the realisation of various key scientists that science was not the most influential determinant for the outcome:

> ...I started out thinking it was quite a technical exercise and I ended up thinking that it was much more a political exercise... **an understanding of the political process was so many times more important than technical knowledge** [emphasis added] … for me, it was a

> life-changing experience, because I was educated into how important the politics are…
> and how unimportant in the end …in relativity to the whole thing, is the scientific
> knowledge… (Interviewee T2).

A similar perspective from another key scientist:

> …it's the leadership through the system… we could have lost half the scientists and the
> process would still have happened…we could have lost half the data, and the process
> would have still happened … it is an entirely political and social process … (Interviewee
> S5).

One of the Queensland planners had a similar perspective, stating, '… the process was all political
and the science was easy by comparison…but of course to get the politics right, you've got to have
the science first… ' (interviewee Q1).

3.8 Relevant research subsequent to the implementation of the 2003 Zoning Plan

3.8.1 Increased knowledge of biodiversity

Since the GBR bioregionalization was finalised in 2001, considerable research has been undertaken
across the GBR. Today a lot more is known about a variety of habitat types and species in the ~90%
that are not shallow coral reefs.   Figures 3.10-3.12 depict some of the spatial heterogeneity that has
been learnt in the GBR in the 16 years since the 2003 Zoning Plan came into effect. Re-examining the
map of bioregions today (especially the non-reef bioregions, a number of which are shown with
straight line boundaries – see Fig 3.9), its suitability as a basis for RAP may seem questionable,
particularly in the light of more recent research (see for example, the research mentioned in Table
3.3).

Table 3.3 outlines examples of GBR biodiversity that was not known at the time of the RAP/rezoning.
The number of recent research discoveries listed in Table 3.3 reinforces an earlier point; that is, the
map of bioregions was based on the best available science at the time and was considered adequate
to depict the diversity across the entire GBR. If GBRMPA had waited for better science such as listed
in Table 3.3, they might still be waiting today. However, taking a comprehensive and representative
approach (applying BOPs that were designed with explicit acknowledgement that there was much
uncertainty), it is now apparent that the 2003 Zoning Plan has provided high levels of protection for
representative examples of most habitat types and species. The increased protection included
habitats that were not known at the time of the 2003 rezoning, for example, cold water corals and
mesophotic reefs. Waiting for a complete scientific understanding before commencing a planning
program is unnecessary and can potentially lead to other problems. The important lesson is to start
using the best available knowledge and be prepared to adapt when new knowledge becomes
available.

There remains a belief within GBRMPA that zone types other than no-take zones can also provide
biodiversity benefits. To date, only limited research has been undertaken considering these other
zone types (e.g., Ayling & Choat, 2008; Boaden & Kingsford, 2015). For example, research has shown
that the no-go areas (i.e., Preservation Zones) in the GBRMP are more speciose than no-take zones,
often boosting fish and other biodiversity in neighbouring areas (Robbins et al., 2006; Ayling and
Choat, 2008). In addition, these no-go areas function as undisturbed baselines that are essential for
effective monitoring and research in the face of climatic change (Cheung et al., 2016).

Table 3.3 Examples of GBR biodiversity <u>not</u> known at the time of the RAP/rezoning

(in date order of publication within each biodiversity feature)

Biodiversity feature	Main references *(see reference list for full details of these publications)*
Mesophotic coral reefs	Bridge et al. (2011a). Variability in mesophotic coral reef communities along the Great Barrier Reef, Australia.
	Bridge et al. (2011b). Topography, substratum and benthic macrofaunal relationships on a tropical mesophotic shelf margin, central Great Barrier Reef, Australia.
	Harris et al. (2013). Submerged banks in the Great Barrier Reef, Australia, greatly increase available coral reef habitat.
	Bridge et al. (2012). Predicting the location and spatial extent of submerged coral reef habitat in the Great Barrier Reef World Heritage Area, Australia.
	Laverick et al. (2018). To what extent do mesophotic coral ecosystems and shallow reefs share species of conservation interest? A systematic review.
Deep water features	Beaman et al. (2008). New evidence for drowned shelf edge reefs in the Great Barrier Reef, Australia.
	Webster et al. (2008). From corals to canyons: The Great Barrier Reef margin.
	Puga-Bernabeu et al. (2011). Morphology and controls on the evolution of a mixed carbonate-siliciclastic submarine canyon system, Great Barrier Reef margin, north-eastern Australia.
	Webster et al. (2016). Submarine landslides on the Great Barrier Reef shelf edge and upper slope: A mechanism for generating tsunamis on the north-east Australian coast?
	Hinestrosa et al. (2019). Spatio-temporal patterns in the postglacial flooding of the Great Barrier Reef shelf, Australia.
Cold water corals	Beaman (2009). Understanding cold water coral ecosystems on the Great Barrier Reef margin.
	Puga-Bernabeu et al. (2017). Gloria Knolls Slide: A prominent submarine landslide complex on the Great Barrier Reef margin of north-eastern Australia.
Inter-reefal biodiversity	Pitcher et al. (2007). Seabed biodiversity on the continental shelf of the Great Barrier Reef World Heritage Area.
	Sutcliffe et al. (2010). The most common sponges on the Great Barrier Reef seabed, Australia, include species new to science (Phylum Porifera).
	Hayes et al. (2020). Identified greater extent and importance of deep and shallow seagrass in the GBR.
Halimeda	McNeil et al. (2016). New constraints on the spatial distribution and morphology of the *Halimeda* bioherms of the Great Barrier Reef, Australia.
Reef health	Sweatman et al. (2018). Long-term Monitoring of the Great Barrier Reef, Status Report.
Fish diversity	Cheal et al. (2012). The distribution of herbivorous fishes on the Great Barrier Reef. Sambrook et al. (2019). Beyond the reef: The widespread use of non-reef habitats by coral reef fishes.

Bridge et al. (2016) undertook a quantitative analysis of 39 features (habitats and assemblages) that were poorly delineated or unknown at the time of the RAP rezoning (such as those shown in Table 3.3). They used a ArcGIS system to determine the extent to which the 39 features were protected within no-take zones in the 2003 Zoning Plan. Bridge et al. (2016) demonstrated that the GBR bioregionalization had deficiencies but provided an adequate basis for undertaking the RAP assessment and hence the 2003 Zoning Plan. Bridge et al. (2016) showed that 35 of the 39 features achieved the minimum objective of at least 20% protection (the minimum figure used for all 70 marine bioregions in the rezoning). The percentages of each feature in no-take zones ranged from 8% to 81% and were approximately normally distributed around a mean of 31%. Bridge et al. (2016) also showed that habitats and assemblages that were unknown at the time of the planning can be represented reasonably well by chance. Furthermore, a broader bioregional subdivision would have made little difference to the overall zoning outcome because of the subsequent planning methods used in the RAP/rezoning.
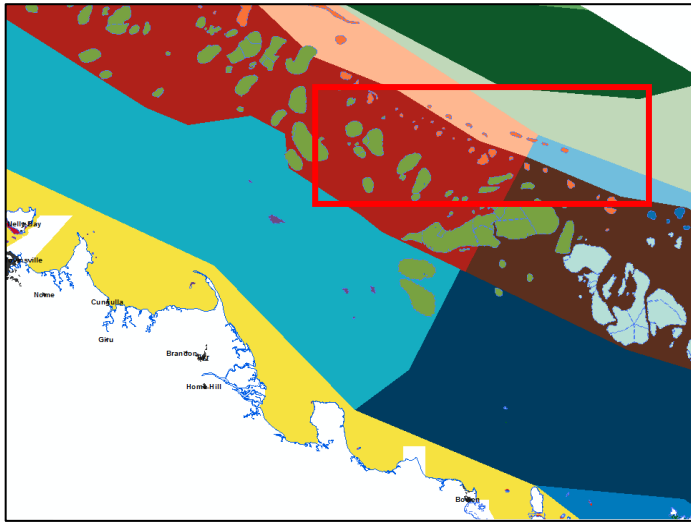
Figure 3.9   Part of the GBR showing examples of the reef and non-reef bioregions mapped by GBRMPA (2000) (see full map in Figure 3.2).
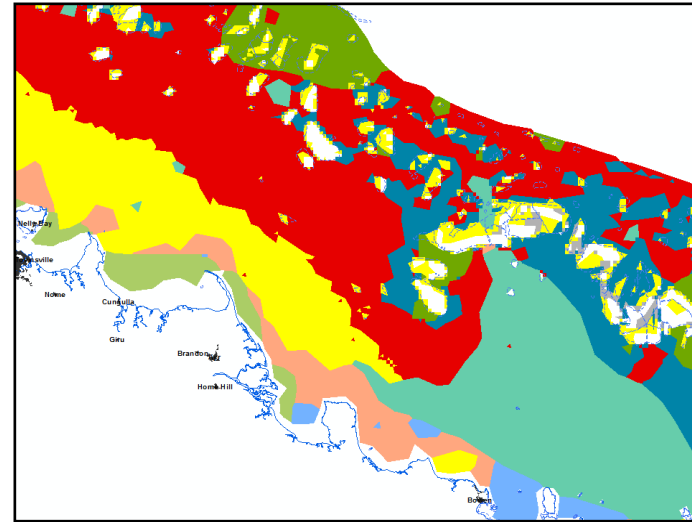
Figure 3.10 Same area as Figure 3.9, but showing the habitats and assemblages mapped by Pitcher et al. (2007) after their survey.
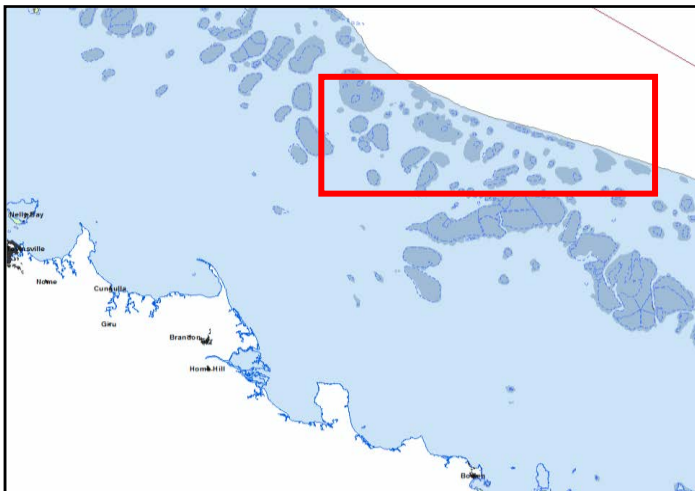
Figure 3.11 Same area as Figure 3.9; mesophotic reefs mapped by Harris et al. (2013). Compare reef size/shape inside the red outline with Figure 3.9.

Beaman, R. 2010 Project 3DGBR: MTSRF Project Final Rpt, RRRC
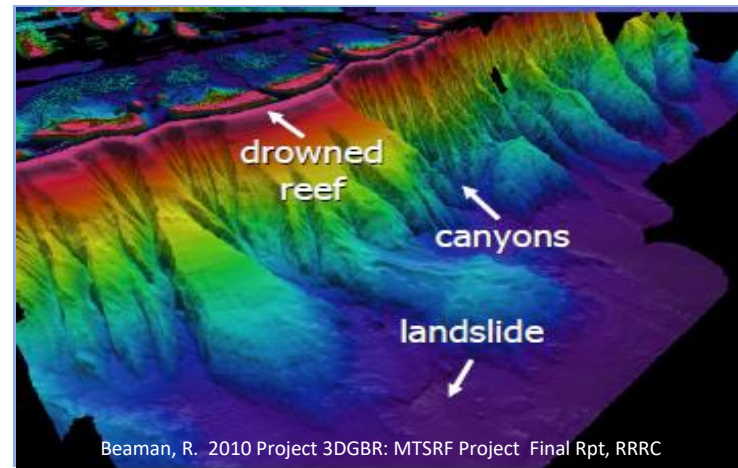
Figure 3.12 Schematic showing deep-water features mapped by Webster et al. (2016); this provides greater detail for deep water areas than the original bioregions.

3.8.2 Fisheries research following implementation of the zoning

Following the commencement of the new zoning plan in mid-2004, a variety of research projects have aimed to assess the impacts of the RAP/zoning. Given the significance of the GBR rezoning from the fisher's perspective (i.e., commercial, recreational and charter), it is relevant to briefly discuss these aspects, particularly as the subsequent research shows the benefits of no-take zones for fishers and fisheries. Various publications have emerged since the zoning was implemented, including both positive and negative perspectives about the impacts for fishers and fisheries; for example, some of the publications that were positive included:

- Russ et al. (2008) demonstrated that coral trout (*Plectropomus leopardus*) numbers rebounded by 31-75% on the majority of reefs that were closed to fishing after only 1.5-2 years.
- Williamson et al. (2004), Harrison et al. (2012) and Wen et al. (2013) conducted DNA parentage analyses of juvenile and adult fishes, and demonstrated that the no-take zones contribute to biodiversity protection and ecologically sustainable fisheries by supplying significant recruits to areas both inside and outside the no-take zones – as well as larval export, there is also the 'spill-over' of bigger fish from no-take zones into the adjacent fished areas;
- Grech and Coles (2011) assessed the interactions between the trawl fishery and spatial closures introduced by the RAP/rezoning. They concluded that most of the areas unavailable to trawling after new zoning was introduced in 2004 were either not trawled or not trawled regularly (<5 hours per year). Consequently, the increase in spatial closures resulted in a minimal change in the spatial footprint of the trawl fishery, hence limiting the socio-economic impact.
- Miller et al. (2012) showed that over a six-year period, coral trout populations declined on GBR reefs open to fishing, but stocks were maintained in no-take zones, highlighting the ongoing benefits of those zones.
- Pears et al. (2012) conducted a comprehensive ecological risk assessment of the otter trawl fishery in the GBR; their conclusion was:

  … zoning (particularly since rezoning in 2004) contributed to the relatively low ecological risks from the otter trawl fishery and is critical for protection of productive habitats, biodiversity conservation and maintaining ecosystem resilience. .. protection through zoning is an important measure which acts to limit spatial expansion of the fishery and potential risk to the ecosystem… (2012, Executive Summary, p. v)

- Lamb et al. (2015) found a four-fold reduction in coral disease prevalence in no-take zones in the GBR compared to areas where hook and line fishing was allowed. They showed that coral damage and the abundance of abandoned fishing line best explained the differences in disease assemblages between these two types of zoned areas.
- Hopf et al. (2016) showed by concurrently restructuring the Coral Reef Fin Fish Fishery, that the conservation benefits of the new zoning network were enhanced and the fishery cost of rezoning the GBR was socialized, mitigating the negative impacts on individual fishers. The combined management approach was shown to be more productive for fish and fisheries than if the rezoning had occurred alone and comparable to what would have been obtained using effort controls alone.
- Ayling & Choat (2008) built on work by Robbins et al. (2006) who had reported densities of reef sharks on two 'no-go' Preservation Zone reefs (pink reefs) five to 40 times greater than those on 'supposed' no-take zones (i.e., they may have still been subject to some illegal fishing). To see if similar shark abundance patterns were present in other GBR regions Ayling & Choat counted sharks and other large predatory fishes on two pink reefs in the offshore

Townsville region as well as on three nearby no-take zones and three fished Habitat Protection zone reefs (blue reefs). Densities of whitetip reef sharks (*Triaenodon obesus*) were twice as high on no-take zones as on blue reefs and were twice as high on pink reefs as on no-take zones. Similarly, grey reef sharks (*Carcharhinus amblyrhynchos*) were four times as abundant on no-take zones as on blue reefs, and twice as abundant on pink reefs as on no-take zones. There were similar patterns in the density of the common coral trout (*Plectropomus leopardus*), including 1.5 times more coral trout on green reefs compared with blue reefs, and 2.5 times as many on pink reefs compared with green reefs.

- Stowar et al. (2008) used Baited Underwater Remote Video Stations (BRUVS) on deepwater midshelf shoals in the southern GBR and '...showed that there was a clear effect of zoning, where the mean abundance index of species primarily targeted by fishing in the blue zone were half those of the same species in green zones that were closed to fishing in 2004....' (p. vi).

- Cappo et al. (2010) used BRUVS on inshore shoals to survey the influence of zoning on fish, sharks, rays, and sea snakes. While the results were not consistent among regions and species, the project clearly demonstrated that numbers and biomass do accumulate (through more and larger fish) in submerged shoal habitat in green zones.

- Emslie et al. (2015) and Sweatman et al. (2015) showed that the density, mean length, and biomass of the principal fishery species, coral trout (*Plectropomus* spp.), were consistently greater in no-take zones than on fished reefs over both the short and medium term. Overall, the GBR-wide biomass of coral trout was ~2.5 times higher in no-take zones than on reefs that were open to fishing. The differences in coral trout density and mean size translated into an 89% higher biomass in inshore no-take zones and an 82% higher biomass in offshore no-take zones. However, there were few differences in the density of most non-target fish species, the percent cover of benthic organisms, or the assemblages of fishes and benthic organisms between no-take zones and fished areas (Sweatman et al., 2015).

- Boaden and Kingsford (2015) conducted fish counts and habitat surveys at four GBR locations, comparing no-take zones, limited fishing areas (CPZs) and areas open to fishing. Their data highlight the effectiveness of no-take zones on the GBR for protecting both targeted species and ecological processes.

- Bonin et al. (2016) also looked at larval connectivity and demonstrated the network of no-take zones in their GBR study areas (the Keppel Islands) was demographically well-connected at both local and regional scales, providing an effective refuge from fishing. However, the no-take zones alone were not considered sufficient to ensure the long-term persistence of the fish population in the face of ongoing, and potentially widespread, habitat loss. There was an additional need of active habitat restoration for effective conservation.

Various papers that were critical of the GBR rezoning from a fisheries perspective have also been published:

- Lédée et al. (2012) found fishers were generally unsupportive of the zoning plan, with the perception they were not adequately consulted during the planning process.

- De Freitas et al. (2013) used a range of survey methods to investigate recreational fishers' views. Approximately 56% of fishers reported losing at least one of their regular fishing locations under the 2003 Zoning Plan. However, they shifted their fishing effort elsewhere and found new areas that they had not exploited previously.

- Fletcher et al. (2015) attempted to show that the GBR rezoning had failed by comparing commercial fisheries data from the GBR immediately before and after the closures were implemented. Their methodology, however, was criticised by Hughes et al. (2016), because they failed to consider the myriad of other management, economic, and social changes (mentioned

above in section 3.5.3.2). Hughes et al. concluded, '… a careful consideration of these issues seriously undermines [the Fletcher et al. (2015)] conclusion that the decline in catches are due almost exclusively to the expansion of no-fishing zones…' (Hughes et al., 2016, p. 637)

Another perspective is from the agencies directly involved in fisheries management; one of the interviewees noted that certain Queensland fisheries managers differed in their public and private views about the RAP/rezoning:

> … Queensland Fisheries … could see that RAP would very much help fisheries management in the sense of maintaining areas where fish could breed, numbers could build up … these were difficult decisions that they didn't have to make because [GBRMPA] was going to make them … privately many of them were supportive .. But certainly, in public forums …because of the nature of the politics of fisheries, they were proponents of the fishermen's [opposing] views... (interviewee R10).

The same interviewee went on to say:

> … Queensland took the view that whatever GBRMPA did below the low water mark, they would mirror above the low water mark [which] …. meant a lot of inshore fisheries, especially crab and net, were going to be impacted. … Queensland would never have done that off their own bat... so where [GBRMPA] put yellow zones, Queensland put them in place …**reluctantly, publicly …but privately quite happy to do it because it got them off the hook** [emphasis added] … (Interviewee R10).

An impartial indicator of the effect (or lack of it) of the revised zoning on recreational fishers is the number of recreational vessels registered over time. Figure 3.13 shows recreational boat registrations in the GBR catchment for the period 1987-2013. Despite dire predictions from recreational fishers during the RAP/rezoning, the 2003 Zoning Plan caused no obvious variation in the increasing trend of vessel registrations, either when the zoning plan came into effect or since.
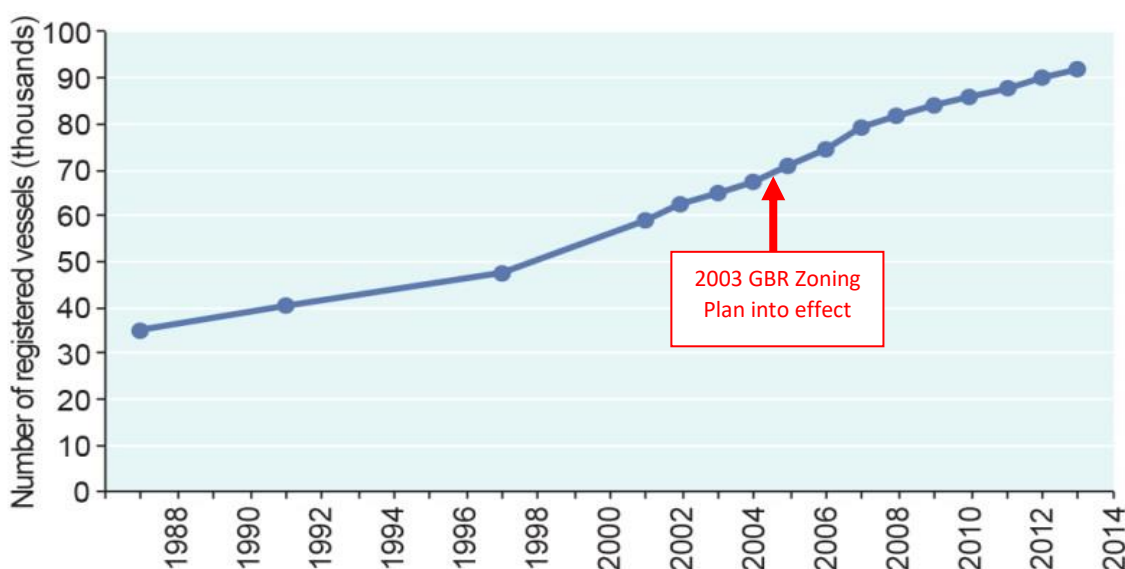
Figure 3.13 Number of recreational vessels registered in the GBR catchment, 1987-2013 (adapted from GBRMPA, 2014).

The concerns raised by recreational and commercial fishers were also obvious in the 2006 independent review of the GBRMPA Act (discussed in Chapter 8).

3.9 Lessons learnt about the role of science in RAP/rezoning

Various lessons were learnt during the RAP/rezoning about the role of science and scientists. These lessons are discussed in more detail in:

- ⎯ **Appendix A7** (specifically lessons #3, 4, 5, 6, 12, 16 , 17, 24, 26 and 34); and
- ⎯ **Appendix A8** (specifically lessons #15, 16 and 25).

Of these lessons, five are directly relevant to the role of science in marine spatial planning and zoning:

- A form of bioregionalization should be a prerequisite prior to developing a zoning plan.
- A comprehensive scientific understanding of an area to be zoned is not an essential prerequisite before developing a zoning plan.
- Zoning should aim to protect one or more representative examples of all known habitats within an MPA.
- Decision support tools/analytical tools may prove helpful although are not an essential requirement to undertake a comprehensive zoning program.
- Zoning has been shown to have spill-over benefits for fisheries, even if the protection of biodiversity is the main objective.

Additional lessons learned about the role of science for MSP/zoning include:

- Planning principles should not be seen as targets or ideal amounts and should be applied together as 'a package', not individually.
- Understand what scientific uncertainty means for providing input into a policy reform.
- Science alone, no matter how compelling, is unlikely to determine the final politically acceptable outcome.

Science will always play an important role informing future planning in MPAs. The science that was applied in the GBR to inform the RAP/rezoning, however, is now dated compared to what today would be considered 'the best available science'. The above lessons therefore need to be viewed in the light of what was happening in 1998-2004, and what might be needed today, especially in a rapidly changing climate.

3.10 Conclusion

This chapter has addressed the first of my research questions, i.e., What was the role of science and scientists in the policy reform process, how influential was science in the process, and what were the lessons learnt? In systematically documenting the role of science in the GBR RAP/rezoning, the subordinate questions posed in section 3.4 are also addressed. There is no doubt that the policy reform was science-initiated, and science provided an important underpinning for the RAP/rezoning. The final approved Zoning Plan was greatly influenced by the bioregionalization and the operational principles and resulted in the protection of representative examples of every one of the 70 bioregions (and hence what was known in the GBR at the time) in the revised zoning network. Furthermore, subsequent research has shown the final no-take zones network protected features that were not known at the time of the 2003 rezoning, an unintended but positive outcome of a comprehensive and representative approach.

The final zoning outcome, however, was far from solely a science-based conclusion, and it was definitely the result of compromise, accommodating a range of needs and socio-political requirements. Science influenced the policy process, and the scientists (in a limited way), also adapted their role in response to the policy requirements. When compared to the political and public processes, however, science was a far

less influential determinant for the success of the policy reform. As further addressed in Chapter 5 (section 5.4) and Chapter 7 (Table 7.1), the views of the majority of the public during the RAP/rezoning were not greatly influenced by any scientific reasoning including scientist's calls for greater protection of biodiversity. Science was a relatively important component of Phase 1. Science and scientists, however, played far less important roles in Phases 2 and 3 of the policy reform process (as shown in the Word Clouds in Chapter 4). Nevertheless, two aspects of science that were fundamental to the process were the level of collaboration between scientists, and the amount of data, time and effort provided *gratis* to assist the rezoning task.

Many of those who were involved, including the federal Minister, acknowledged the importance of the sound scientific underpinning, but also acknowledged the science was 'not all that strong'. The 'best available scientific advice' was used in the RAP/rezoning, and that undoubtedly helped to influence the final decisions. However, science alone was never going to be sufficient to accomplish this major policy reform. As one political interviewee concluded, '… some thought the RAP would succeed because it was based on sound science and computer technology… [but] it had no hope of success without the design of a satisfactory political process to achieve the result…' (Interviewee P1).

At the completion of the RAP/rezoning, a very small number of stakeholders considered some of the zoning outcomes were inconsistent with the scientific recommendations. Their view was that good science had been overridden by political compromises, particularly given the acknowledgement that science was 'a critical underpinning' for the program. No matter how compelling the science was, it alone would not have been sufficient to achieve or dictate the final zoning outcome in the GBR. Again, paraphrasing a comment from a key scientist, '…**the political process was so many times more important than the technical knowledge** [emphasis added]**.**… and how unimportant in the end in relativity to the whole thing, (was) the scientific knowledge….' (Interviewee T2). As outlined in section 3.2.2, the science world is different to the policy world, and policy making rarely follows a systematic scientific approach. Scientists need to be mindful that, irrespective of the veracity of the underlying science, scientists are only one of many stakeholders in policy deliberations. Policy making is about achieving what can be done (i.e., the possible), rather than satisfying all the diverse views and wants (which may be impossible)[31].

Far more influential than the science for the final outcome of the RAP/rezoning were the levels of community participation, the extent of political involvement and the leadership that resulted in the RAP/rezoning. These three factors are further addressed in Chapters 4, 5 and 6.

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[31] A modification of the quote attributed to Otto Von Bismarck "Politics is the art of the possible, the attainable — the art of the next best."

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Chapter 4 – The role of leadership in the RAP/rezoning

4.1 Introduction

This chapter addresses the significant role of leadership which was one of the four critical inter-dependent determinants for achieving a successful RAP/rezoning policy outcome in the GBR. Much of the success of the RAP/rezoning policy reform can be attributed to effective leadership that occurred at multiple levels with a variety of leaders.

The chapter begins with a discussion of various theoretical aspects of effective leadership, particularly at a time of organisational change such as a major policy reform. The body of the chapter then examines the pivotal role that leadership played in the RAP/rezoning policy reform (i.e., the leadership shown by the CEO and also various others within the organisation). However, rather than just a single effective leader, a 'lattice of leadership' is evident (Uhr, 2008). A team effort, led and supported by a duo of effective complementary leaders, is recognised as contributing to the success of the RAP/rezoning. The success also drew upon a range of others with complementary leadership traits and leadership styles at different times during the overall planning process. The 'lattice of leadership' also relied upon effective followership within GBRMPA and was augmented by other leaders outside the agency. Collectively, all these elements of leadership and followership contributed to the success of the policy reform.

4.2 What is leadership?

Much has been written about leadership (e.g., Alquist & Levi, 2010; Bass & Stogdill, 1990; Drucker, 1993; DuBrin, 2010; Economy, 2014; Evans et al., 2015; Goleman, 2000; Howard, 2005; Voon et al., 2011; Wart, 2003) and about leadership styles (e.g., de Vries et al., 2010; Dulewicz & Higgs, 2004; Politis, 2001). The majority of this writing is in the fields of political science or corporate management. The political science literature is largely theoretical (e.g., Young, 1991), while the corporate management literature is aimed at CEOs looking for solutions to business success. The leadership challenges for environmental policy making in the public sector are different and few practical lessons have been documented based on

experience. Evans et al. (2015) provide an overview of leadership relating to environmental policies, and leadership is now emerging as a challenge for socio-ecological issues (e.g., Fabricius et al., 2007; Manring, 2007; Olsson et al., 2006; Sutton & Rudd, 2015).

Some authors maintain that leadership is '… a somewhat bewildering enterprise as there is no unified theory of leadership… too many definitions, and too many theories in too many disciplines…' ('t Hart & Rhodes, 2014, p. 1). Certainly, there is a myriad of definitions of leadership; for example, Wart (2003, p. 221) lists five definitions in an administrative context. I prefer a simple definition of leadership as suggested by Ward (2020):

> … the art of motivating a group of people to act toward achieving a common goal... the leader is the inspiration for and director of the action. They are the person in the group [who] possesses the combination of personality and leadership skills to make others want to follow their direction… (https://www.thebalancesmb.com/leadership-definition-2948275).

Van Ingen (2007) helps distinguish what is leadership and what is management, by building upon a quote attributed to the 'father of modern management', Peter Drucker (1993), who said, 'Management is doing things right; leadership is doing the right things.' Van Ingen (2007) notes:

> ...Leadership is different from management, … management deals with the present, **leadership deals with the future.** Management deals with resources; **leadership deals with people and personalities.** Management deals with facts; **leadership deals with ideas** [emphases added].... (Abstract).

While leadership is different from management, they are linked and need to be complementary, especially during a time of organisational change such as a major policy reform. What makes an effective leader may relate to their position, their personality, their responsibility, their behaviour, or their ability to influence others… or a combination of these. Leaders develop '…their perceptions, attitudes, values, and way of thinking … based on their genetic disposition and the results of the environmental impact during their formative years...' (Howard, 2005, pp. 388-89).

Effective leadership can be regarded as involving a combination of leadership skills and the ability to think and act as a leader, especially when directing the activities of others. This implies the existence of an organisation and followers, with leaders having '… power over others in the organisation as a consequence of office, personal influence, persuasive capacity, charisma or coercion…' (Ahlquist & Levi, 2011, p. 3).

An effective leader is able to communicate effectively, provide a vision and clear direction, resolve conflicts, analyse problems, be adaptable, motivate and delegate appropriately, make sound decisions, ensure cohesion within an organisation, and lead others towards achieving desired goals (Burke & Collins, 2001; Voon et al., 2011; Wart, 2003; Yang et al., 2011). Imperial et al. (2016) wrote:

> ... it should not be a surprise to find that "leadership" is often cited as being a critical factor in the success of many large landscape conservation efforts. For example, Leach and Pelkey's (2001) review of 37 watershed studies revealed that participation by an effective leader, coordinator, or facilitator was one of the two most frequently cited keys to success... (p. 127).

4.3 Being a leader during organisational change

Organisational change often requires creating a new system, which in turn requires leadership (Fullan, 2007). Many therefore believe that major change is impossible unless a key player, often the head of the organization, is an active supporter. Transformations often begin when an organization has a new CEO or head person who is an effective leader and who recognises the need for a major change. Major change programs, however, often start with just one or two people. In cases of successful transformation efforts, the leadership coalition grows and grows over time. However, unless a minimum mass of co-workers soon become committed, the chance of anything worthwhile happening quickly diminishes.

Tichy and Ulrich (1984) suggest that organisational change is usually associated with a number of connected events or happenings, including:

- A 'trigger' event which indicates change is needed (in the case of the GBR, this was the recognition that the management of the GBR was failing to do what was legislatively mandated to protect the full range of biodiversity that existed);
- An unleashing of mixed feelings; there may be a positive impetus for change as well as a strong negative resistance from individuals and parts of the organisation (e.g., admitting that change is required may be seen as an indictment of past leadership); and
- A transformational leader to create a new vision, mobilize commitment to that vision, and institutionalise those changes by revamping the organisational culture.

A leader may also be defined through their actions and to do so, a leader often has to manage change with only their existing resources. Consequently, the challenge of being a leader may also involve communicating, inspiring and supervising, as well as trying to obtain additional resources.

> … the three critical skills for policy success, are political, managerial, and analytical. These skills need to be matched by … resources at three levels: systematic, organisational, and individual. **Leadership is inherent to the political skills that… form the arch-stone upon which the other skills rest…'** [emphasis added] (Howlett, Ramesh & Wu, quoted in Tiernan, 2015, p. 210).

Recognising that change is not easy, some managers are reticent, especially when faced with the challenge of moving subordinates out of their comfort zones. In contrast, an effective leader '….communicates trust and respect for followers' abilities to perform and achieve, [so] the internal motivation of the followers takes over and drives them to succeed…' (Bjugstad et al., 2006, p. 306).

4.4 Styles of leadership

Much of the literature on leadership refers to the relevance of leadership style(s). Styles of leadership are obviously a critical part of being an effective leader and '… can be thought of as the cumulative effect of all traits, skills, and behaviours…' (Wart, 2003, p. 222). Style of leadership is an important attribute for those who occupy such positions as CEOs or heads of organisations. However, while some people assume (mistakenly) that leadership style is more a function of personality, a good leader is able to make strategic choices about their styles of leadership. The best leaders are skilled at more than a single style and have the flexibility to switch leadership styles as the circumstances dictate. Goleman (2000) refers to six basic leadership styles (affiliative, authoritative, coaching, coercive, democratic, and pacesetting styles) and notes the more leadership styles that a leader exhibits, the better. Few leaders have all six styles of leadership in their repertoire, and as Goleman (2000) points out, even fewer know when and how to use them:

> …Leaders who have mastered four or more —especially the authoritative, democratic, affiliative, and coaching styles—have the very best climate and business performance. And **the most effective leaders switch flexibly among the leadership styles as needed** [emphasis added] **….** [they] don't mechanically match their style to fit a checklist of situations - they are far more fluid. They are exquisitely sensitive to the impact they are having on others and seamlessly adjust their style to get the best results... (p. 13).

Wart (2003) refers to 'the style needs of various situations', and continues, '…in addition to style needs (situational demands), style preferences and style range (a leader's repertoire of different styles) is the issue of style quality. Just because one practises a style extensively does not mean one is proficient in its use...' (p. 223). Howard (2005) notes a successful leader has a range of skills that allows them to use the appropriate leadership styles.

The relationship between leadership style and organisational commitment is noted by many authors (e.g., Limsila & Ogunlana, 2008; Lok & Crawford, 1999, 2004; Stander & Rothmann, 2008). Bass and Avolio (1993) recognise various types of leadership – including *transactional leadership* and *transformational leadership*. Transactional leadership focuses mainly on the physical and security needs of subordinates or followers; the relationship that evolves between the leader and the follower(s) is based on reward systems for performance (e.g., promotion, extra pay, or time off). In contrast, transformational leadership is basically a motivational process whereby leaders encourage subordinates or followers to put in extra effort and go beyond what they (i.e., the subordinates) expected before. The subordinates feel trust, admiration, loyalty, and respect towards such leaders and are motivated to perform extra-role behaviours (Bass, 1999; Katz & Kakn, 1978).

Of these two types of leadership, Dulewicz and Higgs (2004) propose a preference for transformational leadership on complex change projects and a preference for transactional leadership on simple projects. Other researchers (e.g., Turner & Müller, 2005; Yang et al., 2011) suggest that both styles may be effective at different phases of a project life cycle. Bass (1999), and Bass & Avolio (1993), consider that transformational leadership is the most effective leadership style in that it may foster increased job satisfaction, given its ability to impart a sense of mission and intellectual stimulation. Burke and Collins (2001) notes a transformational leader is able to '… develop positive relationships with subordinates in order to strengthen employee and organisational performance…' (p. 245) and is able to look beyond their own needs and focus instead on the interests of the organisation. Various authors therefore recognise the importance of assigning tasks to (other) leaders based on their preferred leadership style.

Yang et al. (2011) examined the relationship between leadership style, teamwork and project success and found that '…project managers who adopt transactional leadership and transformational leadership may improve team communication, team collaboration and team cohesiveness...' (p. 265). This supports research by Wart (2003) who assessed public-sector leadership and suggested there is a need for a comprehensive leadership model that integrates both transactional and transformational elements. Contrast this to the 'old-fashioned' approach in government, whereby it was considered that politicians were the transformational leaders and the bureaucrats in the public service were simply the transactional managers (Althaus & Wanna, 2008). I would suggest that this is not the case today.

Considering the question about whether leaders are born or made, Wart (2003) also notes that in contrast to the pre-1900 days of the 'great man theory' which assumed leaders were essentially born (and predominantly male), any question today should be framed as one of degree rather than a strict dichotomy. Wart (2003) goes on to state, '**Experience is likely the more important teacher**. In the extreme, … **leadership cannot be taught but it can be learned** [emphases added]...' (p. 222). In terms of

organisational knowledge and appreciation of the relevant issues, Wart (2003) also notes, '...leaders must have (or in some instances acquire) the basic technical knowledge of the organisation, often more for credibility than the executive function itself...' (p.222). This is obviously important in both the private and public sectors. Much of the early literature about leadership was based on the private sector whereas the need for effective leadership in the public sector today recognises there are different drivers, needs and challenges (e.g., **Althaus & Wanna, 2008**; Bridgman & Davis, 2004; Imperial et al., 2016; Moynihan & Ingraham, 2004; Sedwick, 2014; Shergold, 2004; Wart, 2003).

4.5 Leadership in the Australian Public Service

Leadership and policy making in the Australian Public Service (APS) are two significant responsibilities that depend on a variety of traits, not the least being the ability of ministers and senior officials to work together. Tiernan (2015) noted these challenges include '...the problems of autocratic, impulsive, vacillating or disinterested political masters', and '... the demands of political accountability and the media spotlight [which] overwhelm the interest in and capacity for longer-term thinking and planning...' (p. 213).

Shergold (2004) reinforced this view when he wrote '... the public service has been tarnished by politicisation, intimidation and demoralisation...' (p. 4), and that '... the role of the senior public servant has become more challenging...' (p. 8). Shergold (2004) refers to leaders in the public service needing to be frank and fearless in standing up to their ministers, and qualifies that by saying, '...equally important, and fundamental to their role, their advice must be responsive to the directions set by government and committed to the effective delivery of policy decisions taken by government...' (p. 12).

In 2013, amendments were made to the (Australian) *Public Service Act* 1999 to clarify leadership responsibilities in the APS. These amendments require leaders to remain responsible for delivering the government's agenda, and also to be forward looking, providing creative contributions to government about what the agenda should be (Sedgwick, 2014). Leadership is often regarded as the 'latest big thing' in public sector reform and frequently dominates the public sector agenda (Althaus & Wanna, 2008). The relationship between the minister and the departmental head is obviously an important variable and is addressed comprehensively in Podger (2009). It is assumed that when considering Ministers and departmental heads, that 'both are on the same side', at least for the life of the government. Althaus and Wanna (2008) explain that many public executives today would dispute this, maintaining, '... collaborative leadership between minister and bureaucrat ... is highly contingent; it waxes and wanes not only according to the era but also according to personalities and differences or similarities in work practice and style...' (p. 121).

Departmental leadership in the APS today is sometimes influenced by partisan staffers or ministerial advisers, who '....have become a third player within the traditionally bilateral relationship between ministers and officials...' (Tiernan, 2015, p. 213). Tiernan (2015) laments the growing influence of such advisers, maintaining many of the advisers '...have limited experience and even less expertise...' (p. 215). Podger (2009) provided a more conciliatory view, believing that Departmental Secretaries [i.e., heads of Departments] and advisers have different responsibilities, although share a common commitment to serve the minister, and so this requires '... secretaries and departments to build close links with advisers...' (p. 28). There is no doubt that the public service, its leaders, and ministers today remain vital to the development and review of public policy. As Weller (2001) points out:

> ...There is no problem in getting advice... it can be good or bad... The real problem is for ministers, not themselves always technically proficient, to select the good from the bad and to relate it to their own broader appreciation of political and economic realities and their own philosophical approach to the task of government... (p. 186).

Consequently, achieving policy reform requires leadership to happen at various levels; the relative roles of political leadership and leadership within agencies are both discussed further below. Being willing and able to undertake the challenge of a major change to public policy in a government agency requires numerous qualities indicative of a good leader, including the ability to adopt appropriate leadership styles.

4.6 Leadership at GBRMPA

As outlined in Chapter 1, *the Act* established the Great Barrier Reef Marine Park Authority (GBRMPA), a 'special statutory authority' responsible to the minister. The first permanent Chairman and CEO of GBRMPA was Graeme Kelleher who was appointed in December 1979, a position he then held for 16-years (1979-94). Graeme was followed by Ian McPhail as GBRMPA Chair and CEO (1995-1999). Prior to commencing with GBRMPA, both Graeme and Ian had been long-time public servants, and both had prior experience with natural resource management. Following Ian's departure, the staff at GBRMPA waited for the announcement of the next CEO and Chair. The (then) Federal Minister Robert Hill announced in July 1999 that The Hon. Virginia Chadwick had been appointed as the new CEO and Chair of the Authority. Virginia had spent most of her career in New South Wales (i.e., State) politics and was strongly aligned with the Liberal (i.e., conservative) party. One of the interviewees recollected:

> ... (Virginia) was very influential… she and Robert (Hill) were factional allies over a long period of time and .. Robert always wanted to give her a job … (they) had discussions about the environment and I suspect that Robert liked her approach to things... (Interviewee P3).

Box 4.1 provides my personal perspective about Virginia Chadwick as a leader, and how my initial misgivings were proven to be so wrong.

Box 4.1   Leadership at GBRMPA – a personal perspective

During my time at GBRMPA (1986-2014), I served under four Chairpersons/CEOs. Each of these leaders brought their own particular experience, skills, and leadership styles to the role.

When Virginia Chadwick was announced as the new CEO/Chair of GBRMPA in 1999, I was among the GBRMPA staff who, along with various academic colleagues, were initially both surprised and somewhat concerned. A retired State politician from New South Wales (NSW) who had been quoted as saying she knew little about the GBR seemed incongruous with what we thought we needed for a new CEO. Virginia Chadwick was virtually unknown to anyone in GBRMPA and from what we learned, it appeared her experience in natural resource management was minimal. We quickly sought to learn more and discovered that she had trained as a teacher and had entered the NSW Legislative Council in 1978, serving in both opposition and government. Her (State) Ministerial responsibilities included Community Services, Education, Training and Tourism. She also assisted the State Premier on Ethnic Affairs, Women and the Aged and had served as the first female President of the NSW Legislative Council.

Were these really the skills needed for that key position as the GBR faced new and emerging challenges? Our initial misgivings were not greatly allayed when Virginia Chadwick commenced as GBRMPA CEO/Chair, admitting that she knew little about the GBR and questioning some of the work that was currently underway, including the RAP! However, we all quickly learnt just how wrong we had been to prejudge Virginia's capabilities. Virginia Chadwick proved to be the most effective CEO I experienced over my career working in several Federal agencies, in numerous government agencies in four Australian States and Territories, and in Canada. Virginia Chadwick truly was the epitome of an extremely effective leader and during her eight years as GBRMPA CEO/Chair, she steered the agency through some extraordinary challenges to the pinnacle of its globally regarded reputation, with the RAP/rezoning being the most notable of those challenges.

Most of those who had anything to do with the RAP/rezoning from outside the agency believe that Virginia Chadwick played an exemplary leadership role throughout the RAP/rezoning, and section 4.9 and Appendix A6 outline how well Virginia was regarded as an effective leader. Few of those interviewed, however, were aware that Virginia was not enthusiastic about the RAP when she first joined GBRMPA and later considered it was not achievable – these are explained in the following section.

4.6.1 Leadership during the early days of RAP

In the early days of the RAP (early 1999-early 2000), it was hard to maintain momentum for the task as there were other important issues facing GBRMPA. For example, the revision of the Queensland Trawl Plan, declining numbers of dugongs and other iconic species, and emerging concerns with water quality, were all important and high-profile issues. The RAP was not a major focus for the agency, so it was not easy for my small team to remain focussed. One of the interviewees spoke about my role in the early days of RAP:

> ...from what I knew ….the most important person at the start of RAP was you … you drove the proposal ... without that, the process didn't exist, so I would say you were most important in the first part of it … **but then it only happened politically because Virginia was there … to recognize its value and move it forward** [emphasis added]...
> (Interviewee R4)

At a Senior Management Team meeting in January 2000, soon after Virginia Chadwick started as the new CEO/Chair at GBRMPA, all the Directors provided briefings about their programs within their Directorates. The new CEO/Chair listened intently when I outlined what the RAP was proposing to do and at the completion of the meeting, when compiling a summary of the briefing outcomes, Virginia concluded that the RAP was to be *'…largely a desk-top study…"* and *"... not take up too much time or resources*[32] *...'*.

The RAP team continued to develop material to undertake the RAP, including developing the bioregionalization and the planning principles as explained in Chapter 3. The team also prepared a presentation about RAP for the International Coral Reef Symposium in Bali in October 2000. When Virginia Chadwick saw the presentation in Bali, she realised the political implications of what was proposed. Virginia's comment to John Tanzer, one of the Executive Directors in GBRMPA at the time, was:

> ...You know, **we've got to kill this... this is not politically achievable** [emphasis added]. Why would we do this?... (John Tanzer, GBRMPA's Executive Director during the RAP/rezoning, PhD interview, August 2015).

John Tanzer's response to Virginia was:

> ...Let's have a look at this … if you fundamentally go to the question - Is the Reef adequately protected from a zoning perspective? … the answer is clearly no. We can't keep talking about world's best practice, or best managed reef ...or the best managed marine protected area, when essentially less than 5 percent is under a significant level of protection…
> (John Tanzer, GBRMPA's Executive Director during the
> RAP/rezoning, PhD interview, August 2015).

Virginia Chadwick subsequently changed her perspective about RAP, accepting the rationale as was explained, but as John Tanzer also added, '… she put me on notice … making it crystal-clear, you're in charge of ensuring this doesn't go off the rails politically ...' (John Tanzer, GBRMPA's Executive Director during the RAP/rezoning, PhD interview, August 2015).

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[32] Figure 4.5 provides a copy of the Senior Management Team minutes (January 2000) showing Virginia Chadwick's hand-written annotation written in December 2003, after RAP had become one of the biggest challenges to face GBRMPA.

Convincing the CEO/Chair was only the first step. Virginia then needed to convince the (then new) Minister, the Hon Dr David Kemp. Initially, Minister Kemp was cautious about the value of the RAP (Chapter 6 provides more detail):

> … I thought long and hard for some months about whether or not I should give the go ahead to the RAP -- or whether it should be shelved for an indefinite period -- and when I considered it, **I took the view that it had a chance of being successful because of the leadership and political skill that Virginia Chadwick had brought to the position of Chairman** [emphases added] of the GBRMPA and that she would need to use all her skills, alongside whatever skills I might have, to achieve the outcome. And because **she was politically knowledgeable and understood political processes**, that there was a chance that the RAP process could be successful…

> (Hon Dr David Kemp, Federal Environment Minister during the RAP/rezoning,
> PhD Interview, December 2015)

4.6.2 Identifying who were the key leaders in the RAP/rezoning

As the GBRMPA Director responsible in the early days of the RAP, I had ownership of the task although others clearly needed to become involved if the objective was to be realised. As the project evolved and grew, various leaders emerged, both within and outside GBRMPA, and they became increasingly essential for the continuation and the necessary expansion of the program.

In Question 2 of the interviews, interviewees were provided with a list of various positions or groups relevant to the RAP process, however, they were not provided any specific names against any of those positions. Interviewees were asked to identify which were the key positions for the three different phases of the RAP/rezoning process (i.e., Phase 1: prior to the official start of RAP; Phase 2: during the RAP; and Phase 3: when RAP was being implemented). Further, they were requested, wherever possible, to provide the name or names of the person(s) who were in those position(s) during the RAP/rezoning. In certain instances, the relevant names against a specific position (e.g., the Minister) may have seemed obvious. However, some of the interviewees' answers were noteworthy, being either uncertain or in a few cases, misinformed. Table 4.1 lists the positions that played important roles in the RAP/rezoning and provides a brief analysis of the answers provided for Q. 2 against those positions:

Table 4.1 Names against identified positions provided during the interviews
(from interview Question 2 requesting names of key actors)

Position identified	Analysis of the answers provided in the interviews
The Minister	Many interviewees assumed the Federal environment Minister was the same throughout the RAP/rezoning. However, twelve interviewees (i.e., 35%) mentioned there was a change in the relevant Federal Minister during the RAP process. The three interviewees from Queensland restricted their comments to only the relevant Queensland ministers.
The GBRMPA Chairperson/CEO	Most assumed the GBRMPA Chair & CEO was present throughout the RAP/rezoning and fourteen (40%) specifically mentioned Virginia as the CEO & Chair. Only six (17%) mentioned there was a different Chair/CEO (Ian McPhail) when RAP was first proposed within GBRMPA.

(Table continued on next page)

Position identified	Analysis of the answers provided in the interviews
The GBRMPA Executive Director(s)	Twenty (57%) of those interviewed knew that John Tanzer, as a Senior Executive at GBRMPA, was heavily involved in the RAP/rezoning. However, five of these interviewees (14%) assumed John and Virginia were the only Senior Executives from GBRMPA who were involved throughout. The remaining 15 knew there were other Senior Executives involved during RAP (and most of the 15 were able to provide at least one other name of an SES officer).
The GBRMPA Director responsible for RAP	Almost all of those interviewed knew I was involved with the RAP/rezoning, even if they were unsure of my position as a Director within GBRMPA. All 11 key RAP actors within GBRMPA, two of the three Queensland planners, and 7 of the 12 key sectoral actors knew my role was the Director in GBRMPA responsible for the RAP/rezoning. Outside those three groups, few knew who the responsible GBRMPA Director was.
The RAP Planning Team	Eleven of all interviewees (31%) knew of the RAP Planning Team and nine of these specifically mentioned Leanne Fernandes as the Manager of RAP. Seven (20%) interviewees also mentioned the names of other members of the RAP Team, with Belinda Jago being mentioned most frequently. Several assumed that the RAP Planning team included other groups within GBRMPA such as the Fisheries Issues Group or the Communications group. While these groups were heavily involved in the RAP, they were not part of the RAP Planning Team.
Local MPs (Members of Parliament)	Twenty-one (i.e., 60%) of those interviewed specifically mentioned one or more local MPs (Federal and/or State) who were involved in the RAP/rezoning. Eighteen of these interviewees mentioned multiple names of MPs who were involved. Note, however, the three Qld interviewees answered this question as if it were solely about State MPs.
Key scientists	Most interviewees knew that scientists played a key role at times during the RAP process (although there was confusion as to when that input actually occurred). However, only 14 (40%) of all those interviewed knew the names of any scientists who were involved.
Major GBR industries	Twenty-eight (i.e., 80%) of those interviewed readily listed key industries like tourism, commercial fisheries, and recreational fisheries, citing groups such as AMPTO, QCFO and Sunfish. However, only 13 (37%) were able to list specific names of individuals within those groups. Seventeen individual names of key industry actors were mentioned.
Key actors in other government agencies	Twenty-one interviewees recognised other Federal and State government agencies were involved. Other than the key RAP actors within GBRMPA or the Queensland RAP staff, few interviewees were able to provide relevant names of key personnel within any of those agencies.

(Table continued on next page)

Position identified	Analysis of the answers provided in the interviews
Environmental Non- government organisations (ENGOs)	Twenty-seven (77%) of all interviewees mentioned various environmental NGOs (ENGOs) that were involved in the RAP/rezoning, citing WWF, QCC, AMCS, ACF, CAFNEC, WPSQ, TWS and OUCH (see Glossary for the full names of these ENGOs). Of these, 21 specifically mentioned WWF as the key ENGO in the RAP/rezoning, and 11 (31%) mentioned the name of Imogen Zethoven, the GBR Campaign Manager within WWF.
Others involved	When asked if any other key names or groups were heavily involved in the RAP/rezoning, some interviewees suggested specific names before realizing those names fitted into groups listed earlier. Others, however, identified additional groups they considered were key actors during the RAP/rezoning: • the media was specifically mentioned nine times. • Local Marine Advisory Committees were mentioned six times; and • Local Government and/or Councils were mentioned five times.

Question 2 was asked early in the interview in order to give all interviewees a broad list of positions to think about, and also who the relevant individuals might be. The question enabled the interviewees to recollect names for specific positions, although it was not intentionally posed as 'a leading question' in that it did not provide any names. The interviewees themselves needed to recollect and then provide individual's names where relevant. However, many interviewees seemed to apply their initial thinking about these names when answering subsequent interview questions.

Having considered which positions and names played a major role in the RAP/rezoning in Question 2, the interviewees were then asked in Question 3 to rank the top four actors in priority order of importance during each of the three phases of the RAP (the three phases being, 'Prior to the official start of RAP'; 'During the RAP' and 'When RAP was being implemented'). In many cases, the interviewees mentioned (and wrote down) actual names whereas other interviewees chose to refer to generic groups (e.g., scientists, GBRMPA staff) who played a major role. Consequently, the data provided a combination of names of individuals, certain positions, and specific group names. When analysing the data, it was initially entered and sorted in an Excel spreadsheet i.e., 241 rows of data, which were then colour coded against 4 different levels (=priorities) of involvement as indicated by the interviewees -- primary, secondary, tertiary and 4th (lowest) priority across the three different phases of the RAP/rezoning. A small excerpt showing identified positions or group names is shown in Table 4.2.

Table 4.2   Excerpt from my Excel spreadsheet compiling the data from different interviewees as to how they prioritised various actors (either as a single position or a group) during the three phases of the RAP/rezoning (i.e., 'Prior to official start of RAP'; 'During the RAP'; 'When RAP was being implemented'.

	Priority	Prior to start of RAP	During the RAP	Implementation…
Interviewee AA	Primary	Min. Advisers	GBRMPA CEO and Chair	Federal Minister #A
	Primary	Scientists		
	Second	GBRMPA CEO and Chair	Min. Advisers	GBRMPA CEO and Chair
	Second	-	Scientists	Min. Advisers
	Third	Scientists	Federal Minister #A	Fishers
	Third	-	WWF	Tourism
	Fourth	Conservation NGOs	Politicians	-
Interview. BB	Primary	GBRMPA CEO and Chair	GBRMPA staff	Federal Minister #A
	Second	Federal MPs	Federal MPs	Federal MPs
	Third	Commercial fishers	Commercial fishers	Federal Parliament
Interview. CC	Primary	Federal Minister #A	GBRMPA CEO and Chair	Federal Minister #A
	Primary	GBRMPA CEO and Chair	-	GBRMPA CEO and Chair
	Second	GBRMPA Director #A	GBRMPA staff	Federal MPs
	Third	RAP Planning Team	-	-
Interview. DD	Primary	GBRMPA Exec Officer #A	GBRMPA Exec Officer #A	Federal Minister #A
	Primary	WWF	WWF	GBRMPA Exec Officer #A
	Second	GBRMPA CEO and Chair	-	-
	Third	Fishers	Fishers	Fishers

Further analysis showed the data comprised 47 individual names and 28 groups. With a few exceptions, the majority of individual's names are not referred to in the thesis. Instead, names have been replaced with the position they occupied (e.g., the name Virginia Chadwick is often replaced with her position as GBRMPA CEO/Chair). In Figures 4.1-4.3, individual's names have been replaced by the relevant type of actor shown in the left-hand column of Table 4.3 (e.g., the six scientists named during the interviews are not individually identified in this analysis, instead they are shown as Scientist #A, Scientist #B, etc). This has been done to improve understanding by those who do not know the individuals involved, enabling the results to be more widely considered. However, in certain instances in the thesis, the person's name has been retained, either because it was obvious or for reasons of clarity or emphasis.

Table 4.3 Individuals or groups identified as playing major role in RAP/rezoning
(data from Question 3 of interviews)

Type of actor	Named Individuals	Named Groups	Colour code *(for Word Clouds below)*
GBRMPA 'actors'	14	4	
Federal 'actors' *(other than GBRMPA)*	10	5	
Queensland 'actors'	10	6	
Scientists	6	2	
Conservation NGOs	3	2	
Fishers	3	4	
Tourism	0	1	
Local Government	1	0	
Indigenous groups	0	1	
Other groups involved in RAP	0	3	Black text only
TOTAL	**47**	**28**	

In Figures 4.1-4.3, a separate Word Cloud (or word cluster) is shown for each of the three different phases of the RAP/rezoning. In these Word Clouds, the bigger and bolder the word appears, the more often it was mentioned (during Question 3 of my interviews), and hence the more important it is considered to be.

- The **font size** is indicative of the number of times that particular name or group was mentioned.
- The **colour** indicates the type of actor as shown in Table 4.3; and
- Individuals or groups mentioned only once or twice are in a small font, so are unreadable.

The visual representation of the three phases using the Word Clouds demonstrates the emergence of different leaders at different times in the overall policy process. As expected, the predominant actors in the different phases of the RAP/rezoning do differ. Noteworthy trends include:

1. The GBRMPA CEO/Chair is the predominant name in all three phrases (i.e., in Figures 4.1-4.3)
2. Similarly, the GBRMPA Executive Director was identified as a key actor across all three phases
3. Certain names, such as scientists as a group and some individual key scientists, are obvious in Phase 1 but are much reduced or not discernible in Phases 2 or 3.
4. The size of the following names/groups <u>decreases</u> from Phase 1 to Phase 3:
    a. GBRMPA Director A (responsible for the RAP)
    b. RAP Planning Team
    c. Scientists overall
    d. Minister B
5. The size of the following names/groups <u>increases</u> noticeably from Phase 1 to Phase 3:
    a. Minister A (who was the main Minster throughout the majority of the RAP process)
    b. Federal MPs
    c. State MPs
6. The emergence of certain names/groups in Phase 3 only including the Prime Minister, the Queensland Premier and the Queensland Cabinet.

It is important to recognise these Word Clouds are generated based on the answers given in the interviews. How closely those answers (= individual perceptions) relate to the perceptions of others or to what actually occurred may be debated.

Figure 4.1
(i.e., Phase 1)

Font size in these Word Clouds is indicative of the number of times that a particular name or group was identified during Q.3 of the interviews.

The **colours** of names are explained by Table 4.3.

Figure 4.2
(i.e., Phase 2)

Figure 4.3
(i.e., Phase 3)

Figures 4.1–4.3   Word clouds of the major actors for the three phases of RAP/rezoning
(Word Clouds generated from quantitative data provided during the interviews)
- Figure 4.1 Major actors in Phase 1 prior to the official start of the RAP/rezoning
- Figure 4.2 Major actors in Phase 2 during the RAP/rezoning
- Figure 4.3 Major actors in Phase 3 when the RAP/rezoning was being implemented

Various people whose names or positions are not shown in Tables 4.1, 4.2, 4.5, 4.6 or Figures 4.1-4.3 played important leadership roles during the RAP (for example, within GBRMPA, the Director for Communications and Education, the Director of the Spatial Data Centre, and the Director of the Legal Services Unit all played very important roles during the RAP/rezoning). Consequently, the names provided during the interviews were those known by the interviewees and should not be regarded as an exhaustive list of everyone who was a leader or who was influential during the RAP/rezoning. As the researcher, I was only able to analyse and report on the data that was provided during the interviews.

Bias was introduced when those who were interviewed had a working relationship with the person they nominated, or if they had knowledge of, or a good understanding of, their role in the RAP/rezoning. For example, the political interviewees clearly knew more about the GBRMPA CEO or the Minister than about most others involved in the RAP planning process. Similarly, the Queensland interviewees favoured leaders within the Queensland planning process. All eleven GBRMPA staff who were interviewed (shown as Federal agency officials in Table 4.4) knew a lot about the roles during the RAP/rezoning of individuals such as the GBRMPA CEO/Chair, the GBRMPA Executive Director and the relevant GBRMPA Director. Irrespective of any biases, Table 4.4 shows the greater majority (i.e., 86%) of all those interviewed considered that the GBRMPA CEO/Chair was by far the most important leader in the RAP/rezoning. That same position was also a predominant one in all three Word Clouds representing the three main phrases of the RAP/rezoning (i.e., in Figures 4.1-4.3).

Table 4.4   Six leaders identified as playing a major role in RAP/rezoning

(based on frequency of choice of names in Q.3 and Q.6 regarding leadership traits across all interviews)

Broad groupings of interviewees	Code for analysis	Number of interviews per broad grouping	Individuals identified as playing a major role in RAP/rezoning (numbers = no. of times chosen by different interviewees)					
			The GBRMPA CEO/Chair	The GBRMPA Executive Director	The relevant GBRMPA Director	The Federal Minister	The ENGO Campaign Manager	The RAP Manager
Elected politicians	P	6	5	3	1	3	0	0
Key political advisers	A	3	1	2	1	0	1	1
Interest groups/ sectors	S	12	11	7	7	6	4	1
Federal agency officials	R	11	11	11	11	5	0	2
State agency officials	Q	3	2	1	2	0	0	0
TOTAL		**35**	**30**	**24**	**22**	**14**	**5**	**4**
Proportion of total			**86%**	**69%**	**63%**	**40%**	**14%**	**11%**

As shown in Table 4.4, 63% of those interviewed identified the relevant GBRMPA Director (i.e., my position) as among those who played a leadership role in the RAP/rezoning. This was, therefore, an obvious complexity in my research considering my role as an insider researcher who was also heavily involved in the process. Table 4.1 outlines those who knew of my role (the two not mentioned in that table were one politician and one political advisor). In Table 2.5, this issue is discussed from several perspectives including the willingness of interviewees to provide honest opinions about 'leaders' during the interviews. Consequently, the potential for bias throughout my research was addressed to the best of my ability (see sections 2.4 and 2.8), and the limitations of the methodology are acknowledged.

4.7 Leadership traits

There are particular leadership roles that are required at the outset of a policy change, while other roles are more critical during moments of deliberation or conflict. Other leadership abilities may be needed to champion the collaborative outcomes through to implementation (Agranoff, 2006; Bryson et al., 2006). To undertake these roles, certain leadership traits would seem to be advantageous, recognising that certain people have, or are able to acquire these traits, while others do not. Dowding (2008) explained that leadership traits often emerge '… because of the outcomes caused by certain decisions; how others viewed those outcomes; and how the leader subsequently made new decisions; and how others responded to those decisions…' (p.97). Dowding (2008) therefore maintained that leadership qualities and environment continually interact, and who becomes recognised as a great leader '…depends as much upon elements of luck… as any potential leadership qualities they enjoy…' (p. 101).

One of the questions in the interviews was intended to examine various leadership traits. In doing so it enabled me to explore several aspects:

a) Which traits were exhibited by which leaders involved in the RAP/rezoning?; and
b) Whether the combined list of leadership skills contributed to a more effective outcome than just a single leader?

In Question 6, interviewees were asked to choose and write the names of four individuals they considered provided a 'leadership role' in the RAP/rezoning (this built upon their answers in Q. 2 and 3). Again, no limitations were given regarding the four names that interviewees could chose, and this led to a wide range of names chosen as to who interviewees thought provided leadership during RAP/rezoning. A number of interviewees decided that leadership during RAP/rezoning came from a generic group (e.g., scientists, GBRMPA staff), so wrote group names rather than individual names. This led to a list of 26 different individuals and seven groups chosen across all interviewees. Once the interviewees had written down their four 'leaders' (and several insisted on choosing five), they were then asked to complete a table showing how those individuals rated against twelve leadership traits, adapted from Evans et al. (2015), as shown in the left-hand column of Table 4.5.

Table 4.5   List of Leadership traits assessed in Question 6 of the interviews (adapted from Evans at al. 2005)

12 traits specifically assessed in the interviews	Similar traits/skills *(building upon Wart, 2003; Dulewicz & Higgs, 2004; Arruda, 2016)*
Visioning	far-sighted; overarching sense of vision and direction; Invigorating the organisational culture
Knowledge-building	enabling personal development or learning
Innovating	transforming; a mechanism for modernizing; creativity
Securing community support	engaging; aligning with society
Securing political support	politically aware; astute
Linking actors	network; able to connect; cohesiveness
Trust building	build confidence; integrity; effective communication
Conflict resolution	problem solving; reconciling
Installing the right team	enabling; increased satisfaction amongst those conducting the work;
Securing additional resources	ability to identify and secure additional funds and/or staff
Delivering results	outcome-oriented; focussed on results
Ability to switch thinking between 'big' picture and detail	strategic, but also mindful that the small details also matter

To rate individuals, interviewees applied a scoring system (0, 1, 2, or 3) to indicate the relative level of each of the above leadership traits against each of their four chosen leaders, with the data entered into an Excel spreadsheet. The number of times that certain names were chosen was analysed across all interviewees to determine the leaders most frequently identified during the RAP/rezoning. Based on the frequency that specific names were chosen across all interviews, led to the list of six specific 'leaders' as summarised in Table 4.4.

The six individuals shown in Tables 4.4 and 4.6 were considered by the interviewees to be those who showed the greatest level of leadership during the RAP/rezoning (based on the number of times they were chosen by interviewees). The frequency at which they were identified varied greatly, as shown by the proportion of the total in the bottom line of Table 4.4. Several other leaders were also chosen by several interviewees, albeit at lower frequencies (e.g., one of the Federal MPs and a senior actor in the Queensland Department of Environment, were both chosen). Again, it needs to be stressed that these answers were based on the perceptions of those who were interviewed and may differ from other's perceptions or even from reality as to who were the actual leaders during the RAP/rezoning. However, the range of backgrounds of the interviewees was relatively broad and they all had a reasonable understanding of the RAP/rezoning process and knew many of the key actors.

Trust building was one of the traits that I explored during the interviews (Tables 4.5 and 4.6). In addition, trust was specifically mentioned by 22% of the interviewees as an important factor in the outcome. Trust is "...being increasingly recognized as integral to effective natural resource management...' (MacKeracher et al., 2018, p. 24), and various studies have demonstrated links between trust and positive outcomes in resource management (e.g., Evans et al., 2014; Gilmour et al, 2011; Smith et al., 2012; Turner et al., 2016).

Another point raised by several interviewees was the value of having those involved in the planning with the right skills 'on the ground' as they were able to relate effectively with the GBR stakeholders and understand local politics and community concerns along the coast of the GBR. This was preferable to having well-meaning but largely out-of-touch bureaucrats planning the GBR from Canberra or Brisbane. One senior political interviewee reinforced this point when assessing the list of leadership traits during the interview, commented on the skills within GBRMPA at the time, remarked '… these are the sort of skills that you don't necessarily get, through just putting any bureaucrat into this job ...' (Interviewee P2). A further analysis of the leadership traits of these six individuals was derived from a detailed spreadsheet developed from all interview responses.

4.8 Complementary leadership during the RAP/rezoning

Table 4.6 shows the leadership traits assessed in the interviews in ranked order for each of these six identified leaders based on the interviews. Note, the colour-coding in Table 4.6 is intended to show relative similarities across the 12 leadership traits; however, due to the data inequities between individuals, this coloured depiction of the data should be seen as a relative priority of traits and skills for each individual, rather than for conclusive comparisons *between* individuals. One interviewee, when asked to discuss these leadership traits, noted '…they're all critical … very critical .. because it worked. I think the package worked… it's not one thing or another, it's the whole thing together... each member of the team provided different levels of importance …'. (Interviewee T1).

The six individuals identified in Tables 4.4 and 4.6 were spread across the political, managerial and non-government sectors and the combined list of complementary leadership traits as shown in Table 4.6 (i.e., their respective leadership skills) contributed to effective shared leadership of the RAP/rezoning process. The colour-coding in Table 4.6 is only intended to highlight the relative priorities of those specific leadership traits *within* individuals. For example, the light green colour on 'Securing political support' was the highest rated trait for three of the identified leaders but for two other leaders, it was the lowest rated trait. It is also important to stress, that there were other important leaders involved in the RAP/rezoning, such as the Director of Communications and Education, and these collectively performed as an effective 'leadership team'.

Table 4.6 Key individuals: relative ranking of leadership traits based on interviews

(from Question 6 requesting leadership traits)

Note: Colour-coding is intended to show only the relative priorities of specific leadership traits; due to the data inequities across individuals, detailed comparisons between individuals should not be made)

	The Federal Minister	The GBRMPA CEO & Chair	The GBRMPA Executive Director	The relevant GBRMPA Director	The RAP Manager	The ENGO Campaign Manager
1st (**highest**) - rated trait	Securing political support	Securing political support	Delivering results	Delivering results	Knowledge-building	Securing political support
2nd -rated trait	Delivering results	Securing community support	Installing the right team	Knowledge-building	Delivering results	Delivering results
3rd -rated trait	Conflict resolution	Trust building	Securing political support	Ability to switch thinking – 'big' picture and detail	Ability to switch thinking – 'big' picture and detail	Securing community support
4th	Ability to switch thinking – 'big' picture and detail	Delivering results	Ability to switch thinking – 'big' picture and detail	Visioning	Visioning	Visioning
5th	Visioning	Conflict resolution	Visioning	Installing the right team	Innovating	Ability to switch thinking – 'big' picture and detail
6th	Securing additional resources	Visioning	Linking actors	Trust building	Securing community support	Innovating
7th	Trust building	Securing additional resources	Securing community support	Innovating	Trust building	Linking actors
8th	Securing community support	Ability to switch thinking – 'big' picture and detail	Knowledge-building	Securing community support	installing the right team	Knowledge-building
9th	Innovating	Linking actors	Conflict resolution	Linking actors	Linking actors	Trust building
10th -rated trait	Knowledge-building	Installing the right team	Trust building	Conflict resolution	Conflict resolution	Securing additional resources
11th -rated trait	Installing the right team	Knowledge-building	Securing additional resources	Securing additional resources	Securing additional resources	Conflict resolution
12th (**lowest**) rated trait	Linking actors	Innovating	Innovating	Securing political support	Securing political support	Installing the right team

4.8.1 A 'lattice of leadership'

A concept that seems particularly appropriate for what occurred in the RAP/rezoning is a 'lattice of leadership'. The term was first used by Uhr (2008) to describe '… a style of dispersed public leadership based on a spread of locations where powers and influence intersect…'. While Uhr (2008) was focussed more on the dispersal of leadership roles throughout a political system, he does suggest the …'**lattice of leadership '… is a model for organisational leadership more generally** [emphasis added] …' (p. 44). The term 'lattice of leadership' describes well what occurred with the leadership during the RAP/rezoning given there were a number of 'leaders' with various complementary skills. The inter-weaving of these skills was important, with certain skills sometimes predominating while others were less important, and then at other times this was reversed (Figure 4.4).

Figure 4.4   Image of an interwoven 'lattice' showing how certain strands are, at times, on top with others behind; this is then reversed in a woven lattice. The lattice is a metaphor for how the various strands of leadership are woven together (Image: source unknown).

The lattice of leadership that existed during the RAP/rezoning was largely due to happenstance, although Virginia Chadwick and John Tanzer kept a watching brief on those involved, and ensured any obvious gaps were filled. This is effectively what happened with the appointment of the Director of Communications & Education, Bruce Kingston, who was brought in by the CEO/Chair to fill an important role during the RAP/rezoning planning process. As recollected by one interviewee, '…we were all askance when [Virginia] appointed a communications person at that Senior Executive level but he was exactly what was needed for the task …' (Interviewee R1).

A 'collective' of leaders (Ulhøi & Muller, 2014) is what effectively happened in the RAP/rezoning. The individuals identified in Tables 4.4 and 4.6 contributed to the lattice of leadership with the result being an effective 'leadership team'. In conjunction with other important leaders, they collectively led to the totality of leadership which was a key determinant for the successful outcome of the policy reform process. The combination of the various traits contributed to the overall outcome, and the strength of the leadership group was reinforced by the interweaving of the traits/skills.

Effective leadership requires a combination of leadership skills, and it is unlikely that one individual has sufficient knowledge and all the skills to manage all the necessary aspects in a complex policy reform. Consequently, personal awareness of one's own strengths and weaknesses and being able to work effectively with others across all kinds of issues – managerial, social, ecological, political – is essential.

O'Toole et al. (2002) suggest that a range of factors contribute to the success of sharing leadership; in the RAP/rezoning those factors included complementary skills, complementary emotional orientations, and mechanisms for effective coordination. The relationships and coordination between leaders and their recognition of the level of complementarity was far more important than having effective leadership at any one individual level. One of the interviewees said (and another implied) that the RAP/rezoning succeeded because '…the planets aligned'. It was significant (and fortuitous) that those individuals recognised as key leaders were 'in the right place at the right time' and were all committed to the outcome of better protection of the GBR (Schultz et al., 2015). A similar perspective from another interviewee was:

> …why did this work? Because lots of people agreed… **you actually had to line up a lot of ducks… this is essential.. It's sad that you have to line up so many ducks, and maybe that's why this doesn't often happen** [emphasis added]… you only need one or two of those people fighting, and it falls to pieces...   (Interviewee S5).

The majority of those interviewed saw Virginia Chadwick as the most significant component of the lattice of leadership. Many of those interviewed, however, remarked on the roles of others who complemented Virginia Chadwick, for example:

> …the Minister and Virginia… they were the ones to really drive this through… (Interviewee A2)

> … if we had meetings with GBRMPA, it was always basically with Virginia [Chadwick] and [John] Tanzer…that was the sort of level we dealt with …. And they were always around each other anyway... (Interviewee S9)

> …[others] were the drivers …allowing Virginia to steer through the mire of other complexities, but I do think that the teamwork … was very, very special… there was trust in Virginia leading this team and a lot of confidence was developed amongst the team… (Interviewee T1)

Several of the sectoral interviewees spoke of the political leadership shown by the CEO/Chair and the minister:

> … a lot of work was put into the planning and the science … **but not a lot into the politics … we relied so heavily on Virginia and David Kemp** [emphases added] **…**and it was their personalities that carried it across the line … **had they not been there, it wouldn't have got across the line.**... (Interviewee S10).

One of the six leaders identified in Tables 4.4 and 4.6 was the (then) Federal Environment Minister David Kemp. As shown in Figures 4.2 and Figure 4.3 (i.e., the Word Clouds for Phases 2 and 3), the Minister played a significant role as assessed in the interviews, particularly in the second and third phases of the RAP/rezoning. The respective roles of politics and political leadership during the RAP/rezoning are further addressed in Chapter 6. An essential aspect of the lattice of leadership was the political leadership without which the RAP/rezoning would not have come to fruition. Virginia Chadwick's relationship with the minister was a critical part of the success of the RAP/rezoning. Several interviews raised this perspective. For example, an interviewee who was close colleague of Virginia noted, '…Virginia had a very good relationship with the Minister to understand where he might go and where he might not go…' (Interviewee T1). In discussing the role of political leadership, Moon (1999) recognised:

...political leadership must acknowledge the interaction between the leader's resources, such
as personal skills and political opportunities, and the constraints imposed by social,
economic, and political systems and historical circumstances... (p. 81).

A number of the interviewees highlighted the significant leadership role of Minister Kemp, for example:

…to get it through, Kemp really put his shoulder to the wheel … he was fantastic**.**… and he
backed Virginia…' (Interviewee S10)

… **Kemp played a major role in getting it through cabinet** [emphasis added] and .. getting his
own party's support for it..' (Interviewee S6)

Minister David Kemp wrote about political leaders in 2008:

… it is not the personalities of our leaders nor their rhetoric, nor the advisory structures with
which they have surrounded themselves, nor the pattern of lobby group pressures they
have faced, … but what our political leaders have believed, and what their purposes and
values have been: their credos[33]. Certainly, they have responded to circumstances, but
circumstances only create the opportunity for action... (Kemp, 2008, p. 206).

Five of the six individuals in Tables 4.4 and 4.6 were closely affiliated with GBRMPA or the government
and hence were 'inside the tent'; namely, the Federal Environment Minister, the GBRMPA CEO/Chair, the
GBRMPA Executive Director, the relevant GBRMPA Director, and the RAP Manager. The sixth individual
(Imogen Zethoven, the ENGO Campaign Manager) was 'not inside the same tent'. Imogen Zethoven was,
however, acknowledged in 14% of the interviews as playing a key leadership role in the success of the
RAP/rezoning (Table 4.4).

Another term in the leadership lexicon is 'shared leadership' or 'collective leadership', although some of
the literature about shared leadership (e.g., Bergman et al., 2012; Döös, 2015; Drescher et al., 2014;
Kocolowski, 2010) implies co-leaders (i.e., two leaders at the same level). In many ways, shared
leadership is what occurred between the CEO, Virginia Chadwick, and Minister Kemp, and similarly
between Virginia and John Tanzer, one of GBRMPA's Executive Directors. The advantages (and the
pitfalls) of shared leadership can equally apply to broader leadership teams, and '…the odds on the
success of shared leadership appear to go up when the individuals involved play different and
complementary roles…' (O'Toole et al., 2002, p. 74). As explained by O'Toole et al. (2002), shared
leadership is neither a new nor unusual concept, and it is appropriate, '… when the challenges a
corporation faces are so complex that they require a set of skills too broad to be possessed by any one
individual...' (p. 68).

Virginia Chadwick always maintained a close and effective working relationship with John Tanzer
throughout the RAP process. Interestingly, Virginia and John had opposing political backgrounds (see
Chapter 6), although they quickly developed a strong working relationship during their time at
GBRMPA. While this equated to shared leadership in one sense, it was not an equal or level co-
leadership; rather it was a complementary approach while still being hierarchical. John Tanzer
recollected the 'Sunday phone sessions' during which Virginia and he had regular tactical discussions
about the progress of the RAP/rezoning and what the priorities were for the forthcoming week. This
was a demonstration of 'adaptive management and adaptive planning'. Whenever any sort of 'course

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[33] A credo comprises a set of values and beliefs about what is important, what governments can and should do, and
how they can be most effective.

correction' was needed during the RAP, Virginia Chadwick discussed it with John Tanzer and they quickly moved to ensure it was undertaken. The consequent periodic refocussing and agility of GBRMPA's efforts contributed greatly to the success and the outcome. However, it was the totality of the leadership that was instrumental in the success of the RAP/rezoning. Nevertheless, one person unquestionably was the 'linchpin' of that combined leadership effort, and that was the CEO/Chair of GBRMPA, Virginia Chadwick.

4.9 The Hon. Virginia Chadwick AO: a remarkable leader

'Many leaders are competent, but few qualify as remarkable' (Economy, 2014, online)

The high proportion of interviewees (i.e., 86%) who referred to Virginia Chadwick as a key leader, showed how well-regarded the CEO/Chair's skills and abilities were considered, along with her role that led to the success of the RAP/rezoning. **Appendix A6** provides examples of interviewees' comments made during the interviews, and collectively these excerpts demonstrate why Virginia Chadwick was so highly regarded. Her role as CEO/Chair was significant and ensured that GBRMPA had strong political support as well as a high level of community support for the program. Many people associated with the GBR would agree that Senator Robert Hill's decision to appoint Virginia Chadwick as the CEO/Chair of GBRMPA was ideal for the time and when it came to the RAP/rezoning, she was definitely the right person at the right time (Mumford et al., 2008) [compare this to the initial views expressed in Box 1].

The CEO/Chair's role in securing political support was stressed by several political interviewees:

> … **Virginia's ability to secure political support** [emphases added]… I think that was helpful because there were a lot of coalition people up the coast and **Virginia had credibility with those people** and she of course had credibility with a large number of other people involved in the process... I regard this as one of the main benefits **of having somebody with (Virginia's) political background in the position**. I don't think there'd be another chair of a statutory authority who could stand in front of 700 screaming people and be unfazed by it or at least deal with it effectively… she dealt with it and she understood that…. (Interviewee P1)

Another political interviewee said:

> ... Virginia Chadwick was an awesome advocate for RAP – **I don't think RAP would have succeeded without Virginia … she was very highly regarded within the government** [emphases added]... a key factor …that the government trusted about Virginia was her political nose … but it's true. **Virginia was able to tell the PM and Kemp "Look, this is how it's going to play out ... if we do this, this and this, this is how it will play out politically" ..**. and she was trusted… (Interviewee P5)

As CEO/Chair, Virginia Chadwick did not micro-manage nor did she insist that she be in total control of every aspect of the RAP/rezoning. Consequently, she operated where she knew she had strengths and was happy to leave other aspects of leadership (e.g., knowledge building, innovating) to others in the 'leadership team'. When discussing the range of traits and skills required to undertake the RAP/rezoning, a senior political player said: '… I think (Virginia) probably would have got her way... I think she would have gone looking for people if [the skills] weren't there…' (Interviewee P2).

My experience with the CEO/Chair was that she demonstrated both transactional and transformational leadership styles. This was reinforced by most of the GBRMPA officers who were interviewed. For example, one of the GBRMPA interviewees outlined the high level of respect that the majority of the staff had for the CEO/Chair:

... Virginia subtlety guided us ... starting from a base of 4.5% no-take zones ... we had somehow got into our heads that maybe we'd end up with 12% or 13%, but **at some point Virginia somehow broke that rule totally** [emphases added] and ... we ended up putting out 30 percent, which at the time this happened was unthinkable ... so **her leadership took us from being conservative to being bold in what we were trying to achieve and that was absolutely pivotal**... (Interviewee R1)

Virginia Chadwick as the CEO/Chair earned and received great respect from GBRMPA staff and also from the Board (i.e., the Marine Park Authority) and most stakeholders. She was therefore able to gain endorsement for her commitment to both strategic change and transformation. The CEO/Chair also had an amazing ability to make everyone within GBRMPA feel their role in the organisation was important, whether you were a member of the Senior Management Forum or the lowest grade administrative officer. In particular, she built great loyalty amongst those in her Executive Management Group.

One of the CEO/Chair's great strengths as a leader was a willingness to change her mind when faced with better information. Figure 4.5 shows an excerpt from the January 2000 GBRMPA Senior Management Team meeting minutes where the CEO/Chair had initially concluded that RAP was to be '...largely a desk-top study which should not take up too much time and resources...'. In December 2003 after the RAP/rezoning had become one of the biggest challenges ever faced by GBRMPA (and cost many millions of dollars), Virginia gave me a copy of this minute with her hand-written annotation.

Figure 4.5 Excerpt from GBRMPA Senior Management Team meeting minutes (January 2000)
Note the items underlined; Virginia's hand-written annotation was added to this copy in December 2003.

Virginia Chadwick was unquestionably an extremely effective and well recognised leader. Box 1 (earlier in this chapter), considered Virginia's effectiveness as a leader was due to her wide range of leadership traits (see also Table 4.6), combined with her personal and professional character traits. However, this was not solely my personal perspective; across the range of those I interviewed, ranging from scientists to politicians to sectoral representatives, interviewees agreed that Virginia Chadwick was a politically astute leader and acknowledged her outstanding leadership skills and abilities[34] (see also Appendix A6).

It is clear from the research, however, that Virginia Chadwick could not have achieved the RAP/rezoning outcome alone, so recognition also needs to go to those who worked with her. As Bjugstad et al. (2006) note, '…**the effectiveness of a leader is to a great extent dependent on the willingness and consent of the followers** [emphasis added]. Without followers, there can be no leaders… ' (p. 305). In addition to the effective leadership team, there was also an effective group of followers, mainly within GBRMPA. Consequently, any discussion about leadership for the RAP/rezoning needs to also discuss the concept of 'followership' (Brumm & Drury, 2013; O'Toole, 2008).

4.10 Followership – the teams within GBRMPA during the RAP/rezoning

Followership has been defined as '…the ability to effectively follow directives and support the efforts of a leader to maximise a structured organisation' (Bjugstad et al., 2006, p. 304).   Bjugstad et al. (2006) point out the misconception that leaders do all the thinking and followers merely carry out commands. They suggest three conditions that must exist for followers to be highly motivated:

> …First, they must have the confidence that they can do the job expected of them. Second, trust is needed in their leader to tie outcomes to performance. Lastly, the followers need to be satisfied with the outcome(s) they receive… (p. 307).

The literature on teams indicates that leadership is a highly influential factor in effective teamwork as outlined below. Matthews and McLees (2015) maintain two aspects of an effective team are the product of an effective leader who firstly, is able to develop credibility and influence among team members, and secondly, establishes a motivating vision and goals for the team. Yang et al. (2011) found that projects with high complexity were more likely to be successful when they experienced a high level of team communication, team collaboration and team cohesiveness. Katzenbach and Smith (2005) discuss how an effective team's performance depends upon four key elements – common commitment and purpose, performance goals, complementary skills, and mutual accountability. Mutual accountability enables a team to achieve performance levels that are far greater than the individual abilities of the team's members. To achieve these benefits, team members must listen, respond constructively, provide support to one another, and develop a strong commitment to a common objective.

Within GBRMPA there were many effective staff who, as followers, demonstrated they were independent, innovative, and loyal, yet willing to question leadership. The diversity of tasks that were required across the agency to achieve the policy outcome is shown by the list of groups in **Appendix A5**. The majority of these officers were within a series of effective teams as outlined In Table 4.7. This hierarchy of effective teams <u>within</u> GBRMPA was a key aspect of the success of the RAP/rezoning. The highest level 'team' comprised the GBRMPA CEO (Virginia Chadwick) working closely with John Tanzer as one of the GBRMPA Executive Directors. To ensure that the RAP/rezoning was coordinated across the

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[34] Virginia Chadwick is also remembered for other major achievements while leading GBRMPA for eight years as CEO/Chair. These achievements include vastly improved relations with the tourism industry, the introduction of formal agreements with Traditional Owner groups, the Reef Guardians programs, improved community partnerships and increased funding for field management.

entire agency, John Tanzer established a Senior Management Forum (SMF). The Directors of all relevant groups across GBRMPA met regularly within the SMF to ensure they addressed their relevant issues. John Tanzer, as Executive Director, made it clear who was the lead group within GBRMPA responsible for the RAP/rezoning:

> ... the only way we were going to get this through was to have a dedicated team which was given priority… I said to the Virginia at the time, **"We do this; we do it well. We don't do much else, otherwise this is not going to work"** [emphasis added]… there had to be part of the organisation that was entrusted with this – with a leadership role and leadership means making decisions – and that was the RAP Planning Team headed up by Jon Day …

> (John Tanzer, GBRMPA's Executive Director during RAP/rezoning, PhD interview, August 2015).

The SMF was extremely effective, providing guidance and facilitation across the agency, and enabling the GBRMPA Executive Management Group to monitor progress. SMF team members were encouraged to use the SMF as a sounding board for ideas and to communicate openly with mutual respect. This helped to build more trustworthy working relationships and a culture of collaboration, teamwork, and productivity including 'collective work-products' (Katzenbach & Smith, 2005; Whetten & Cameron, 2011).

One of the interviewees who was a member of the SMF recollected:

> … operating as a team is probably the best thing we ever did and that's **probably the best team I've been part of … there was a genuine desire across the organisation to get the best outcome for the Reef and the Marine Park** [emphasis added] … there were some quite robust discussions, but at the end of the day there was a consensus on points and people had to suck it up and get on with it. You didn't have time to ponder things too much …. Suck it up and move on… (Interviewee R7).

Table 4.7 Some of the key teams within GBRMPA during the RAP/rezoning (see **Appendix A5** for more detail about the diversity of tasks across GBRMPA)

Team	Primary functions of the team during RAP
Executive Management Group	The core leadership team for the RAP/rezoning was Virginia Chadwick (CEO/Chair) and John Tanzer (Executive Director).
Senior Management Forum (SMF)	Comprised all relevant GBRMPA Directors, and the RAP Manager, all of whom had specific responsibilities relating to the RAP/rezoning
RAP Planning Team	Members played pivotal roles on the regional planning groups, analysing public submissions, providing major input into key documents (e.g., the Zoning Plan, brochures, updates, the Regulatory Impact Statement etc).
Fisheries Issues Group	Played pivotal roles on the regional planning groups, worked with fishers, peak bodies and Queensland fisheries managers and their data to understand the issues and help refine the zones.
Spatial Data Centre	Produced hundreds of maps including the GIS overlays which helped develop the Zoning Plan; also, post-hoc reporting of numerous zoning options and the final detailed boundary descriptions
Communication & Education Group	Coordinated the community information programs and media campaigns, maintained the GBRMPA website and answered numerous public enquiries
The Legal Services Unit	Prepared the statutory Zoning Plan including working closely with the legal draughters (Federal and State); also prepared the Regulatory Impact Statement and related information

Interviewee R7 noted that,'… **everyone was totally committed and totally focused ….and totally believed in what they were doing** [emphasis added] …and that created its own energy and drive and focus…'. Below the SMF there were a variety of other teams, each with an effective leader as shown in Table 4.7. One of the interviewees noted, '...we had leadership at a whole range of levels...' (Interviewee R1). Another recollected. ' …the whole of the staff of GBRMPA were engaged in this project. From the top to the bottom, and I think it was wholly consuming because a lot of people just left their normal 'business as usual' and did things for RAP ...' (Interviewee T1).

In determining what might be an optimal number of teams appropriate for a complex policy reform in a public sector organisation, O'Toole et al. (2002) suggest, '… roles and tasks can be divided along as many lines as there are individual skills and interests on one axis and organizational needs and opportunities on the other...' (p. 78). Virginia Chadwick and John Tanzer collectively provided empowerment and guidance, however, they did not micro-manage the various teams. This was reinforced by one of the interviewees who stated, '…John and Virginia were the enabling executive … while they were giving us 'top cover', they were guiding us … ….in terms of executive leadership, they were exemplary throughout...' (Interviewee R1). The effectiveness of the executive duo providing excellent leadership and management was recognised in interviews across various sectors and was recognised by more than 25% of all those I interviewed.

Interviewee R8 noted the involvement of most GBRMPA staff across the agency:

> …**we wouldn't have been able to do this, without everyone getting involved** [emphases added] …from the secretaries, to the person on the front counter answering enquiries … I can't think of anyone that didn't step into the breach when required. And we were also keeping the business running … because you'll recall we were restructuring the tourist industry at the time, the latency… also the review of day-to-day management … upgrading the whole research program ... and it was the start of the water quality stuff. **There was so much going on .. so, all those unknown staff members** (like 'unknown soldiers') **… shouldn't be forgotten ..**. (Interviewee R8).

Given the workload and time constraints there were several tense situations and some robust discussions within parts of GBRMPA. Occasionally there were lapses in behaviour due to the pressures on the participants. Interviewee R6 recollected, '...there was internal friction and tension at times …', recalling one occasion when two participants in a regional planning group had to be restrained by their colleagues as they tried to settle a disagreement in a manner which was 'outside the Public Service code of conduct'.

Another interviewee who was not a GBRMPA employee, recollected the wide range of GBRMPA officers involved in the RAP:

> … it was **very much an organisation-wide effort and it had to be**…. That was one of the keys to success. If it had just been an elite separate group in the organisation, it would never have happened... Everyone had to have a stake in it, and everyone did ... (Interviewee A2).

Undertaking a major policy reform in any organisation also requires an ongoing need to manage the resources (including staff and operational funding) within that organisation. As the RAP/rezoning developed into an enormous task, it required considerable resources. One of the interviewees recollected, '... during the RAP, they wouldn't give Virginia any additional resources ….she had to reallocate within the agency... we had to cut back everything else to fund it...' (Interviewee S10). Despite the concerns raised by some GBRMPA officers about other important tasks that were facing the GBR at

the time, the Executive Management Group determined the agency's resources were to be primarily directed to ensure the RAP/rezoning was completed within a specific timeframe. Specific management decisions required during the RAP/rezoning are covered elsewhere. For example, coordinating the wide range of scientific input at the start of RAP is addressed in Chapter 3; all the public engagement methods discussed in Chapter 5 required resources and coordination; and the assessment of the unprecedented number of public submissions required coordination and the reallocation of staff resources.

4.11 Leadership in other sectors during the RAP/rezoning

Appendix A4 provides a list of the key actors (e.g., politicians, sectoral leaders, local government representatives, Chairs of GBRMPA's Local Marine Advisory Committees), many of whom showed leadership or were heavily involved during the RAP/rezoning. The results from my interviews revealed many individuals were regarded as showing 'leadership' during the RAP/rezoning across the different sectors and organisations involved. Leaders other than within government who were identified in the interviews included the following:

- *Imogen Zethoven,* the GBR *C*ampaign Manager for WWF Australia, was identified as a leader by many and certainly amongst the conservation ENGOs. Bringing the ENGOs together with a unified voice was actually an enormous challenge, particularly as most ENGOs were extremely opposed to the RAP/rezoning at the start of the program. The main reason was the Regional Forest Agreements which were opposed by the ENGOs, had been based on three key planning principles (comprehensive, adequate, and representative – the CAR principles). As a result, these principles and the resulting CAR reserve systems were not well regarded by ENGOs, which led initially to a deep scepticism about the RAP amongst most environmental groups around Australia.

  > …I came into this campaign.. **surrounded by groups who basically thought it was a problem … my challenge was to try to convert them, so I undertook a variety of measures to convince the NGOs** [emphasis added] … one of the key things that I organised was a science workshop for the benefit of NGOs .. we invited Hugh Possingham, Trevor Ward, and a bunch of others to a two-day meeting … by the end of that workshop everyone was exhausted, [but] ... an enormous trust had been built up between the scientists and the conservationists … although there was still a little bit of scepticism because it was a government program …
  >
  > (Imogen Zethoven, GBR Campaign Manager WWF,
  > PhD interview, December 2015)

  Several of the political interviewees spoke highly of Imogen; for example, one recollected, '…Imogen was ferocious … and a very good campaigner … she prowled the halls of Canberra… talking to anybody she could bail up...' (Interviewee P5). Another politician observed, '…Imogen is by far a better politician than she'd ever be a scientist or reef administrator ... [she] is very astute ...very clever… and a political manipulator...' (Interviewee P3).

- *Ted Loveday* and *John Olsen* were leaders within the Queensland Seafood Industry Association (QSIA) and represented most parts of the commercial fishing industry during the RAP/rezoning, so were considered leaders by that sector. QSIA was able to convince Minister David Kemp to consider various last-minute considerations before the zoning plan was finalised (see Chapter 3). The QSIA also pushed hard for the Structural Adjustment Package (see Chapter 6).

- *Prof Terry Hughes* (James Cook University) and *Prof Hugh Possingham* (University of Queensland) both assisted in gaining Ministerial approval in Canberra for the revised RAP/rezoning before the plan went to Cabinet. As one interviewee recollected, '… Terry was quite instrumental in getting [Minister] Kemp to feel comfortable…' (Interviewee A2).

- *Daniel Gschwind* (Chief Executive, the Queensland Tourism Industry Council) was identified as a leader for the tourism industry during the RAP/rezoning: ' …[Daniel] played an incredibly important role...he's a really enlightened individual and the kind of representative that the industry needed at the time…' (Interview S6).

- *Cathy Taylor* was identified as a leader within the Queensland Parks & Wildlife Service. A Queensland interviewee recollected, '… [Cathy] was instrumental in steering the project through the [Queensland] political maze ... at the time she had very good connections because of her wealth of experience in State Government … in Premier and Cabinet, and in the whole machinery of government... (Interviewee Q2).

So, leadership occurred in many sectors and organisations outside GBRMPA as well, and these all contributed to the overall success of the RAP/rezoning.

4.12 Conclusions about the significant roles of leadership and followership in the RAP/rezoning

There is no doubt that leadership occurred at a number of levels during the RAP/rezoning. From the interviews, and also from various other perspectives, Virginia Chadwick as the CEO/Chair, was widely regarded as an extremely effective and transformational leader. Her role in ensuring the outcome of the RAP/rezoning remains her most high-profile legacy at GBRMPA. The reality, however, is that Virginia Chadwick's exceptional leadership alone would not have achieved the success of the RAP/rezoning. It was a team effort comprising a wide range of complementary teams, each with their own effective leader, and all coordinated by an effective leadership duo.

The perspective of power being conferred by others to someone who outwardly is regarded as a good leader is not dissimilar to the example given by Gustafson (2008) who states '… a president or prime minister may be the most influential person in a party or state, [but] he or she is not solely responsible for either successes or failures. In a sense, power is conferred by allies and followers…' (p. 110).

Building on the concept of a 'lattice of leadership' as discussed above, the success of the RAP/rezoning was due as much to a cohesive leadership team lead by an extraordinary leader (namely Virginia Chadwick) who was complemented immensely by the Minister and by her deputy (John Tanzer) along with a group of other committed and effective leaders. As alluded to several interviews, it was fortuitous that this group of committed players were all involved and driven to collectively achieve the outcome. The 'planets aligned', enabling this to occur. Nevertheless, the significant role of individual key leaders in securing the policy outcome of the RAP/rezoning should not be underestimated. Based on the interviews (and triangulation between various interviews), it is clear that:

- Without the CEO/Chair's initial agreement within GBRMPA, or the Ministers approval to allow the RAP/rezoning to proceed, the policy process would not have progressed past being just 'a good idea within GBRMPA'.
- Without the remarkable leadership shown by Virginia Chadwick, as the CEO/Chair, along with her deputy John Tanzer, then GBRMPA staff would themselves not have given a high level of commitment over such a prolonged program.

- Without the political leadership shown by both the CEO/Chair and Minister Kemp, and the political trust they both developed, it is unlikely the RAP/rezoning would have got through 'the political complexities' in Canberra as it did.
- While there were many leaders at different stages of the RAP/rezoning, only a few key leaders were critical throughout virtually the entire period of the policy reform. Neither the GBRMPA CEO/Chair nor the GBRMPA Executive Director were directly involved from the very start of the RAP/rezoning program, although both subsequently provided the most comprehensive and long-term leadership during the program.

When it comes to leadership, most of the political actors that were interviewed would agree with one of their colleagues who said:

> … the key lesson is to understand that environmental protection depends ultimately on the support of people and **the principal mechanism for achieving the support of the people is a political process of leadership** [emphasis added]. And no protection of the environment is safe without the continuing support of the political process and leaders who believe in the conservation and strengthening where possible of ecological systems... (Interviewee P1).

As 't Hart and Uhr (2008) note, leadership is often exercised '… most visibly and decisively at certain critical junctures…' (p. 13). The RAP/rezoning policy reform was certainly a critical juncture in the 40+ years of the existence of the GBRMPA. Olsson et al. (2008), in extolling the success of the RAP/rezoning in the GBR, noted:

> ...The RAP process shows **the role of skilful leadership for moving between stages and across multiple organizational and political levels** [emphasis added]; first when the executive team allocated internal resources for developing the RAP, and second when the Chair of GBRMPA, Virginia Chadwick, won the critical support of David Kemp, the Federal minister, for proceeding with RAP and the new zoning plan. Leadership issues have been addressed in several studies … but not in the context of understanding transitions to ecosystem-based management... (p. 9493).

The resulting complementary 'lattice of leadership' that occurred throughout the RAP/rezoning was a significant contributor to the success of the program. Consequently, when there is a need to address a policy reform of a complexity similar to the RAP/rezoning, the concept of a 'lattice of leadership' (or certainly shared leadership) should be considered. Olsson et al. (2014) also recognised the important roles of institutional entrepreneurship and transformational leadership, including a '...focus away from the role of individual leaders to interacting key individuals...' (Art. 1). Lessons about the role of leadership are discussed in more detail in:

— **Appendix A7** (lessons #6, 10, 13, 15, 17, 23, 19, 33, 36 and 38); and
— **Appendix A8** (lessons #2, 7, 8, 10, 12, 14, 18, 19 and 20).

If there is an overall formula for policy reform based on the success of the RAP/rezoning, two key components of that formula would be effective (or shared) leadership and effective followership. Considering the lessons from this chapter, I would suggest the following played significant roles in the success of the RAP/rezoning:

Shared Leadership + Effective Followership (+ commitment + passion + trust + luck)

Given the findings in this chapter, it is intriguing that texts that are often cited as being informative sources about the theory and practice of policy making (e.g., Bridgman & Davis, 2004; Edwards et al., 2001; Thomas, 2007) do not convey more overtly the importance of effective leadership in policy development. These texts do, however, recognise the importance of politics and the community, and these aspects are discussed in my next two chapters.

'Leaders instil in their people a hope for success and a belief in themselves.
Positive leaders empower people to accomplish their goals' [source unknown]

Chapter 5 - Public engagement though participation

5.1 Introduction

Public engagement was shown to be an integral component of the RAP/rezoning program. This chapter shows the program for engagement and participation was effective, targeted, and sustained, and a critical cornerstone of the policy reform. At that time, it was the most comprehensive program of public engagement for any environmental planning task within the GBR and arguably in Australia. The political imperative to engage the public is widely recognised as necessary for environmental planning, although few environmental researchers drill down to specifically discuss how this should be undertaken at different stages of an overall planning process. In this chapter, I first define who comprised 'the public'. I then outline a number of the main challenges for effective public engagement during the RAP/rezoning. A variety of methods were applied by GBRMPA to address these challenges; for example, community information sessions and targeted media were two extremely effective ways to engage. The range of methods used throughout the RAP/rezoning process is examined, along with the roles played by various key sectors during the engagement program. The significance of the media is discussed as the media played an important role throughout the policy process. The chapter concludes with an evaluation of the effectiveness of the public engagement program along with the key lessons learned during the RAP/rezoning. Several of these lessons about engagement are relevant for future major policy programs in the GBR and are also applicable to environmental policies elsewhere.

5.2 What is public engagement?

In recent decades, public engagement (also known as 'public participation', 'community participation' or 'stakeholder involvement') has become a regular component of environmental decision-making. This is not a new concept. For example, Arnstein (1969) wrote about a 'ladder of citizen participation', arguing for improved levels of participation in planning processes. Around the same time, the public's role in conservation in Australia started to change markedly, along with some bureaucrat's understanding of the changing role. This was noted by Judith Wright, the renowned Australian poet and conservationist who highlighted the role of public opinion in conservation in 1969, and wrote:

> ...To the scientific conservationist who has experience in dealing with public attitudes to his
> programs, it may … seem that public opinion is one of the chief blocks on the way to proper

> planning of resource use … yet only public opinion – educated public opinion – will be the
> decisive factor in the fight... (Wright, 1969, p. 43).

Public engagement in decision making is today widely endorsed in academic and policy circles (e.g., Appelstrand, 2002; Beierle & Konisky, 2000; Chwalisz, 2020; Dovers et al., 2015; Petts & Leach, 2000; Reed, 2008; Rowe & Frewer, 2005; VAGO, 2015). One of the various definitions of public engagement is '...the involvement of those affected by a decision in the decision-making process...' (International Association for Public Participation, quoted in the Victorian Auditor-General's Office (VAGO), 2015). Various authors (e.g., Bäckstrand, 2003; Innes & Booher, 2007; Petts, 2006, 2008) consider that effective public engagement is the 'right thing to do', leading to improved decisions, strengthening democracy and building public trust in key decisions and decision-makers. The increasing desire by civil society to be more involved in policy development, and the increasing complexity of policy making (for example, considering alternatives, consequences, risks, and trade-offs), are among the numerous reasons why effective public engagement and participation are important; however, such participation is not a 'one-off' static occurrence and needs to be regularly reviewed.

Appelstrand (2002) referred to public participation as constituting '…a prerequisite for legitimacy – and thus acceptance of laws and decisions...' (p. 289). Most government agencies today promote public engagement as an essential part of decision-making, recognising '…the credibility of a decision is enhanced when it is perceived to be the product of an open and deliberative process...' (VAGO, 2015, p. 2). Petts (2008) also observed, '...engagement processes have to be competent if they (and hence inherently the institutions that organise and promote them) and the participants … are to be trusted...' (p. 828).

When discussing the importance of public engagement, much of the literature refers to 'stakeholders' as the focus of public participation. For example, Pomeroy and Douvere (2008), noted every individual is a potential stakeholder when outlining the role of stakeholders in marine spatial planning. My view is that there was a very broad group who had an interest in the GBR during the RAP/rezoning, and this was broader than just those who 'had a stake' in the GBR. An extensive range of users, interest groups, organisations, rights-holders, and management agencies had a direct interest in the planning program. This included all types of fishers (commercial, recreational, charter) and their related industries, tourist operators and those in their related industries, local communities, scientists/researchers, politicians, environmental NGOs, other Federal and State agencies as well as those involved in related industries such as shipping and ports. Of major importance was the local communities (Indigenous and non-Indigenous) who live adjacent to the GBR, and those who regularly use the GBR for their traditional, cultural, and recreational reasons (Day et al. 2012)

Also significant was the global community, including those who had visited the GBR and those who had not, but nevertheless maintained a strong vicarious interest in the world's best-known coral reef. For example, Gurney et al. (2017), examined local, national, and international interests, and identified four types of attachment to the GBR that spanned conventional locations and use communities. Their findings suggest that place attachment can have a global reach crossing geographic and social boundaries.

Given the status of all those who were interested and/or involved (i.e., GBR rights-holders and Indigenous interests, the broad global community who have an interest, as well as numerous users and a wide variety of stakeholders), I have therefore chosen to use a broader term ('the public') rather than stakeholders in this chapter. In doing so, I recognise there are various kinds of 'public' (for example, traditional, non-traditional, active, aware, local, domestic, or international). While there are limitations

considering 'the public' as one homogenous group, I have used the term throughout this chapter, recognising there is a need to consider different groups within the broad label of the public.

5.3 The challenges of effective public engagement during the RAP

From the time the RAP[35] commenced, there were challenges for effective engagement. Convincing others about the need for the RAP was one particular challenge. Similarly, there was a need to convince others that increasing the protection of biodiversity was not only important, but it was also achievable. The first public documentation about the RAP was an overview booklet published in May 1999 (GBRMPA, 1999). This booklet was intended to communicate the RAP process to the GBR public and included:

- the phases of the RAP process
- guiding principles
- an indicative timetable (at that time it was envisaged RAP could be completed by late 2001)
- five pages of frequently asked questions about the RAP.

Managing the GBRMP has not always been easily or harmoniously undertaken, especially given the diverse industries that rely on the GBR for their livelihoods. One interviewee from the tourism industry who has been involved with the GBR for decades, recalled the situation before Virginia Chadwick commenced as CEO/Chair at GBRMPA:

> **...** I became involved when the industry sector groups – fishing, tourism – were at serious odds and effectively in the trenches against GBRMPA. That's how engagement was conducted ... it was a type of 'trench warfare' ... there was no trust... no recognition that there may be some sort of mutual interest that outweighed sectoral or partisan interests.... (however), **Virginia Chadwick took control of things and … started to turn the ship around … I find it hard to imagine that the RAP would have been achieved without the ground rules and the terms of engagement** [emphasis added] established through Virginia and others …   (Interviewee S1).

Virginia Chadwick recognised the GBR tourism industry could be amongst GBRMPA's greatest allies, particularly given the overall economic worth of that industry and the political implications. Tourism was a logical supporter of increased protection of the GBR, so considerable effort was made throughout the RAP/rezoning to work with tourist operators and their associated industries to ensure they understood and became supportive of the new zoning proposals. Gaining this support, along with that of the local communities in the early days of the RAP process was not easy and substantial endeavours were required to convince them of the merits of the program. Soon after the GBRMPA CEO/Chair gave her endorsement of the RAP/rezoning program, an experienced communications and media expert, Bruce Kingston, was appointed as a new Director within GBRMPA. When initially briefed about the RAP/rezoning, Bruce recalled his astonishment that GBRMPA was attempting such an ambitious undertaking across the entire GBR community:

> ... My first impression was …"**You've got to be joking – you want to offend the entire GBR coast, all at once!"** [emphasis added]… but I quickly learned, yes, that was part of the process that we were about to do...the sheer scale of it was astonishing… and it took me a while to understand what we were trying to do...
>
>   (Bruce Kingston, GBRMPA's Director, Communication & Education during
>   the RAP/rezoning, PhD Interview, July 2016)

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[35] In the early days, the program was called the RAP, and the need to conduct a simultaneous GBR-wide rezoning was not widely recognised.

Equally surprising to Bruce Kingston, was a realisation that GBRMPA had an image problem, especially in the local GBR communities:

> ... it **quickly became obvious that GBRMPA locally had an image problem … and was almost invisible to the rest of the country** [emphasis added]. So, GBRMPA had no stored credibility to be able to go out into the market and start to argue ... in what turned out to be highly antagonistic markets at times ….
>
> (Bruce Kingston, GBRMPA's Director, Communication & Education during the RAP/rezoning, PhD interview, July 2016)

Bruce's initial observation was that the RAP Planning Team within GBRMPA was progressing the development of a new zoning plan, despite the fact the broader GBR public had no idea there were problems with the existing zoning plans[36]. To address this shortcoming, Bruce convinced the RAP team to ease off their planning efforts while the communications team at GBRMPA commenced a systematic media campaign called *'Under Pressure'*. This campaign was aimed at educating the public, helping them to understand there were threats to the GBR. The *'Under Pressure'* campaign utilised a variety of media including free-to-air public-service TV announcements and newspaper articles to describe the variety of pressures facing the GBR. Because of these increasing pressures, the media campaign explained the existing zoning was not able to protect the range of species and habitats across the GBR. By implication, the campaign subtly suggested that part of the solution was the community needed a new zoning plan (the role of the media is discussed further in section 5.4). A key aspect of increasing public understanding required the simplifying of technical terms. As questions arose in public interactions, GBRMPA responded by developing a series of technical information sheets using layman's terms to communicate complex issues such as the importance of protecting biodiversity. An effective infographic *'Crossing the Blue Highway'* and its accompanying brochure (Kelley, 2000) helped explain ecological connectivity and the need to protect a range of habitats in the GBR, not just coral reefs.

The environmental NGOs (the ENGO community), having recognised the significance of the RAP, started to develop their own public education campaign. By this time, GBRMPA had acknowledged that the GBR was under pressure and therefore needed a higher level of protection. Such a position was traditionally the role of ENGOs, so this meant the ENGOs, led by WWF, needed to come up with a different approach from GBRMPA's education campaign. '... [We needed] a different goal ... and to ensure that our opponents didn't try to undercut GBRMPA by aligning GBRMPA and WWF too closely, we had to position ourselves as more challenging than GBRMPA ...' (Interview S6). WWF subsequently advocated for 50% of the GBRMP to be fully protected in no-take zones; a position which subsequently made the government's draft and final zoning plans seem reasonable.

5.3.1 Methods of public engagement

In accordance with the statutory requirements for all zoning programs under *the Act*, two formal and obligatory periods of public engagement are required; the first period occurs prior to a draft plan being prepared and the second period enables public comment on that draft plan. In the RAP/rezoning, these two formal phases became known as the two Community Participation Phases, CP1 and CP2.

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[36] As outlined in Chapter 1, zoning had occurred sequentially over the years for different sections of the GBR, so there a number of zoning plans were in place for those different sections. The outcome of the RAP/rezoning was the entire GBRMP was rezoned in a single amalgamated zoning plan.

There are numerous methods used for public engagement and a number of these had been applied in previous GBR zoning programs. As advocated by Arnstein (1969), such engagement methods may be arranged on a spectrum – or a ladder -- ranging from manipulation of citizens in the process at the bottom of the ladder, to citizen control of that process at the top of the ladder. The levels and extent of public participation increase as one moves up the ladder. However, there are a number of shortcomings associated with Arnstein's approach. As Smith (2018) noted, Arnstein's simplistic approach fails to consider the timing or the context of public participation and assumes that policy or planning decisions are made in a single pre-determined time. Arnstein uses the term 'consultation' and the location of the term in the lower half of Arnstein's ladder indicates it is a form of tokenism. There are, however, various examples of well organised consultations occurring early in a policy process that have led to widespread and effective participation as outlined by Smith (2018).

Another conceptual framework for public engagement was developed by Petts and Leach (2000). They conducted a comprehensive literature review evaluating various methods used for public engagement in government processes. Their review focused on approaches seeking to involve the public directly and actively in decision-making where the decision remained with a government agency. Petts and Leach (2000) included an assessment of the aims of public participation and the need to fit different methods to purpose. They reflected on Arnstein's (1969) ladder and concluded there were four broad levels or categories of public engagement and participation:

Level 1. Education and information provision	*traditional*
Level 2. Information feedback	*traditional*
Level 3. Involvement and consultation	*innovative consultative*
Level 4. Extended involvement	*innovative consultative*

Both these conceptual frameworks were applied to the 35 public engagement methods applied during the RAP/rezoning (Table 5.1). The 35 methods used in the RAP/rezoning are listed in a comprehensive table in Day (2017, Supplementary Information Table T2) including an outline of each of the methods used, and the relevant phase(s) during the RAP/rezoning when they were used.

Table 5.1 lists these 35 methods and indicates where each method would correspond to the steps on Arnstein's conceptual ladder or to the four levels proposed by Petts and Leach (2000). The numbers in brackets following each method in Table 5.1 refer to the respective method as listed in Day (2017a) where more information about each method is provided, including hyperlinks to the method or to more information. Relating the 35 methods used in the RAP/ rezoning to the levels of stakeholder engagement described by Petts and Leach (2000) shows:

- 21 of the 35 methods (60%) ranked as Level 1, i.e., education/information
- Eleven methods (31%) ranked as Level 2, i.e., information feedback
- Two methods (6%) ranked as Level 3, i.e., involvement and consultation
- One method (3%) ranked as Level 4, i.e., extended involvement.

Table 5.1 Methods used in RAP/rezoning: showing corresponding steps in Arnstein (1969) and in the framework by Petts and Leach (2000)

Arnstein's ladder of participation (1969)	Methods used in the RAP/rezoning (numbers in brackets refer to Day, 2017, Supplementary Information Table T2)		Petts and Leach's levels of engagement (2000)
Citizen control	n/a		n/a
Delegated power	n/a		**Level 4 (i.e., extended involvement** e.g., community advisory committees, liaison groups, Citizen juries, consensus conference, visioning
Partnership	Local Marine Advisory Committees (LMACs) (12)		
Placation	Fact sheet correcting misinformation (22) Techniques to monitor community awareness (e.g., telephone polling) (28)		**Level 3 (i.e., consultation)** e.g., workshops, focus groups/forums, open-house, online forums
Consultation	Draft Bioregions Map (2) Submission Brochure (7) Publicity campaigns (8) Detailed submission maps (10) RAP/ rezoning website (13) Differing formats used for public submissions (21)	Community information sessions/ staffed displays (23) Public meetings (24) Staffed telephone lines (25) Draft Zoning Plan (26) Draft Zoning maps (27)	**Level 2 (i.e., information feedback)** e.g., staffed displays/exhibits, staffed telephone lines, internet, public meetings, teleconferencing, surveys, interviews and questionnaires, deliberative polls
Informing	Introductory brochure (1) Final Bioregions map (3) Biophysical principles and Socio-economic and management principles (4) Frequently Asked Questions (FAQs) (5) 'Pie-chart' maps (6) Using 'champions' can help raise awareness in some parts of the community (9) Leaders Guide (11) Technical Information sheets (14) Update newsletters/ brochures (15) *'Crossing the Blue Highway'* Poster (16)	Unstaffed exhibits/ displays (17) Television advertising (18) Advertisements in regional and national newspapers (19) Radio spots in regional centres (20) Final Zoning plan (29) Final Zoning maps (30) Report on Zoning (31) Definition of 'one hook' (32) Zoning co-ordinates (33) Regulatory Impact Statement (34) Report on the social and economic impacts (35)	**Level 1 (i.e., education/information)** e.g., leaflets, newsletters, displays, unstaffed exhibits, advertising, local/national newspapers, site visits, video
Therapy	n/a		n/a
Manipulation	n/a		n/a

Each of the methods used to engage during the RAP/rezoning had its own particular strengths and weaknesses. A number of these methods were 'traditional' (i.e., proven) such as the use of publicity campaigns and 'champions' to promote the need for the rezoning. Certain methods were targeted for a specific audience (e.g., the Leaders Guide was aimed specifically at politicians and other key decision makers). Other methods of engagement were innovative for the time (remember this was in the late 1990s-early 2000s, before comments on social media were commonplace, and GBRMPA had relied

mainly on written submissions in previous zoning programs). Innovative approaches included a GBRMPA Fact sheet titled '*Correcting the Mis-information'*, and the strategic use of telephone polling combined with focus group sessions and community surveys to help GBRMPA, and the Minister's office, understand the views of the wider community including the 'silent majority'[37].

5.3.2 The two formal phases of engagement in the RAP/rezoning

During the RAP/rezoning, the level of public engagement was much greater than that legally required in *the Act*, both in the nature and duration of the two formal consultation phases (CP1 and CP2) and the ongoing informal engagement. Public engagement occurred throughout the entire program of the RAP/rezoning (as shown in the stages of the RAP/rezoning, Figure 1.5) and increased markedly following the commencement of CP1. During 2000 and 2001 (the period of informal consultations prior to CP1), GBRMPA held over 140 meetings with more than 1,800 people. In 2002 and 2003, including the two formal consultation phases (CP1 and CP2), GBRMPA participated in a further 500 meetings with over 6,000 people.

Given the scale of the program, and to facilitate and encourage community participation, GBRMPA also embarked on various campaigns to increase public awareness. By way of example, the first formal participation phase (CP1) was extremely resource-intensive over three months (exceeding the one month required by *the Act*) and involved a variety of public engagement techniques (Table 5.2).

Table 5.2 Various methods of public engagement used prior to, and during, the first formal phase (CP1) of public participation for the RAP/rezoning (adapted from GBRMPA, 2005)

Methods of engagement	Extent of application during first formal phase of RAP (May-August 2002)
Community Information Sessions (see 5.3.3 below for more information)	Such sessions were undertaken in 22 regional centres
Public meetings and individual meetings	~200 meetings, engaging many thousands of people face-to-face
Public submissions	33,000 submission brochures distributed
Free-call telephone number for information at GBRMPA	4,000+ telephone calls received at GBRMPA's free-call number
Community Service Announcements (CSAs)	1,500+ CSAs shown on television throughout the GBR Region
Newspaper articles	100+ newspaper articles (usually following a media release)
Newspaper advertisements	70 adverts placed (mainly at the beginning and end of CP1)
Radio interviews and TV mentions	Over 60 radio appearances and 10 TV appearances
Webpage material on RAP	6,800 visits (~38,000 hits) to the RAP webpage on the GBRMPA website

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[37] The 'silent majority' is an unspecified group of people, generally large in number, who are interested or concerned but do not express their opinions publicly (Stephenson & Lawson, 2013) .

These various methods were aimed at maximising engagement, ensuring that the widest possible cross-section of users and communities became aware of RAP/rezoning. The public could therefore avail themselves of the opportunity to provide a written submission prior to the preparation of a draft zoning plan. Considering the importance of the GBR at the local, national, and international levels, the public engagement program aimed to reach all interest groups, with a strong focus on local communities and users given they were more closely involved in the Marine Park.

The success of CP1 was due to a combination of various ways of engaging the public (including those listed in Tables 5.1 and 5.2). The result was an unprecedented level of constructive input and improved engagement. During both CP1 and CP2, a wide range of public meetings occurred. Some of these public meetings were confrontational (e.g., Figure 5.1) due to a number of extremely irate stakeholders, primarily fishers (this is explained further in section 5.5).

Figure 5.1 Front page of the *Townsville Bulletin* newspaper the day after a heated public meeting at the Townsville Entertainment Centre where approximately 1,000 concerned fishers gathered to hear about the RAP/rezoning (Wednesday 25th June 2003).

Whilst a large number of meetings were organised by GBRMPA, other meetings were arranged by local communities or sectors who were keen to have their views heard. Meetings were therefore held with local communities, commercial and recreational fishing organizations, key Federal and Queensland politicians, Indigenous people (a number of whom were also recognized as Traditional Owners), tourism operators and conservation groups. Similarly, meetings occurred with representatives of organizations such as the Association of Marine Park Tourism Operators (AMPTO),

Sunfish (a key recreational fishing group), major environmental NGOs, and branches of the Queensland Seafood Industry Association (QSIA), which was the peak body for all commercial fishers during the RAP/rezoning.

Some of these meetings were large, 'formal' and rowdy public gatherings (as depicted in Figure 5.1), and a few resulted in subsequent threats or warnings to GBRMPA officers. Other meetings, however, were small, informal, and less confrontational. For example, Figure 5.2 shows the initial meeting at Stanage Bay, a small coastal community near Shoalwater Bay, where a large proportion of the town turned out to hear about the proposed rezoning. Regardless of the size or the liveliness of the meetings, all such gatherings provided valuable opportunities to outline what was proposed and to hear the concerns of local people (section 5.3.3 explains how this was improved).

Figure 5.2   A public meeting in Stanage Bay during the first phase of community engagement (CP1) in 2003

In contrast to the relatively peaceful initial meeting at Stanage Bay (Figure 5.2), concerns were subsequently expressed in the same community. This led the Queensland Police to warn GBRMPA they could not guarantee the safety of government officers attending any follow-up meetings. A second RAP/rezoning meeting occurred at Stanage Bay with police in attendance. A policeman sat at the back during the meeting – he did not say or do anything, but the community knew he was there, and the planners certainly felt reassured, knowing he was there. Fortunately, all the RAP/rezoning meetings proceeded without physical violence; however, given the opposition from certain sectors, there was plenty of verbal abuse and several threatening occasions.

When the draft Zoning Plan was released in June 2003 during CP1, copies were placed in 110 publicly accessible locations along the GBR coast to assist the public to access the draft (i.e., in 32 Council offices, 33 public libraries and 48 marine-related retailers such as fishing tackle shops, dive shops, etc). The second phase of public consultation (CP2) benefitted from various lessons in CP1; these included a shorter, and more effective, public submission form that helped to increase the number of public submissions received, and improved ways to process the incoming information from the public, including digitizing maps and a more effective web-based query tool.

Public meetings were only one of many ways used to engage the community. The two formal consultation periods were supplemented by significant informal engagement utilising all the methods shown in Table 5.1. Collectively all these methods contributed to the success of the overall policy reform. Compared to many other public participation programs which are short and tokenistic, the engagement during the RAP/rezoning was wide-ranging and sustained. Among the outcomes of the comprehensive levels of engagement were the significant differences between the draft and final zoning plans (as shown in Figure 5.10).

5.3.3 The community information sessions

Most of the methods used to engage the public were effective (Day, 2017a); however, the success of the community information sessions was particularly noteworthy. This improved way of interacting with the community resulted from the experience that 'normal' public meetings (where presenters sit in front of an audience and answer questions, usually after a presentation), were not effective for a useful exchange of knowledge and views. As recognised in the literature (e.g., Adams, 2004; McComas, 2001), public meetings were opportunities for a noisy minority to dominate, resulting in frustrations both in the audience and with those trying to run the meeting.

Learning from experience with colleagues in Parks Victoria, GBRMPA conducted community information sessions comprising informative 'displays' which could be set up and manned by agency staff in regional centres on pre-advertised dates (generally for a 3-4 hour period, usually 3pm-7pm). These 'open-house' sessions were held in schools and community halls, informing any interested persons who were keen to obtain information, make comments, or hear what GBRMPA was proposing in an informative and inclusive environment (Thompson et al., 2004). Three 'duplicates' of these displays were produced enabling three regional teams to work concurrently along the length of the GBR coast informing most local communities during CP1 and CP2. Figures 5.3 and 5.4 show examples where community members were able to discuss their concerns and suggestions directly with a GBRMPA staff member in an informal and non-threatening environment.

These sessions required a high degree of preparation and a substantial commitment in terms of resources and staff, including senior staff within GBRMPA. The public response and outcomes indicated this level of commitment was worth the effort for both the agency and the public. One of the factors that contributed to the success of these community information sessions was the detailed knowledge and local awareness of GBRMPA officers. GBRMPA had previously recruited staff who had worked in various industries or had experience with different user-groups which meant they had a high level of 'credibility' when liaising with those sectors (Day et al., 2004). The familiarity these officers had with specific stakeholder concerns built a level of trust between GBRMPA, the key sectors and interested members of the public, and this was invaluable in the community information sessions. Prior training of all involved staff was an important aspect that led to the success of these two-way information sessions and enhanced the ability to collect detailed and spatially explicit information. GBRMPA ensured the key source documents for the rezoning were available and explained. For example, the bioregions, the planning principles, and the technical information sheets were made available, so attendees could learn how the new zoning network was being developed.

Figure 5.3   During CP1, the Community Information Sessions provided opportunities for locals to learn about the RAP/rezoning, such as why the bioregions were important (Innisfail, August 2002).

Figure 5.4 During CP2, the Community Information Sessions enabled GBR locals to see the proposed zoning plan and ask questions about it (August 2003)

5.4 The role of the media during the RAP/rezoning

The role of the media has been shown to be substantial when developing policy and numerous researchers have discussed this role (e.g., Doyle & Kellow, 1995; Shanahan et al., 2008; Thomas, 2007). Drawing upon various case studies, Doyle and Kellow (1995) concluded the media in Australia are '…quite simply, immensely powerful players in environmental policy formulation...' (p.174). In most instances of policy reform, including environmental policy, the media can be either a great and influential ally – or alternatively, a fierce and critical opponent (e.g., Thomas, 2007; Shanahan et al., 2008).

Around the time the RAP/rezoning was receiving considerable publicity (i.e., the early 2000s), a national study of 'middle Australia' found that respondents consistently ranked newspapers as the most influential medium in their assessment of political and economic matters (Pusey, 2003, p. 127). Effectively engaging the public via the media therefore presented an important and challenging problem during the RAP/rezoning (this was in the days before the pervasive influence of social media).

> ...Editors and journalists serve as filters, making decisions about the newsworthiness of particular issues and framing the way material is presented. Information presented to consumers is moulded to serve the purpose of making a headline and selling papers... (Compas et al., 2007, p. 692).

Shanahan et al. (2008) questioned whether the media is '… a **conduit** [emphases added] for policy participants, with media accounts transmitting multiple policy beliefs of those involved in policy debates, or a **contributor** in the policy process, with media accounts supplying consistent policy beliefs with congruent narrative framing strategies to construct a policy story...' (p. 115). In terms of the RAP/rezoning policy process, the media played both roles (i.e., they were both a conduit and a contributor), and to paraphrase the words of Hall (1993), the press was "... both a mirror of public opinion and a magnifying glass for the issues that it takes up" (p. 288).

One of the key players in RAP/rezoning described his perspective:

> … the media were crucial for two reasons… they were a carrier of our information … and one of the virtues of being in coastal Queensland, is that the media … have fairly low reporting standards … so, it was **quite easy to write a story, and have it run. Conversely of course, it was quite easy for the fishing groups to spin a story and have it run, so it was a battle by media on any given day** [emphasis added]… (Interviewee R4).

Throughout the RAP/rezoning, the media played key roles, particularly as there was a need for effective (i.e., timely and appropriate) communication and public education. The media were essential for both those tasks. For example, there was limited public understanding about the importance of the marine environment and how it functioned. This placed the media in a powerful position as the media was able to shape the public's knowledge, understanding and opinions. The public was not aware: (a) what biodiversity existed in the GBR; and (b) why it needed to be protected. Consequently, the public had limited understanding of (c) why increasing the level of protection of the marine environment was important, or (d) why such increased protection needed to be planned and systematic, rather than randomly protecting additional areas across the GBR. The media therefore was able to determine what perspectives were provided, distorted, or embellished, whether attitudes were championed or denied, and which positions were influenced. When it comes to protecting specific areas, there was often a reluctant public acceptance of having highly protected areas, although equally a very dogmatic NIMBY[38] response.

Generally, GBRMPA received a reasonable level of support from the majority of the media, particularly nationally:

> … I don't think we ever got a really negative story in national or major media. We had strong support from most of the ABC media … we only did very badly in some of the

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[38] NIMBY = '*not in my backyard*' – a term originating in the USA to describe the arguments of those opposing development in their vicinity while not necessarily opposing similar developments elsewhere.

small local papers that were conditioned to "all things outside our area and all things government are bad" … (Interviewee R4)

Using the media for public education was introduced earlier (the *'Under Pressure'* campaign). Another equally effective public education campaign was conducted when the draft zoning plan was released in 2003. Titled *Let's keep it Great,* this media campaign used a number of well-known personalities and popular supporting teams to champion the GBR. For example, Cathy Freeman, the Australian athlete widely known for her efforts at the Sydney 2000 Olympics, was one of various faces who was immediately recognisable on the TV. After each champion mentioned their link to the GBR, they simply stated *"The Great Barrier Reef; let's keep it Great!".*

Examples of the strong influence of the media on local opinions are shown in Figures 5.5 and 5.6. These depict a variety of newspaper clippings from two different periods during the RAP/rezoning. Figure 5.5 shows press clippings from mid-2003 at the height of the public engagement following the release of the draft Zoning Plan. This led to a lot of misinformation and angst, with headlines like, "Fish zones ludicrous"; "Industry braces for fishing bans"; "Reef plan closure 'unfair' for this region". In contrast, the press clippings from mid-2004 (Figure 5.6) followed the commencement of the revised Zoning Plan which included significant changes after the second period of public participation. It was also indicative of the enormous efforts to engage most sectors, and resulted in headlines such as, "Reef plan world-first"; "Zoning plan will have benefits"; and "Plaudits for reef plan".

Figure 5.5 Examples of negative press clippings following the release of the Draft Zoning Plan in mid-2003 *(Montage courtesy of Darren Cameron, GBRMPA)*

Figure 5.6 Examples of more positive press clippings following the commencement of the new Zoning Plan in <u>mid-2004</u> *(Montage courtesy of Darren Cameron, GBRMPA)*

The need to be as proactive as possible with the media for policy reforms such as the RAP/rezoning is obvious. Despite GBRMPA's best efforts, however, it was evident during the RAP/rezoning that the media was dominated by contested opinions rather than factual and contextual information. There was a relatively low level of media support for scientific evidence, and a relatively low level of impartiality when reporting on opposing views. Lloyd et al. (2017) compared the historic role of the media in the early days of the GBRMP (e.g., the 1970s) with more recent media, and noted:

> ... the media landscape has shifted, with social media allowing environmentalists a
> platform for their persuasive communications. Future research is needed into the role
> of social media in the current campaign for the GBR... conflict is a compelling narrative,
> so campaigns that have no 'battle' need to find other news values to ensure they
> remain reportable... (p. 61)

5.5 The significant roles of the key sectors in the engagement program

All the sectors played roles in developing the new zoning, although the influence of some sectors was more obvious during the RAP/rezoning process. For example, in CP1, 36% of all the submissions identified themselves as part of the recreational fishing sector (GBRMPA, 2005). In CP2, submissions from this sector rose to 45% of all submissions received. However, a large proportion of these submissions were proformas (i.e., a pre-written and usually photocopied submission which was then individually signed and dated). Several proformas were circulated by different fisher groups; those

proformas were easy to code as they rarely provided any new information, and they were less useful for planning.

The government's independent *Review of the Act* (Commonwealth of Australia, 2006) reviewed all aspects of the zoning (see Chapter 7, section 7.4.3). The summary in that review of GBRMPA's interactions with the fishers stated:

> ...The Authority [GBRMPA] held a total of 360 meetings with fishing stakeholders between June 1999 and November 2003, and 20 debriefing sessions were conducted in June and July 2004. During the final months, the Authority had numerous exchanges with peak fishing groups to try to reach solutions that would satisfy the needs of fishers as well as those of other stakeholders, as well as respecting the Biophysical Operational Principles and the rezoning objectives. As the final zoning proposals neared submission to Parliament, briefings were arranged for fishing peak bodies and local Federal Members of Parliament... (Commonwealth of Australia, 2016)

The strong influence by the various fishing sectors was particularly obvious in a variety of ways as one interviewee aligned to the commercial fishing industry stated:

> ...**only the QSIA had the resources and the technical proficiency and the understanding of how the pieces fitted together to have influence** [emphasis added]... certainly, the final zoning plan had a lot less impact on the industry than the draft. That's not to say that was no impact … but it had less impact …. The QSIA at the time had a savvy enough response politically to drive some change...   (Interviewee S4).

Figure 5.7   One of numerous small and targeted meetings held specifically with fishers to discuss the proposed zoning

Both the commercial fishers and the recreational fishers exerted strong political influences, although the politicians recognised this occurred in different ways:

> … one group is looking after its livelihood and the other is looking after its recreation, its lifestyle ... [but] they are both big emotive influences…   (Interviewee P2).

Equally important was the influence of fishers in the Queensland planning process conducted by the Queensland government for the adjoining State Marine Park. One of the Queensland planners recalled they were given a clear mandate early in the planning process to ensure that any new zoning did not interfere with several important inshore fisheries, primarily the mud-crab and the barramundi fisheries:

> …we did allow commercial crabbing to extend into areas …and we basically dared [the Commonwealth] "If you don't like it, do something about it"… because that's how critical we regarded the inshore fisheries … to have them onside in those key areas ...   (Interviewee Q2).

The environmental NGOs, led by WWF, played a significant role throughout the RAP/rezoning, calling for much higher levels of protection across the GBR from the early stages of the policy process. This was a deliberate strategy by the ENGOs and an obvious counter argument to the fishing industry who were opposed to any increases in protection. The ENGO views may have appeared extreme to a portion of the public, and in comparison, the government's proposals seemed acceptable.

The role of the scientists early in the RAP process was fundamental to provide the sound scientific underpinning. This was one of the strengths of the RAP/rezoning process, especially as it was endorsed and promoted by the ENGOs and largely accepted by the politicians. However, as explained in Chapter 3, having even more accurate or up-to-date scientific information would not have guaranteed a better outcome … and having a strong scientific justification alone, however compelling, would not have achieved a successful outcome.

It is interesting to see how different sectors viewed each other's efforts at public engagement after the RAP was finalised. One perspective from a commercial fisher concluded:

> … we may have halved the impact (of the draft plan) on our sector. **But the NGOs and the scientific submissions had a far bigger influence than we did …. [they] increased the level of protection from 5% to 30% .**.. **so that's an even bigger impact** [emphasis added]. So, we chipped around the edges of which 30% that we basically preferred … (interviewee S4)

Given the final outcome (i.e., an increase in the no-take zones from 4.6% to 33.3% across the GBR), the point raised in the quote above is plausible. Nevertheless, the fishers also had significant influence in that they managed to exert considerable political sway near the end of the process which led to a number of last-minute zoning changes (at 'five minutes to midnight') along with the introduction of the Structural Adjustment Package (discussed in Chapter 6). Consequently, the losses or negative aspects perceived by various sectors were balanced by other beneficial or positive elements that were advantageous despite being less obvious.

The final zoning plan included various compromises and left virtually all sectors feeling somewhat disappointed. However, there was also widespread acceptance that no single sector got exactly what they wanted, and that the extent of public engagement and participation had effected significant changes during the planning process (Day, 2016). The expectation by a few that comprehensive public engagement meant the policy process would be either conflict free or consensus based proved unrealistic; no single solution would satisfy all users, stakeholders, and rights-holders. As noted by

Helms (2003), consensus is not an achievable goal for public engagement processes dealing with issues of this magnitude or complexity.

5.6 Engagement efforts with Indigenous communities and Rights-holders

Aboriginal and Torres Strait Islander people's relationship to their sea county[39] brings with it ...' a complexity of cultural rights and responsibilities... clan members are owners of their country, they belong to their country, they identify with their country and they are stewards of their country...' (Smyth & Isherwood, 2016, p. 307). Within the GBR, the sea country of 70 different Traditional Owner groups is recognised (GBRMPA, 2019c).

During the RAP/rezoning, specific efforts were made to engage Indigenous communities and particularly the recognised Traditional Owners. Engagement with Indigenous communities about the RAP/rezoning commenced at the same time as most sectors were engaged, and there were more than 100 meetings (e.g., Figure 5.8) specifically with Indigenous communities during the planning process. Within the management agencies, there was an expectation that Indigenous people would: (a) understand the rationale for the RAP/rezoning; and (b) work effectively within the timeframes and procedures set by the legislation or by the government processes. Neither expectation was based on an effective comprehension of how many Indigenous groups preferred to do business. Many Indigenous participants would have preferred to have the opportunity to discuss any proposals with other members of their group before making comments. Nevertheless, in the second phase (CP2), 24 submissions were received specifically from Indigenous organisations (Table 5.3).

Figure 5.8   One of the RAP information sessions held in an Indigenous community to explain the proposed zoning. The GBRMPA officer presenting the information was an Indigenous person.

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[39] 'Sea country' is the term used by Indigenous groups to describe coastal and marine environments within a broader traditional estate that is associated with the sea or saltwater – including coastal areas, tidal lands and tidal waters, estuaries, beaches, bays, marine waters, and islands – and to which Indigenous cultural rights, authority, obligations and complex biocultural systems apply (Rist et al., 2019).

The statutory requirements for the GBR zoning process provide for the submission of written comments within specific timeframes set out in *the Act,* or longer if directed by government. However, as explained by Bennett and Dearden (2014) and Voyer et al. (2012), management agencies should not assume all those who are interested in a planning outcome are able to communicate effectively in writing. There should not be an expectation that all groups can similarly provide suggestions, either in a meeting or via a written submission, about the social and economic impacts of any proposed changes or how those impacts might be minimised. For various reasons, not all those who express an interest in a planning process should necessarily be treated the same.

> ...Power at the negotiating table devolves to the politically savvy, articulate and often well-educated sections of the community and **marginalises sectors of the community who have lower levels of literacy, confidence in speaking in public forums, or understanding of the intricacies of the political or bureaucratic system** [emphasis added] they are attempting to influence...   (Voyer et al., 2012, p. 436).

The placement of several no-take zones, particularly in the Far North of the GBR, was chosen based on the input from Traditional Owners. There were, however, other aspects that were questioned by a number of Indigenous participants during the RAP/rezoning information sessions. For example, some people queried the lack of a 'cultural layer' in the zoning, or the ability to use zoning to protect certain areas purely for cultural reasons. This was recognised by Nursey-Bray & Rist (2009) who highlighted the '... need [for] a shift in management understanding of what 'local' and 'cultural' knowledge is, and the role it plays in the decision-making process ...' (p. 125). In recent decades, various measures have been introduced to recognise the long-standing and continuing relationship that saltwater Indigenous groups have with their sea country. Several of the measures listed by Smyth & Isherwood (2016, p. 311-312) were introduced in the 2003 Zoning Plan.

An important step towards acknowledging native title was explicit recognition that none of the zones precluded s. 211[40] of the *Native Title Act 1993* (Cwlth). A legislative change in the 2003 Zoning Plan also enabled GBRMPA to work with Traditional Owner groups to develop Traditional Use of Marine Resources Agreements (TUMRAs). TUMRAs and Indigenous Land Use Agreements (ILUAs)(Rist et al., 2019) are community-based plans for sea country management accredited under both Queensland and federal legislation. They describe how Traditional Owner groups work in partnership with the Australian and Queensland governments to manage the traditional resources in their sea country. Today there are nine TUMRAs — and an ILUA — in the GBR involving eighteen Traditional Owner groups; these cover over 25 percent of the GBRMP coastline (GBRMPA website, 2020).

Various issues remain, however, around effective engagement between managers, user groups and Traditional Owners. Therefore, future engagement between GBRMPA and Indigenous groups needs to consider the *effectiveness* of that engagement as well as *how* or *when* such interactions occur. The lack of protection of areas due to their cultural significance remains another important lesson, especially given recent legislative changes to *the Act* about the significance of GBR heritage. Nursey-Bray and Rist (2009) point out, '... there is still a disjuncture between theory and implementation...' (p. 125). Suggestions for improvement, especially if/when any future rezoning is considered in the GBR, are further addressed in Chapter 8 (section 8.4.4).

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[40] The *Native Title Act 1993* (Cwlth) (NTA) was passed by the Australian Parliament recognising the rights and interests of Aboriginal and Torres Strait Islander people in land and waters according to their traditional laws and customs. Section 211 of the NTA allows hunting, fishing, gathering and cultural or spiritual activities 'as of right' by Traditional Owners in their country (land or waters), irrespective of whether there has been a determination of native title.

5.7 Written public submissions

A diverse range of public submissions was received during the two formal phases of public participation. How the submissions were analysed, including the basis for coding, and how information provided in maps was analysed spatially so it could be linked to other submissions, were examined by Innes et al. (2003) and summarised in GBRMPA's *Report on the Zoning* (GBRMPA, 2005). The vast majority of the submissions received during the RAP/rezoning were from GBR coastal communities or individuals. In addition, submissions were received from every Australian State and Territory as well as internationally. Table 5.3 outlines the range of submissions from the various sectors in the second phase of public engagement (CP2).

Table 5.3 Number of submissions from CP2 based on interest or affiliation
(adapted from GBRMPA, 2005)

Interest/affiliation	Number of submissions	Percentage of total
Business interests	68	0.32%
Commercial Fishing Organisations	35	0.16%
Recreational Fishing Organisations	83	0.39%
Tourism Industry	95	0.44%
Conservation Non-Government Organisations	36	0.17%
Commonwealth Government Agencies	6	0.02%
Queensland Government Agencies	3	0.02%
Local Government	8	0.02%
Member of Parliament	5	0.02%
Indigenous Organisations	24	0.11%
Community Groups	27	0.11%
Family	23	0.11%
Individual submissions (note a large proportion were proformas*)	20,068	**93.8%**
Other	50	0.23%
Unallocated (did not indicate)	843	3.94%
TOTAL	**21,374**	**100%**

*Proformas were developed by various sectors. The recreational fishers were the primary group to use proformas; these were generally a one-page photocopied document signed and submitted by an individual.

As Table 5.3 shows, almost 94% of the submissions came from individuals in the second submission phase (CP2), noting a large proportion of these were proforma submissions. In comparison, the number of submissions from organisations or interest groups was much lower. However, most of these single organisational or group submissions represented hundreds of constituents. For this reason, GBRMPA repeatedly stressed that the number of submissions received on any one issue did not equate to a number of votes for any issue (so it was definitely not a numbers game). GBRMPA stressed the importance of the *content* of submissions rather than the relative number.

The high level of public engagement during the RAP/rezoning resulted in 10,190 written submissions being received in CP1 and 21,374 public submissions in CP2 (Figure 5.9). This unprecedented number of submissions, far more than ever previously received by GBRMPA, required innovative ways to collate, code and consider the information when developing a revised zoning plan (Innes et al., 2003).

Figure showing RAP/rezoning: **31, 564 written public submissions** *(over the two formal phases of public engagement)*

	Cap / Bunker 1977	Central 1983	Cairns 1983	Far Northern 1986	Mackay/ Cap 1988	Cairns 1992	Gumoo 1998	Far Northern 2001	RAP
No. of submissions	29	920	391	233	626	1,009	138	233	31,564
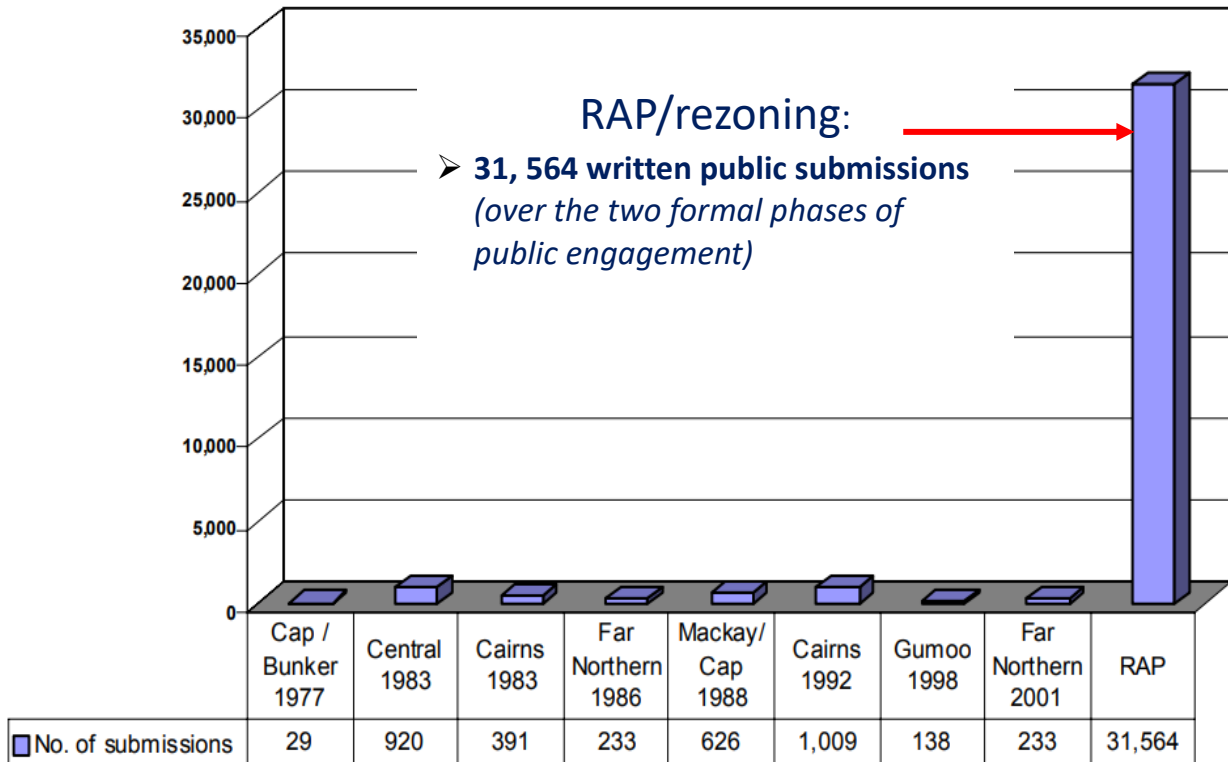
Figure 5.9 Comparison of the number of public submissions received for GBRMP zoning between 1997-2003. The unprecedented number of submission for the RAP/rezoning is obvious

(from GBRMPA, 2005).

Figure 5.10 shows the extent of the changes between the draft Zoning Plan (GBRMPA, 2003) and final Zoning Plan (GBRMPA, 2004). This depicts, as an example, a small portion of the GBRMP near Townsville (see location inset in the lower left corner). The majority of the zoning changes that occurred between the draft and the final zoning plans were primarily to address concerns raised by GBRMP users, particularly fishers.

Draft Zoning Plan – mid 2003   **Final Zoning Plan – mid 2004**
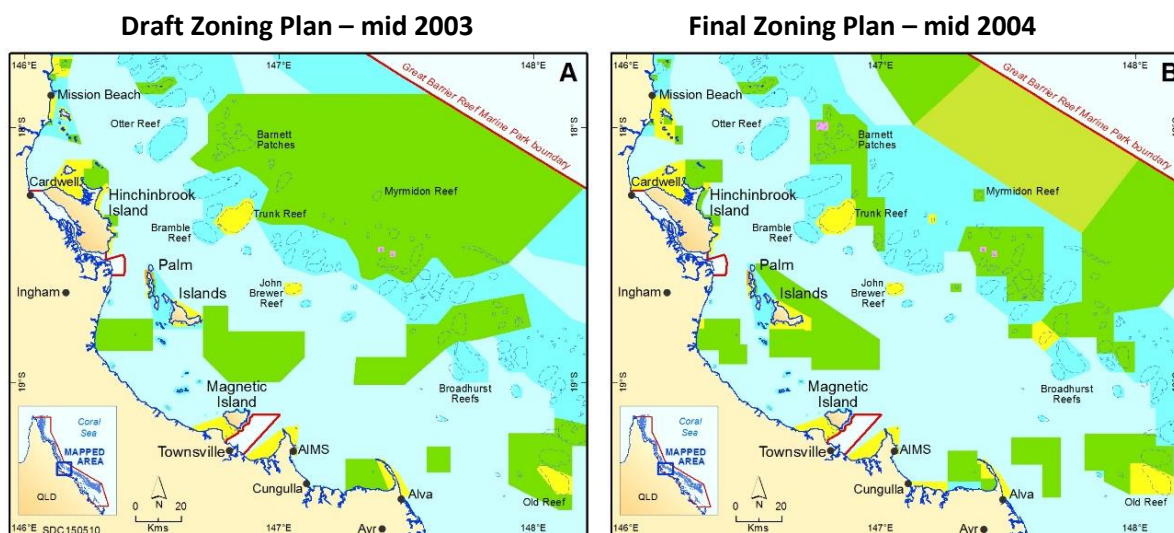
Figure 5.10   Examples of zoning changes between the draft zoning plan (A) and final zoning plan (B) for a small part of the GBRMP (map inset shows this small part of the GBRMP north of the city of Townsville. Many changes occurred between the draft and final zoning plans primarily to address the concerns raised in public submissions, particularly from fishers). For an explanation of the different zone colours, see Table 3.1. [from Day, 2016, © Commonwealth of Australia (GBRMPA)]

5.8 Public engagement after the new Zoning Plan came into effect

As noted by Bridgman and Davis (2004), a policy '...does not conclude with a cabinet decision. *Implementation* must follow...' (p. 28). Consequently, a key aspect of implementing the RAP/rezoning involved extensive efforts for public engagement before and after the date the new Zoning Plan came into effect (1st July 2004). GBRMPA embarked upon a wide-ranging program of public education to ensure that all potential GBR users understood the new zoning and had access to adequate information to allow them to comply with the new zoning requirements. A wide variety of engagement methods was used during the implementation phase of the RAP/rezoning (Table 5.4) including free zoning maps (Figure 5.11).
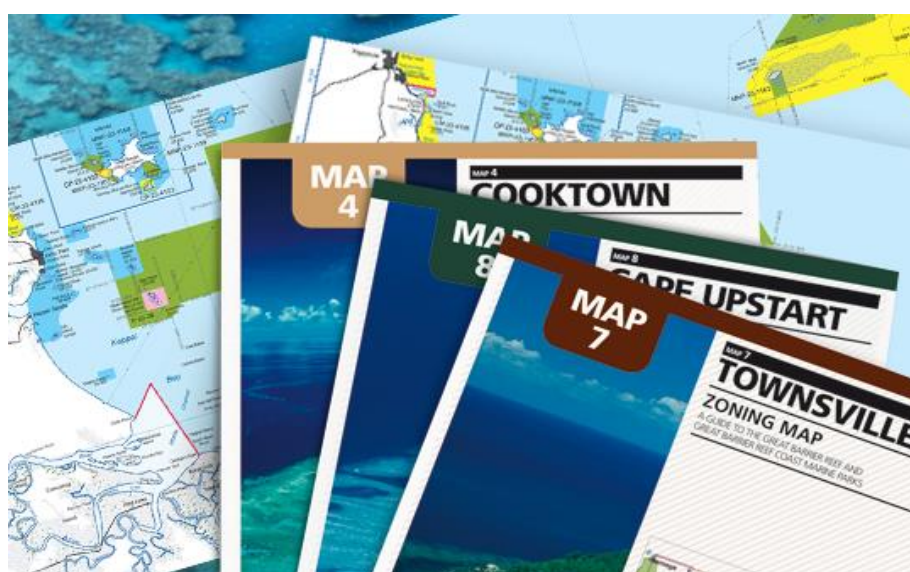
Figure 5.11 GBR zoning maps were made freely available from community access points

Table 5.4 Various methods of public engagement used during the implementation phase of the RAP rezoning (adapted from an answer to Senate Estimates, February 2004*)

Methods of public engagement during implementation
1. Newspaper, television, magazine, and radio advertisement advising of the commencement of new zoning on 1 July 2004
2. Production and distribution of more than 500,000 full-colour maps depicting the new zoning (see Figure 5.11).
3. Creation of a network of more than 200 Community Access Points (bait & tackle shops, marinas etc) to help distribute zoning maps along the GBR coastline
4. Newspaper, television, and magazine advertisement advising: a. the location of Community Access Points along the GBR coast to obtain zoning maps b. upcoming information sessions in communities along the GBR coast c. specific changes to zoning regulations of relevance for fishers
5. Production and distribution of an interpretive booklet *"An Introduction to Using Our Great Barrier Reef Marine Park"*
6. Production and distribution of CD ROM's showing zoning maps, zoning plan, interpretive material, and associated planning publications
7. Distribution of zoning maps and associated interpretive material to: a. all registered commercial fishers along the GBR coast. b. all Federal and State Members of Parliament along the GBR coast. c. all persons and organisation who made submission to the zoning process
8. Erection of signage at all major boat ramps along the GBR coast (see Figure 5.12)
9. Liaison with manufacturers of electronic navigation products to facilitate the depiction of the new marine park zoning on electronic navigation systems
10. All zoning co-ordinates were made publicly available on the web for download onto personal GPS/plotters
11. Publication of information sheets featuring information for specific user groups
12. Ongoing liaison with GBR coast media to facilitate local coverage of the new zoning changes
13. Development of a new website including an innovative interactive mapping tool to allow users access to all maps, interpretive information, information sheets and zone boundary descriptions
14. Attendance at most major regional shows (including boat shows)
15. Briefing of a significant number of GBR coast councils about the implementation of the new zoning plan
16. Participation in Queensland Seafood Industry Association port briefings along the GBR coast
17. Engaging local communities through briefings to Local Marine Advisory Committees along the GBR coast

(Adapted from an answer to Question on Notice No. 25, Senate Estimates, 17 February 2004, Hansard, p. 58)

The zoning maps were a significant component of the education campaign to inform GBR users about the locations of the new zones and what they could, and could not do, within each zone (see item 2 in Table 5.4). The maps showed the GBRMP zoning and the State Marine Park zoning and were jointly badged by both the Federal and Queensland Governments, reinforcing the complementary approach to public engagement. The cost of printing full colour zoning maps (19 different maps to cover the entire GBR), arranging for the maps to be widely distributed (items 3 and 7, Table 5.4) and disseminating the maps at no cost to users may seem both expensive and resource intensive; however, the benefits outweighed the costs. Today (more than 16 years later), most relevant zoning information is available

online as a free downloadable app[41] although many Marine Park users still prefer the hard-copy maps. This is because the zoning maps are extremely accurate being based on satellite imagery and in specific locations are more accurate than the commercial navigation charts.

Other implementation products for the new policy included boat-ramp signs (Figure 5.12) and the provision of the zoning information to manufacturers of electronic navigation products to enable them to install the zoning on electronic navigation systems e.g., personal GPS and GPS plotters. The total cost of the implementation phase was never calculated, although some additional funding was provided from the Federal government for implementation, primarily in the area of compliance and enforcement. The totality of all the items in Table 5.4, however, would indicate the cost of implementation was considerable, both in dollar terms and resources to develop the various products.

Figure 5.12   Signage showing both the Federal and Queensland zoning, along with information for users, was installed at boat-ramps adjoining the GBR

5.9 Assessing the effectiveness of public engagement in the RAP/rezoning

Table 5.5 is an assessment of public engagement based on a framework developed by Petts (2006). The table considers 33 different requirements for effective public engagement across five key elements of engagement and was originally published as Supplementary Material in Day (2017a, Supplementary Information Table T4). These effectiveness assessments were based upon the primary references cited in the right-hand column of the Table and were subsequently cross-checked against various parts of this thesis.

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[41] http://www.gbrmpa.gov.au/access-and-use/zoning/eye-on-the-reef-zoning-app - the app operates on either a smartphone or tablet and also works outside of mobile range.

Table 5.5 Assessment of RAP/rezoning against key requirements for effective public engagement (from Day, 2017a, based on Petts, 2006)

☐ Effectively addressed	☐ Adequately addressed	☐ Not effectively addressed

Management Element (from Petts, 2006)	Requirements for the relevant management element (from Petts, 2006)	Effectiveness in RAP/rezoning?	References justifying the rating
1. Recruitment of Representative Interests	Locally informed perspectives from a variety of viewpoints	Effective	Day et al., 2004 Day, 2017a Fernandes et al., 2005
	Sufficient time for recruitment	Not effective	
	Recruitment by lead facilitator to provide contact continuity	Adequate	
	Direct contact with potential participants	Adequate	
	Core participants engaged through whole process	Adequate	
	Information provision to wider community	Effective	
2. Active Facilitation	Independence from project decision/delivery agencies	Adequate	Day et al., 2004 Day, 2017a Thompson et al., 2004 Fernandes et al., 2005, 2009 GBRMPA, 2005
	Act in interests of lay and expert participants	Adequate	
	Controlling the more dominant voice while encouraging the weaker	Adequate	
	Significant facilitation experience	Adequate	
	Subject knowledge and ability to synthesize technical information	Effective	
	Maintenance of balance between assistance and direction	Effective	
	Assist discussion by elucidating issues and making essential linkages	Effective	
	Ongoing participant contact within and outside of meetings	Effective	
3. Collaborative Framing	Achieve buy-in by showing issue framing is not closed down	Adequate	
	Agreed upon terms of reference and ground rules	Effective	
	Time to explore all issues but ensure focus on what is possible	Adequate	
	Continuous use of narrative and visual prompts	Adequate	
	Capitalize on and be seen to value local and experiential knowledge	Effective	
	Co-produced lay and expert framing and priorities for action	Adequate	
	Mechanism to ensure that official agencies recognize all local issues	Adequate	
4. Optimizing Interaction	Project team pre meetings	Effective	Day et al., 2004 Day, 2017a Fernandes et al. 2005, 2009
	Making technical presentations publicly understandable	Effective	
	Bringing public concerns into an expert discourse	Effective	
	Expert and public informal and formal interaction throughout	Effective	
	Continuous individual expert involvement	Effective	
	Site visits	Effective	
	Background information provision	Effective	
	Small group and plenary discussions	Adequate	
5. Managing the Unexpected	Sufficient funds to allow flexibility of process	Not effective	
	Facilitator close monitoring of process	Adequate	
	Open communication when problems arise	Adequate	
	Management of expectations to maintain confidence and build trust	Adequate	

Rowe and Frewer (2005) demonstrated the effectiveness of public engagement depends on the mechanism(s) chosen and the way that the mechanism is applied. Assessing the 33 requirements from Petts (2006) against what happened in RAP/rezoning shows:

- 45% (n= 15) of these recommended requirements are assessed as having been effectively addressed (i.e., the requirement as specified by Petts (2006) was entirely achieved). For example, all but one of the requirements for 'optimising interaction' were considered as being effectively achieved as discussed earlier in this chapter.
- 49% (n= 16) are assessed as adequately addressed (i.e., the requirement as specified by Petts (2006) was achieved but to a lesser degree than those considered entirely effective)
- 6% (n= 2) are assessed as not effectively addressed

Two recommended requirements in Table 5.5 were assessed as 'not effectively addressed'; these were:

1) The first requirement was within the management element called 'recruitment of representative interests' and assessed whether there was 'sufficient time for recruitment'. GBRMPA officers were able to determine in a timely way who was invited to assist from the scientific sector. However, there was little, if any, opportunity to 'recruit' or invite specific individuals from the key sectors or interest groups (e.g., fishers, tourism, community groups, other agencies) for more effective engagement. Those sectors determined who would represent them during engagement. I have therefore chosen to assess this as 'not effective', because the recommended outcome of recruiting suitable representative interests was not available. This, however, was because there was no opportunity to do so, rather than a timing issue.

2) The second recommended requirement assessed as not effective was in the management element called 'managing the unexpected'. Here the recommended requirement was for 'sufficient funds to allow flexibility of process'. There was a minimal budget to undertake the RAP/rezoning. When the program grew in complexity and duration, the agency was forced to reallocate funding from other areas within GBRMPA to ensure the RAP/rezoning was completed. There were several unexpected aspects during the rezoning, and they were ultimately funded. However, it was a matter of re-prioritizing and re-allocating within the agency to meet the need rather than pre-emptively establishing any contingency funding. One example was when the Minister requested GBRMPA to undertake a third round of targeted public consultation (primarily with the commercial fishers), beyond that statutorily required (see section 6.6.1). Despite that fact there was no budget for this additional consultation, it was completed, thereby giving the Minister sufficient confidence to subsequently take the zoning plan to Cabinet.

In the supplementary material from Day (2017a), a further assessment was made of the public engagement program in the RAP/rezoning against another framework developed by the Victorian Auditor-General's Office (VAGO, 2015). The framework posed 20 questions across six elements of 'good practice' in government decision-making. The assessment of the RAP/rezoning was rated as 'effective' for 17 out of the 20 questions in the VAGO framework (see Day, 2017a, Supplementary Information Table T3). Three areas were highlighted in this assessment where improvement was needed:

- improved identification of the resources and skills prior to commencement of the program,
- improved estimate of a realistic timeframe for the program, and
- improved monitoring of the budget and progress against the original timeline.

All three areas are important and should be addressed in any future planning programs within the GBR.

5.10 Lessons learned from the RAP/rezoning about public engagement

The essential requirement to effectively engage the public during policy formulation cannot be overlooked or downplayed. As noted by Beale (1998), '...it is no good for scientists or policy-makers to bemoan the reality of community sentiment; it will not go away and it is always going to be an integral part of our decision-making process...' (p. 48). How engagement is undertaken is fundamental, recognising the advice from Hurlbert and Gupta (2015) that '...different levels of engagement are appropriate in different contexts depending on the objectives and the capacity of stakeholders...' (p.101). It is up to planners and managers to choose whichever engagement methods best suits their managerial, social, political, and economic situation, having first considered who are their stakeholders, rights-holders, users, and interest groups. Petts (2006) points out the form of public engagement is not as important as the way in which it is conducted.

Smith (2018) stressed that stakeholders need to be brought to the table early and then continuously engaged throughout the process of design, implementation, and evaluation. This was reinforced by others (e.g., Charles & Wilson, 2009; VAGO, 2015). Ultimately, the public engagement aspects of any planning process need to be tailored for the situation and must consider the relevant context. It is also important to recognise that almost all planning processes are political, and whether planners or managers like it or not, and irrespective of the level of public engagement, there are likely to be compromises (for political reasons and changing circumstances) at the end of most planning processes. Effective leadership also played a role as outlined in Chapter 4. The provision of appropriate resources for public engagement, the development of effective management systems and support within GBRMPA (e.g., the database to cope with the submissions, a shared list of all community engagement events, appropriate staff training) and the willingness to allocate extra resources when required, were all examples of the support from the leadership within GBRMPA. Dehens and Fanning (2018) maintain the success of any MPA depends heavily upon its ability to acquire a significant level of acceptance and support providing legitimacy from its stakeholders. Building upon the case outlined by Dehens and Fanning (2018), I suggest the success of an MPA, or a related policy program, also depends upon an ability to acquire a significant level of acceptance and support within the managing agency, from the CEO down.

Many lessons were learnt about public engagement during the RAP/rezoning. These lessons are discussed in more detail in:

— **Appendix A7** (specifically lessons #7, 10, 13, 16, 18, 23, 28, 29, and 36); and

— **Appendix A8** (the full list of all 25 lessons as this paper was specifically about public engagement). This list indicates which lessons need to be considered before the commencement of a planning program, which lessons apply throughout a planning program, and which lessons may be appropriate as/when required given a particular planning process.

While the public engagement process in the RAP was comprehensive and on balance was effective, such programs always need to be reviewed and updated.

5.11 Conclusion - the importance of effective, sustained, and targeted public engagement

The success of the public engagement during the RAP/rezoning was dependent upon several factors. These included the duration of the engagement (sustained throughout the RAP/rezoning), the wide

variety of methods used, the capacity to amend zoning in response to the public's concerns, and the support for effective public engagement activities throughout the agency at all levels. The variety of methods used enhanced both the level and diversity of public engagement and collectively contributed to the overall success of the planning program. Olsson et al. (2008) noted, '... the regional teams, and the community information sessions [were] innovative evolving structures set up especially for the RAP to improve interactions between …. The GBRMPA and other key actors across multiple levels…' (p. 9493)**.**

The specific costs of the public engagement aspects in the RAP/rezoning were not recorded at the time and would be extremely difficult to determine retrospectively. However, it is apparent from the complexity and intensity of the engagement that the costs were high. Importantly, there is need to recognize there are ongoing costs to educate the community as to what the policy means and how it affects them. Consequently, the costs to implement a complex policy such as the RAP/rezoning were initially high. Some of those costs have continued, and while they are less today, they are expected to continue for the life of the policy (e.g., ongoing public awareness, especially as new users access the GBR). This is reinforced by Morrison (2017) who noted that this kind of large-scale public participation can be very effective, although it is difficult to maintain over time. In effect, while these costs may seem high, the benefits are greater, especially when the Total Economic Value of the GBR is considered (Table 8.1 explains the GBR generates around A$6 billion every year). Smith (2018) noted, '... even if early stakeholder engagement appears time consuming, it is often seen to reduce so-called 'transaction costs' that might appear at a later stage, such as in plan implementation … (p. 3).

One of the agency interviewees spoke of GBRMPA's efforts to consult meaningfully:

> ...to make sure [the public] were thoroughly aware of the information and the issues … to **discuss, listen and adapt the policy and issues around what people who used the park every day said** [emphases added]…their knowledge and information was added into the mix. … that was why it was so successful because people were given an opportunity to input. … **instead of having just a team of people doing the planning, you had a whole community** … (Interviewee R8).

As previously noted, '...successful engagement is dependent on the willingness of community members and stakeholders to engage on matters that are important to them, and on the level of commitment of managers to also get it right...' (Day et al., 2019, p. 22). Across the GBR, however, there were differing community views which required careful consideration. What was a significant issue in one part of the GBR was different to the issues in other locations. Therefore, in the same way that public engagement needed to be tailored to specific sectors, engagement also needed to be tailored for different localities. GBRMPA needed to accommodate the diverse wishes of the broad community across the GBR, and this was an important aspect of briefing decision-makers who in some instances had previously heard only one perspective.

The resulting zoning plan was a successful outcome, and the comprehensive and systematic process of public engagement was one of the key contributing factors. The positive benefits of this engagement included:

1. The increased awareness amongst users, Rights-holders, and other interest groups, about the need to protect a range of habitats and the importance of biodiversity (this is termed 'beyond-process social learning' by Bull, Petts and Evans, 2007).

2. Combining local knowledge with expert opinion as an important piece of the planning process. GBRMPA was able to develop an effective way of collating the best available science from the scientific community (i.e., the map of bioregions and the biophysical operating principles/socio-economic & cultural management principles) as well as spatially relevant information from the public (through maps provided with public submissions and the community information sessions). Collectively these contributed to a draft plan that, as far as practicable, met the planning goals. Virtually all of this spatial information was provided *gratis*, with only minimal resources expended to gather these datasets.

3. The clear relationship between the level of public engagement and the final outcome.

When the revised zoning plan was tabled in the Australian Parliament in December 2003, media attention and political lobbyists ensured that most members of Parliament were aware of the planning process, the high levels of public engagement, and the significant changes that had occurred between the draft and the final plan. Virtually all those with political experience whom I interviewed, spoke about the critical link between securing community support for the RAP and the subsequent securing of political support. Understanding the views of 'the silent majority' who represented the views of the wider community (Day, 2017a; Stephenson & Lawson, 2013) was critical. This was reinforced by one of the interviewees:

> ... the community engagement that was part and parcel of the RAP/rezoning acted as an important channel, buffer and shock absorber when it came to the overall politics of the exercise. Most of the 'great unwashed' did not attend meetings or briefings or put in a submission but the fact they were aware they could, was reassuring for them. Also, the fact that we got out and didn't stay in our ivory towers ...and then we came back to them was politically critical. Disenfranchise the broader community from decisions that will impact them, and you have a problem ... (Interview A2).

There were differing political perspectives about the effectiveness of GBRMPA, a number of which were a legacy of issues from before the RAP/rezoning process. As one politician noted, '…the greatest political difficulty in the whole process was a lack of trust of GBRMPA by some of the people in some industries … because of issues that had arisen before the RAP was underway…' (Interviewee P1). Other political players, however, recognised the efforts that GBRMPA put into community engagement:

> **...GBRMPA took it seriously and it actually did change its draft plans to try to satisfy the concerns of local communities. ... what impressed me, was the Authority was flexible in what it was doing** [emphasis added] ... that was really important because it helped get sections of the community over the line… (Interviewee P5)

The next chapter addresses the various aspects of politics as another fundamental requirement for achieving the RAP/rezoning, recognizing the clear links between effectively engaging the community and how that contributed to securing political support in the RAP/rezoning.

Chapter 6: The role of politics in the RAP/rezoning

6.1 Introduction

Chapter 6 examines the role of politics and related governance issues in the RAP/rezoning policy reform. The political context relevant to the policy reform involved various types of politics, including inter-governmental politics, inter-agency politics, party politics, sectoral politics, and community politics. The analysis of politics and governance draws upon the literature as well as my interviews. Many of those I interviewed held roles that were directly or indirectly involved in political aspects or political lobbying during the RAP/rezoning. The importance of 'political windows'[42] and timing are discussed along with the benefits of the differing political relationships of the key actors within GBRMPA. The complexities of the governance issues are discussed, including the implications for the RAP/rezoning of the Queensland-Federal relations and the Structural Adjustment Package. Three instances where different political aspects could have derailed the policy process are also discussed.

6.2 The role of politics in policy reform

The importance of politics when making policy was recognised by Lehman (1992) who stated, '....**policymaking of any kind is highly political** [emphasis added]; that is, policymaking is part of political conflict and struggle over the distribution of scarce resources...' (p. 732). Bridgman and Davis (2004) observed, 'Policy making is not a strictly logical pursuit, but **a complex and fascinating matrix of politics, policy and administration** [emphasis added] … no single procedure guarantees a successful result… ' (p. 23). Edwards et al. (2001), having examined four policy reforms in detail, concluded '.. the cases have shown the paramount importance of politics in determining whether policy progresses from stage to stage and at what pace...' (p. 184). Thomas (2007) also noted '...there will always be

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[42] A 'political window' is recognised in the political sphere as providing a window of opportunity or an opening to achieve something that might not otherwise exist.

winners and losers, so **policy work is inherently political**...' [emphasis added] (p. 8). Politics is one of three dimensions assessed to determine policy success or policy failure in the framework developed by McConnell (2010), the other dimensions being 'process' and 'program' (as explained in section 7.4.1).

However, what constitutes 'politics' is not easily defined; many definitions fall within a narrow focus of political science or ideology (e.g., Bourque & Grossholtz, 1974; Houlihan, 2007; Rancière et al., 2001). Other definitions of politics are too simplistic or imprecise (e.g., 'the art or science of government' (Webster Dictionary[43]), or 'Politics is about who gets what, when and how' (Lasswell, 1965). Furthermore, there has been little systematic analysis of the role of politics in conservation planning (Morrison et al., 2020)

6.2.1 The role of politics in the RAP/rezoning

The most appropriate definition of the politics during the RAP/rezoning is summarised by Marsh & Stoker (2002) who recognised four interwoven aspects of politics:

- *...Politics as government*: associated with the art of government and the activities of the state.
- *Politics as conflict resolution*: concerned with the expression and resolution of conflicts through, compromise, conciliation, negotiation, and other strategies.
- *Politics as power*: the process through which desired outcomes are achieved in the production, distribution and use of scarce resources in all areas of social existence.
- *Politics as public life*: primarily concerned with the conduct and management of community affairs... (adapted from Marsh and Stoker, 2002, as quoted in Bambra et al., 2005, p. 190).

All four of these aspects of politics were relevant during the RAP/rezoning. The first three might seem obvious, and the fourth, *Politics as public life,* related to the role of community engagement in the planning process, and particularly the role of the so-called silent majority (see Footnote 36) and its influence on the politics (as explained in Chapter 5)*.*

Olsson et al. (2008) identified the importance of politics in the RAP/rezoning, noting that gaining political support was one of '... five strategies used by GBRMPA to implement the RAP and the new zoning plan...' (p. 9491). A variety of ways of gaining political support were mentioned by Olsson et al. (2008) including manoeuvring the political system for support at critical times (p. 9489); seizing a political window of opportunity (p. 9490); using pollsters during RAP for political leverage (p. 9492); and mapping the political landscape (p. 9492). Olsson et al. (2008) also noted that the political skills of GBRMPA's executive team were important for navigating the political system (p. 9493), and skilful leadership enabled the Executive to move across multiple political levels (p. 9493). These different aspects of gaining political support demonstrate the overlaps of politics with effective leadership (Chapter 4) and with public engagement (Chapter 5).

6.2.2 The political context for the RAP/rezoning

Australia's *Oceans Policy* (AOP) (Commonwealth of Australia, 1998) provided some initial political context and broad overarching policy guidance in the early days of the RAP/rezoning. The AOP was released in 1998 to mark the International Year of the Ocean, and provided '...a coherent, strategic planning and management framework capable of dealing with the complex issues confronting the

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[43] Some politicians might disagree with this dictionary definition, arguing that politics is much more an art than a science.

long-term future of [Australia's] oceans...' (p.1). One of the aims for the AOP was to achieve full integration across sectors and jurisdictions through ecosystem-based approaches. Consequently, various aspects that helped to guide the early days of the RAP planning process were derived from the AOP and included the *Principles for Ecologically Sustainable Ocean Use*, and the *Appendix 1: Policy Guidance for Oceans Planning and Management* (Commonwealth of Australia, 1998). Also released in 1998 were guidelines developed by the Australian and New Zealand Environment and Conservation Council (ANZECC) Task Force on MPAs. The *Guidelines for Establishing the National Representative System of Marine Protected Areas* (NRSMPA) (ANZECC, 1998) were prepared to assist government agencies in the development of a national system of MPAs and to assist stakeholders to understand the process. The ANZECC Guidelines included the CAR principles, described as:

- *Comprehensiveness*. The NRSMPA will include the full range of ecosystems recognised at an appropriate scale within and across each bioregion.
- *Adequate*. The NRSMPA will have the required level of reservation to ensure the ecological viability and integrity of populations, species, and communities.
- *Representativeness*. Areas that are selected for inclusion in MPAs should reasonably reflect the biotic diversity of the marine ecosystems from which they derive.

The Federal government's election commitment proposing a representative national network of MPAs for Australia's oceans was raised by several interviewees as being an important precursor for the RAP. This election commitment had been promoted by the (then) Federal Environment Minister, Senator Robert Hill.

6.3 Major political actors in the Federal sphere

In mid-2001, the GBRMPA CEO/Chair, Virginia Chadwick, briefed Robert Hill[44] as the Federal Environment Minister, suggesting the RAP was an important task for GBRMPA. Minister Hill decided not to proceed with the RAP, although the reasons for his decision at that time are not clear. It is possible the Minister felt there had been enough political debate associated with the GBR because there had been considerable controversy in the preceding years around the 'trawl wars'[45] and dugong protection.

Various ministerial changes in the Coalition Government occurred in late 2001 and Dr David Kemp was appointed as the Federal Minister for the Environment. David Kemp was well regarded by his political colleagues, as noted by one of the political interviewees, '...David is a very astute fellow, a real intellectual ..and very good environment Minister... He understood these things, from both the scientific point of view, but also he's quite an astute political scientist...' (Interviewee P3).

As the GBRMPA CEO/Chair, Virginia Chadwick briefed David Kemp as the incoming Minister, again suggesting the RAP as one of various important tasks for the GBR. Minister Kemp recounted this in his interview:

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[44] Robert Hill was the Federal Environment Minister from 1996-2001. Hill was the Leader of the Government in the Senate (and subsequently the Defence Minister) and always retained a strong interest in matters relating to the GBR.

[45] What became known as the 'trawl wars' was a particularly contentious time when GBRMPA, with the backing of Minister Hill, took on the State of Queensland and the fishing industry over the management of trawling within the GBR. Numerous reforms to trawling occurred but there was a lot of acrimony over the process and the outcomes.

> … it was in one of those early meetings, possibly our first meeting, that Virginia outlined to me the fact that a substantial rezoning of the Great Barrier Reef was necessary … and that work was proceeding at GBRMPA to make this possible… Well, it was **my responsibility to decide whether or not to support the RAP process … whether or not there was a RAP** [emphases added].... I took it on notice because I could see immediately that it was a very complex and far-reaching process that would undoubtedly be politically difficult to achieve – and indeed that a great deal of political capital would probably need to be expended in achieving the outcome that she sought...

> And so **I thought long and hard for some months about whether or not I should give the go ahead to the RAP** – or whether it should be shelved ….I took the view that **it had a chance of being successful because of the leadership and political skill that Virginia Chadwick had brought to the position** of [GBRMPA] Chairman … so I decided to gamble on undertaking the process knowing that Virginia would be there...
>
> > (Hon. Dr David Kemp, Federal Environment Minister during the RAP/rezoning, PhD interview, December 2015).

Within the Liberal party, Virginia Chadwick and Robert Hill were in a different 'faction' to David Kemp which may have explained some of Kemp's initial uncertainty. Regardless, a good working relationship soon developed between the new Minister and GBRMPA's CEO/Chair. One political interviewee noted, '... both of them …would have had an eye for the politics [and]… been motivated by a genuine belief in the scientific advice they were getting...' (Interviewee P3). Another interviewee noted:

> …[David] Kemp was a big C conservative .. and he proved himself to be very analytical and very precise…he was smart and he was clever … and because he was on the conservative side and was prepared to carry [the RAP] forward, it held the conservatives at bay a lot more ... (Interviewee S10).

John Tanzer (GBRMPA's Executive Director during the RAP/rezoning) took the opportunity to add to his perspective about Minister Kemp when John was requested to check his quotes following his interview:

> .....[David Kemp] had a very strongly developed sense of right and wrong as informed by the facts. He is a very value driven person. If, after deep consideration of the evidence, his intellectual and moral compass set him on a certain direction, then he would hold to that … a laudable trait. At the end of the day, this was to prove crucial, as politicians mostly from his own side, attempted to change his mind and commitment...
>
> > (John Tanzer, email personal communication, 16th October 2020).

One of the key requirements for gaining approval for the RAP/rezoning was securing a strong level of political support. This was not without its challenges as outlined by one of the political interviewees when explaining how policy was developed in the Federal government:

> ...Well, this is a number's business … [you] have to … win the Prime Ministers support, then win cabinet support, then Liberal Party support, then win the coalition, the joint party's support …. And they were all influenced by different interests and factors...
>
> > (Interviewee P2).

Securing sufficient political support in Canberra required considerable effort, time, and coordination. One of the interviewees recounted when a group went to Canberra for a political briefing organised by GBRMPA. The group comprised Virginia Chadwick (GBRMPA CEO/Chair), Terry Hughes (JCU

scientist), Daniel Gschwind (Tourism Council), Imogen Zethoven (WWF), and it was arranged that they would see:

> …. David Kemp, Peter Dutton (Member for Dixon), Deanne Kelly (Member for Dawson), Paul Neville (Member for Hinkler), Steve Ciobo (Member for Moncrieff), Teresa Gambaro (Member for Petrie), Bruce Baird (Member for Cook), Ian McDonald and Santo Santoro (Queensland Senators), Phillip Ruddock, Joe Hockey …staffers from Ian McFarlane's office... so it was a pretty good part of the cabinet …. We deliberately turned this into an economic argument… that's why the tourism minister (Joe Hockey) was involved, but we also wanted to have Treasury involved and as many other agencies as possible... (Interviewee S1).

The political manoeuvring to gain political support occurred overtly and also behind the scenes, as one interviewee recollected:

> '…Virginia had to fight very hard politically and call-in political favours [emphases added] … she was very careful when she argued her case .. …her arguments were around legacy … the legacy for the government, around their political positioning for elections ….it was also around the national interest and she argued those very strongly… [but] those arguments were not done in public… they were private arguments… (Interview S10).

The involvement and role of all the Federal politicians changed markedly over the three phases of the RAP/rezoning. The graphical Word Clouds depicted in Chapter 4 show there was minimal involvement of politicians in Phase 1, although by Phase 3 the role of the Federal Minister was prominent, with Federal MPs and Federal Parliament also playing a role. Several of the political interviewees mentioned the role of the Sustainable Environment Committee of Cabinet that was chaired by the Prime Minister (PM). This explained the level of support of Prime Minister Howard for the RAP/rezoning:

> ... [Howard] decided that he was going to commit to the environment….you've got to remember we lost an election on the environment and Howard was in the business of winning elections …he knew the legacy he wanted out of the environment and the Great Barrier Reef…. he always thought the Liberal Party deserved much more credit for having taken major environment decisions than it was ever given … (Interviewee P2).

The role of the Cabinet and the Coalition government in the final stages of approval of the revised zoning plan were also critical and confirmed the Prime Minister's support in the RAP/rezoning:

> ...There were furious debates in the party room where particularly Warren Entsch, Deanne Kelly and Paul Neville challenged the PM on the need to do this… whether [the government] were committing political suicide by doing this...Howard was very good in the party room [emphases added] ... [he] would sit there and listen …he'd work out what support he had from his colleagues or otherwise. He held subsequent meetings with his Queensland colleagues, again to work out which way the wind was blowing… the PM and the Minister had to be certain that they were not going to politically damage the government... (Interviewee P5).

Warren Entsch, Deanne Kelly, and Paul Neville, as local Federal Members of Parliament (MPs), were strong advocates for what they believed to be the interests of commercial and recreational fishers in their electorates. They staunchly represented the interests of these constituents, but they did not have a formal role in approving or finalizing the zoning plan. Nevertheless, their role during the broader RAP/rezoning debates was substantial and required a lot of political effort from Minister Kemp,

GBRMPA's CEO/Chair and key GBRMPA officials. Certain local MPs, however, appeared to be conflicted in their views:

> … our local MP was De-Anne Kelly … as a National, Deanne was our Federal representative, so she was trying to support the government … but up here she was supporting the fishermen at the same time... so, she played a merry tap dance... (Interviewee S9).

Several interviewees commented on the role of Peter Lindsay, the local Federal MP in Townsville. One political colleague remarked '…Peter was a good support act which was different to every other politician up here … it was never in doubt about where Peter stood about RAP…' (Interviewee P3). Another interviewee said '...[Peter] was a supporter the whole way through and ... definitely played a major role, keeping us informed of what was happening…. in contrast, [Warren] Entsch played a major role on the other side and made life difficult for us ...' (Interviewee R4). This view was supported by another key actor who understood the local politics:

> ... [Peter] Lindsay was supportive of the RAP/rezoning… personally I think he was very supportive of Virginia and smart enough to know that putting the Reef first was likely to gain some votes from the likely 'left of centre' constituents in his electorate such as JCU staff and students, GBRMPA and AIMS or at least mitigate the leakage of preferences to the opposition... his low key but consistent, support for the RAP/rezoning did not hurt him at the subsequent election when he was the beneficiary of a significant swing.... (Interviewee A2)

6.4 The roles of Queensland actors in the RAP/rezoning

Given the responsibilities of both the Federal and Queensland governments in the management of the GBR, the politics of the RAP/rezoning was more than just Federal politics. Queensland politicians who played important roles included the local State members whose electorates abutted the GBR, the State Minister responsible for the environment, and the Queensland Premier and Queensland Cabinet were all involved at various times. Compared to their Federal counterparts, however, the roles of the Queensland politicians were different in many ways and changed markedly over the period of the RAP/rezoning. From the Queensland political perspective, there were three distinct stages of the RAP/rezoning. Firstly, a stage of minimal interest; followed by a period of rapid interest and escalating concern, and then the third stage when Queensland had to move rapidly to catch up to the Federal process.

6.4.1 Early days of the RAP/rezoning from Queensland's perspective

In the early days of the RAP/rezoning, the Head of the Queensland Cabinet Office was formally on the GBRMPA Board, so the Queensland Government was well aware of the forthcoming planning process and GBRMPA's ambitions. The day-to-day management staff (i.e., the rangers and other field staff) began to work with GBRMPA staff in engaging the community to explain the reasons for the proposed rezoning. In that first phase of engagement, one Queensland officer admitted ' …we didn't really engage… we left that to GBRMPA to deal with… we didn't have anything to say … we didn't know what we were going to do, so we were told to go along, don't say much and watch …' (Interviewee Q1).

At that early stage, the RAP/rezoning was not on the political radar of most Queensland politicians as indicated by one of the Queensland interviewees:

> … [John] Tanzer [from GBRMPA] was briefing local [State] MPs all the time …but they
> weren't listening…. And they didn't understand. They never understood the boundary,
> neither did Cabinet… they still don't understand the boundary… (Interviewee Q1).

Despite this apparent lack of interest by politicians in the Queensland Government, the early engagement and briefings by GBRMPA's senior executive was to prove critical when the political intensity of the public debate intensified with the release of the first draft.

6.4.2 Increasing concerns from Queensland about the RAP/rezoning

As the first phase of the public engagement about the RAP/rezoning progressed, a number of the commercial fishers and recreational fishers began to express their concerns. A political advisor in Queensland recollected:

> …I remember quite clearly in the early stages we were on board…but then we said
> "Whoa! We're out of here". ….**we started to get feedback, particularly from local
> members and others …that we needed to be very careful with what GBRMPA was
> doing** because the perception would be … that the QLD government was driving this or
> was party to this, and that in the coming State election.. the fear was that this would be
> an issue in every regional seat up and down the Queensland coast … (Interviewee A1).

A perspective of one of the Queensland officials was that the Commonwealth's RAP process had not endeared Marine Parks to the recreational and commercial fishing interests, and there were also other issues:

> … the data in relation to the territorial sea and closure lines were largely unknown. We
> didn't know where state waters were … so, **we had a data issue, we had a jurisdictional
> issue, we had a feisty public engagement issue** …and of course, we had commercial
> interests to deal with … and the joint permitting arrangements that were at best
> complicated …at worst, complex and almost unthinkable in parts … (Interviewee Q2).

Part way through the RAP/rezoning, commercial and recreational fishers started to publicly express their concerns. There were, however, other recreational fishers who were either ambivalent or supportive, as explained by one of the key actors in the RAP/rezoning, who said ' … this silent majority were an important part of the political process that smarter politicians like [Peter] Lindsay were picking up on…fishing organisations are not the same as fishers more broadly, especially in north Queensland…' (Interviewee A2).

The interest and concern of the State MPs began to change as the fishers' disquiet became more vocal and a number of controversial public meetings occurred. As a consequence, Queensland organised a briefing in Brisbane for the Queensland Minister and Queensland backbenchers. This Backbenchers' Committee meeting turned out to be a pivotal point in Queensland's involvement in the RAP/rezoning. One Queensland public servant, who was requested to attend the meeting at the last moment, recollected:

> …Basically, the [State Environment] Minister and every [State] coastal MP was there ...
> that was the problem! … the local member for the Whitsundays had misled her
> constituency by saying that Queensland controlled the whole of the Whitsundays …
> when I tried to explain the complexity of the boundaries … [and I said], this is why we
> have complementarity... She said, "**You mean the waters around those islands aren't
> Queensland?**" [emphases added] … I said, "Well they might be, they may not be, but
> we've got complementarity, so it doesn't matter". She exclaimed, "**It doesn't matter!!**",

and that's when she slammed the table and said "Minister, your Department is out of control" ... (Interviewee Q1).

Another Queensland advisor gave his view of the political perspective of Queensland at that time:

...Well, to be frank the State wasn't really keen on putting its feet on the sticky paper (to quote a former Queensland Premier), because of the fall-out, particularly in marginal coastal seats. The fall out was potentially pretty severe and there was a view that the Commonwealth … had the easier road to hoe because they could have green zones right out to sea which wouldn't really affect 'Mum and Dad fishers' [on the coast]… **we didn't want to get caught up in the uncertainty** [emphases added] and if we were shoulder to shoulder with GBRMPA staff in the public domain, it would look like we'd already made up our mind on exactly what the final outcome would be and we'd have nowhere to go… **the decision was made to back off until the Commonwealth were clear on what they wanted to do, then we would know how we to respond** ... (Interviewee A3).

This equivocation led to significant uncertainty for the Queensland officers who were trying to work with GBRMPA. They were constrained in what they could do and were concerned the higher echelons of the Queensland bureaucracy were unaware of the implications of the decision to withdraw from the process.

…we were lurching from failure to failure from Queensland's side … trying to keep up with GBRMPA ... Firstly, there was the shock of the withdrawal, immediately after the first consultation phase… we [had participated in] the open houses but then we withdrew … after that disastrous briefing of the [State] Minister's backbench committee …

(Interviewee Q1).

At this stage, there was a strong belief at the level of senior political advisers in Queensland that the RAP/rezoning would never succeed. By keeping a low profile, Queensland politicians and bureaucrats believed they could distance themselves from any controversy. One of the Queensland advisers noted, '…we have this proud tradition in Queensland of blaming the Commonwealth for the stuff that you think might be unpopular in your own electorate!...' (Interviewee A3). Another senior Queensland adviser recollected:

…there was no way in the world that you guys [GBRMPA] were going to achieve a jump from 5 percent to over 30 percent in one go… this was sheer lunacy, and I remember telling [John] Tanzer – "You are kidding yourself – this will not happen – you are heading for grief and you should back out now"... (Interviewee A1).

The 'hands-off' position adopted by Queensland at this time was obvious to many of those outside government. It was widely recognised by various sectors that Queensland had decided to '… sit back and see what happens, and …if it's absolutely marvellous, let's mirror it and jump on … if it's an absolute disaster, it's not ours ...' (Interviewee S4). Another of the sectoral interviewees noted:

… during RAP, they [Queensland Parks and Wildlife Service officers] **played no role, because they weren't allowed to** [emphases added]... the Premier at the time didn't allow them to … they had to hide under the table every time anyone mentioned the word RAP … **ironically, it was a very major role during RAP, to have no role at all...**

(Interviewee S6).

6.4.3 Realisation in Queensland the RAP/rezoning might succeed

Towards the end of 2003, Queensland realised that the Commonwealth was progressing with its rezoning and despite the controversy, was likely to achieve an outcome. Because the Commonwealth would be seeking to implement the new zoning[46], this led to a stark realisation in Queensland of what this might mean:

- The Commonwealth would potentially produce a zoning plan and zoning maps for only the Federal waters. Given the legal uncertainties for marine boundaries like 'internal waters' (with imaginary lines across the mouths of estuaries and bays) and the different interpretations of low water, this would result in even more management complexities and uncertainties and possible legal challenges.

- If the Commonwealth and State waters had plans with different zonings for intersecting areas, it would have been extremely difficult for users to comprehend or for managers to enforce.

A decisive moment for Queensland's position was the significant decision for complementary zoning:

> ...I have to give credit to John McKell [the Queensland Environment Minister] .. at a briefing session, he said "I don't understand **the issue – it's one ocean, why don't we just have one law"** [emphasis added]... and that was a principle we held dear when we started to think through some of the issues and guided us in terms of complementary zoning … (Interviewee Q2).

One Queensland political advisor explained what this realisation of complementarity meant and how they quickly had to develop a Queensland position:

> … **it would have been madness to have anything other than a complementary result** [emphases added] … but it required a hell of a lot of work with the departmental specialists ... understanding how the State zoning could complement the Commonwealth zoning and then working with the various backbenchers and the other ministerial officers … [to ensure] we had **a consistent and coherent approach that was politically defensible**…we really had to scramble ...but that was of our own making because we were the ones that decided to extricate ourselves formally for a while... (Interviewee A3).

This rapidly evolving Queensland political process was experienced first-hand by one of the Queensland planners. Soon after a new Executive-level person joined the Queensland Environment department, the department's planning team was called to her office. This new Executive Officer knew little about the RAP/rezoning, although she had been made aware from the Premier's office that it was politically important:

> ... she said, "Who are the stakeholders? I'll scribe". We replied, "The rec [sic] fishers, commercial fishers, Indigenous people, Local government, blah, blah, blah", [sic] ... but she said, **"Who are you talking about'? I want the key stakeholders who are critical, not these bit players** [emphases added]... and then she writes down the Queensland Cabinet Secretary, Cabinet, the Premier, the Minister, the DG [Director General]... and then she drew a line and said "There, that will do... I will look after this lot and you look after the rest below the line". For me, that was when the penny dropped … **this was a massive**

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[46] Whether the Federal (Coalition) government saw political advantage of progressing this in spite of the State (Labor) government is unclear.

> *political* **undertaking ...she did politics well and we didn't know politics.** We made little
> bits and pieces of parks and green zones …   (Interviewee Q1).

This interface between the planning process and the political process was also critical to the project's success in Queensland. As one Queensland official recollected:

> …the Executive Director of Policy in Premiers and Cabinet, and the Executive Director of
> Policy in the [Environmental Protection Agency], were both instrumental … it was my
> role to make sure they were properly briefed, so that they could go to their masters and
> say it's okay... there was a lot of apprehension and fear about the Commonwealth RAP
> process, and what impact that would have from an industry issue, [given] the GBR is vital
> to the State economy …   (Interviewee Q2).

That same interviewee outlined how Queensland perceived the RAP:

> ... the complementary zoning project, which was the **State's response to RAP was not**
> **part of the RAP** [emphases added]… the idea was to pull the Commonwealth's 'zoning
> blanket' up to high water where we could ... but we would retain our own decisions in
> those waters that were clearly state waters, for example, in rivers, estuaries… **we didn't**
> **call our program RAP or anything to do with RAP**… our outcome was a single State zoning
> plan …   (Interviewee Q2).

Updating the legal aspects in the Queensland legislation to implement the rezoning proved similarly complex to those facing the Federal legal drafters:

> ...One thing that was critical to the success of the project was having someone in the State
> office of Parliamentary Counsel, who had an understanding… of having to deal with
> Commonwealth legislation and State legislation as if it were one…. [for example], the state
> definition of commercial permits and Commonwealth definition of commercial permits
> were not dramatically different …but different enough, to cause both jurisdictions
> problems if that didn't work together. So Parliamentary Counsel worked through those
> issues for us …and in the end, we came up with forms of words that met the needs of the
> Commonwealth, the needs of the State and the needs of the commercial operators to
> instantaneously bring in a system that allowed the existing joint permits to continue and
> new permits to operate seamlessly...   (Interviewee Q2).

Four months after the (Federal) *Great Barrier Reef Marine Park Zoning Plan 2003* came into effect on 1st July 2004, Queensland declared the *Great Barrier Reef Coast Marine Park Zoning Plan* in November 2004. Queensland's Coast Marine Park combined a number of previous small State marine parks into a large single State marine park, covering the majority of Queensland waters between high water mark and low water mark along the GBR coast. The State zoning 'mirrored' the adjoining Federal zoning in the majority of State waters. This ensured complementary zoning from high water, out past low water (i.e., the limit of the Queensland jurisdiction as determined by the High Court), to the seaward extent of the Federal Marine Park.

Despite the differences and tensions between the Queensland Government and GBRMPA during the RAP/rezoning (as outlined above), the resulting complementary approach means that today there are matching management provisions for virtually all marine waters in the GBR Region irrespective of the jurisdiction. This has many benefits including joint (i.e., Federal-State) permits, increased public understanding, and unified/consistent enforcement and compliance approaches (Davis et al., 2004).

Figure 6.1 shows GBRMPA officers working in conjunction with Queensland Parks and Wildlife Service (QPWS) officers to explain the RAP/rezoning to community members when the revised plan came into effect.

Figure 6.1   As the RAP/rezoning was being implemented, GBRMPA officers and QPWS officers worked cooperatively to explain the new zoning to the public (in this case, a community meeting in Rockhampton, July 2004). (L-R: John Barrett (GBRMPA), Steve Hoseck (QPWS), Belinda Jago (GBRMPA); three unidentified community members]

6.5 Sectoral politics

Sectoral politics were also clearly at play during the RAP/rezoning process. Many political actors and lobbyists were involved, including key individuals from each of the relevant sectors (e.g., tourism, commercial fishers, recreational fishers, charter fishers, ENGOs), all of whom became embroiled in the political deliberations around the RAP/rezoning. For example, some of the commercial fishers and the charter (or game) fishers became heavily involved in lobbying politicians and active in the media, as they were concerned about the implications of the RAP/rezoning for their sectors. Another relevant sector was Local Government**,** especially those councillors whose local government areas abutted the GBR, who were involved primarily for the stakeholders within their constituencies.

A wide range of submissions covering all the relevant sectors were received during the two phases of public participation. How these submissions were considered in the final zoning is summarised in the report on the zoning (GBRMPA, 2005). Different sectors utilised the political process in different ways; the commercial fishers were highly influential and convinced the Minister there were last-minute changes to the zoning that would further reduce the impact on their industry while (they maintained) having only minimal impact on the biophysical operational principles.

> … there weren't a lot of other groups who got some of the very last-minute changes that we got …we were able to meet with the Minister very late in the process … just before the final zoning plan was about to go to Cabinet …   (Interviewee S4).

John Tanzer (GBRMPA's Executive Director during the RAP/rezoning) has suggested this raises an interesting and paradoxical point:

> ... despite the commercial fishing sector being much less economically significant than the recreational fishing sector and certainly tourism, they were arguably more politically influential at least when it came to influencing zone size and boundaries. Economic importance and capacity to politically lobby and influence are not as directly related as they may first appear...
>
> (John Tanzer, personal email communication, 16th October 2020).

This level of last-minute political influence was not prevalent across all the sectors although there was widespread sectoral interest in the final zoning plan. Figure 6.2 shows an excerpt from the Minister's speech from *Hansard* when the revised plan was submitted to Federal Parliament in December 2003. In the speech, Minister Kemp summarised the views of the key sectors:

...The Queensland Tourism Industry Council has applauded the plan, saying:

> This plan is a crucial step in protecting one of Australia's greatest natural assets and a milestone in demonstrating our ability to manage our resources. We congratulate Minister Kemp and the Great Barrier Reef Marine Park Authority not only on this outcome but also on the open process of consultation which preceded it.

The Executive Director of the Association of Marine Park Tourism Operators (AMPTO) said:

> I doubt that I will see a more important conservation effort anywhere in the world in my lifetime.

The process of consultation has come in for particular commendation. The Game Fishing Association of Australia Research and Development Foundation said:

> The Minister and the Great Barrier Reef Marine Park Authority have listened to the concerns expressed by hundreds of game fishers from all over Australia and the world, restoring faith in the public consultation process...

Figure 6.2   Excerpt from *Hansard* 4 Dec 2003, p. 23835 (part of the speech by Minister David Kemp recommending the new Zoning Plan for parliamentary approval)

The last quote in the above speech from the game fishers exemplifies the political influence of particular sectors. During the RAP/rezoning, the GBRMPA planners were busy dealing with the (relatively noisy) commercial and recreational fishers, and inadvertently overlooked the game fishers who had been comparatively low-key. A number of the game fishers, however, were politically connected (e.g., the golfer, Greg Norman, was a keen game fisher and on a first-name basis with the Prime Minister and the US president). Concerns were growing within the game fishing sector, and once those concerns became known in Canberra, GBRMPA officers were quickly dispatched to Cairns with a clear directive to 'listen to the game fishers'. The resulting large offshore Buffer Zones, which allow trolling for marlin and billfish but no other forms of fishing, became the compromise to meet the game fishers' concerns. Ecologically, this was a less-than-desirable outcome, however, it meant the zoning plan was not derailed, so politically it was an acceptable outcome. This is explained in a recent perspective from John Tanzer:

...after negotiation, the compromise of buffer zones was less than what the game fishers wanted which was dark blue or yellow abutting the reef edge… they got buffer zones, but I still recall complaints because it meant they could not 'catch a trout for dinner'… Virginia and I discussed this and the risk of game fishing interests pulling the whole thing down. It was clear that these interests were prepared to delay considerably which, given the political window, would have probably sunk [the plan] entirely… with this in mind it was a small price to pay and while some GBRMPA officers were upset and saw it as us pandering to the 'big end of town', the stakes were real, and politics is the art of the possible …

(John Tanzer, previous Executive Director, GBRMPA, personal email communication, 16th October 2020).

The importance of developing a sound relationship with the Minister was understood by each of the sectors and was explained by one of the sectoral interviewees who exerted a major influence on the outcome:

… one of the other things about the success of the project, is the relationships you develop … it was absolutely fundamental that I developed a very close working relationship with the Minister's office … I can't underplay how important those relationships were inside government…   (Interviewee S6).

6.6 Less obvious political aspects during the RAP/rezoning

While the political roles of the State and Federal jurisdictions and the sectors might seem obvious, there were also less obvious although still significant political aspects of the RAP/rezoning policy reform. These include political will, the importance of 'political windows' and the unanticipated value of differing political affiliations.

6.6.1 The significance of 'political will'

Once both the GBRMPA CEO/Chair and Minister David Kemp became involved in the RAP/rezoning, political will became a significant aspect of the continuation and completion of the policy reform. Most interviewees who had interacted with Virginia Chadwick recognised she was a politically astute leader, particularly once she became an advocate for the RAP/rezoning. However, Minister Kemp necessarily needed to give the final approval for the RAP to formally commence. From that point on, both the Minister and the CEO/Chair continued their support, despite all the controversies. John Tanzer recollected in recent correspondence:

... However, Minister Kemp, ever mindful of the need to dispassionately weigh up the pros and cons, was always wanting to make sure GBRMPA was following due process, making choices on the basis of evidence, and if anything, erring on the side of over consultation. Accordingly, he required timely and comprehensive briefings throughout the process to reassure himself on these aspects. It was made clear ... that his support was determined by GBRMPA being able to respond to his questions and requirements. Virginia saw the importance of meeting this need and made it a high priority for the agency...   (John Tanzer, personal email communication, 16th October 2020).

One example of 'erring on the side of over-consultation' was when Minister Kemp requested GBRMPA undertake a third round of targeted public consultation, beyond that statutorily required. The initial reaction of GBRMPA officers was that this was neither fair or feasible (the feeling was the team was too exhausted, there was no time, there was no budget, and was it really necessary?). Minister Kemp's 'political antennae' told him it was necessary, and it happened.

When Minister Kemp was requested to check his quotes in the context of this draft chapter, he took the opportunity to reflect on his reasons for approving and supporting the RAP/rezoning:

> ...When I ask myself why I acted as I did, there was one over-riding motivation, and that was to achieve an outcome that would be good for Australians and the world. **There was no short-term political gain to be made by the RAP** [emphases added]. If I had not pursued the RAP, there would have been no short-term political cost to me personally in the party ... to achieve the RAP, indeed, involved the expenditure of political capital, which was only worthwhile because the goal was of over-riding significance....
>
> ... I took some time to be convinced of its merit and practicality, as I could see that it might incur some high political costs. In deciding to proceed with the RAP at first, and then to pursue it through to final parliamentary approval despite growing resistance within the party, I saw myself as **giving priority to the RAP itself over other political considerations. This was because the preservation of the GBR was a value of exceptional importance within my 'worldview' or political philosophy,** which is one based on reason, rationality, and public interest .... and I wanted to have the personal assurance that when I retired from politics, I could be confident that I had worked for worthwhile outcomes and wider interests...
>
> <div align="right">(Minister David Kemp, personal email communication, 28 June 2020).</div>

The strong political commitment showed by Minister Kemp was recognised by John Tanzer in recent correspondence when John was checking his quotes in the draft chapter:

> ... [David Kemp had] a strong sense of right and wrong, of the importance of doing the right thing – this trait of David contributed ultimately to him staying the path despite so much political resistance… it would have been easier politically to just kick the whole thing down the road... making it someone else's problem in the future...
>
> <div align="right">(John Tanzer, personal email communication, 16th October 2020)</div>

Minister Kemp was not directly involved in the preparation of the draft and final zoning plans. The reason for that was explained by one of his political colleagues, '...Kemp didn't take part in the process because he was the Minister. He had to keep arm's length to the process ...in case the outcome was going to be that we wouldn't proceed...' (Interviewee P5). Ultimately it was Minister Kemp who recommended the final zoning plan to Federal Cabinet for endorsement and gazettal into law.

6.6.2 The importance of 'political windows' and timing

Timing is everything. In reality, there is a balance between waiting to have sufficient relevant information for a policy and hastening to ensure a policy is developed and gets implemented. Timing and recognising political windows were therefore both significant parts of the RAP/rezoning policy reform. Personal experience brought this into perspective. As the Director responsible for the RAP/rezoning, I was called by the CEO/Chair to her office at the completion of the second phase of public submissions. It was August 2003 and GBRMPA had just received 21,370 public submissions commenting on the draft plan, more than double the number received in the first phase of RAP. Virginia Chadwick explained that the final zoning plan needed to be completed and submitted to Federal Parliament before Christmas, four months away. My initial reaction was it would be virtually impossible for the project team to undertake an assessment of all the submissions, amend the draft plan in the light of those submissions and have the plan prepared for submission in that time. Virginia Chadwick listened and then made it clear – the plan needed to be in Parliament by Christmas.

What the CEO/Chair did not mention at that time was there was a political window; a Federal election was likely to happen early the following year that had the potential to mean all our planning and engagement efforts might be wasted. Virginia Chadwick asked what was needed to get the job done within the timeframe. Within a matter of days, officers across the agency were co-opted to help with the analysis of the submissions. As happened so many times throughout the RAP process, GBRMPA staff worked incredibly hard, and the analysis of the submissions was completed as required. A revised zoning plan was delivered to the Minister by early December 2003. This key aspect of timing and the potential implications were echoed by Minister Kemp who recollected:

> …**Virginia was acutely aware of the electoral cycle as I was, and we recognized that there would be an election in 2004 and that it was crucial that the RAP** [emphases added] – the whole process for concluding the RAP, including the necessary legislation – be completed some six months or more before the election occurred …the thing that I learned, was how critical the timetable was.… **The whole RAP could have been completely derailed had we not got the legislation through the Senate in December 2003** … the local backbenchers who were responding to local pressures, and not the national interest, were having an increasing influence within the parliamentary party ….
>
> (Hon Dr David Kemp, Federal Environment Minister during the RAP/rezoning, PhD interview, December 2015).

This key learning was echoed by another interviewee:

> … one of the lessons learned is doing it quickly. … **RAP was done all during one political term and that was a result of the leadership and the political smarts of the people involved with it** [emphasis added] … [they] realized that they had to drive this at a great rate whilst having the political acumen to undertake consultation and make everyone feel like they're being listened to…but to drive it …to get it through before the election was held… (Interviewee S6).

On the subject of timing, there are differing interpretations on what constitutes the start date of the RAP/rezoning. Officers within GBRMPA consider the RAP commenced in 1999 when the internal agency decision was made to commence RAP planning process. However, the perspective from the Minister was different; the RAP did not exist (other than as a proposal within GBRMPA) until he gave formal approval for the RAP/rezoning process in 2001. So, from the Ministers' perspective, the RAP/rezoning should only be regarded as occurring between 2001 to 2003.

6.6.3 Political affiliations and relationships

Being on different sides of the political divide might seem problematic when it comes to developing policy. However, the different political affiliations of the two key actors at GBRMPA turned out to be an advantage. The CEO/Chair, Virginia Chadwick, was a long-term Liberal politician, an ex-New South Wales Minister, with strong links to specific factions in the Liberal party, hence her appointment by the existing Coalition government. In contrast, John Tanzer, one of two Executive Directors already at GBRMPA when Virginia was appointed, had very strong affiliations with many Federal and Queensland Labor politicians, had been a Ministerial adviser in previous Federal and Queensland Labor governments and was also appointed by the Queensland Labor Government as the CEO of the Queensland Fisheries Management Authority. Although Chadwick and Tanzer were both operating in a supposedly politically neutral public service, their political differences could have adversely influenced their relationship or resulted in major problems for GBRMPA or the RAP/rezoning.

In a testament to their own abilities and personalities, both individuals recognised they had complementary skills and experience, and quickly developed a strong mutual respect for each other. Whenever it was necessary, Virginia Chadwick and John Tanzer used their respective political relationships to advantage – something that was essential throughout the RAP/rezoning given the Liberal/National Party Coalition, under Prime Minister Howard, was the Federal government at the time, while the Queensland Labor government was in place under Premier Peter Beattie. This ability to cover 'both political bases' was a distinct advantage enabling good contact with both sides of politics and a further indication of an eminently successful leadership duo within GBRMPA. During her eight years as CEO and Chair at GBRMPA, Virginia Chadwick worked closely with John Tanzer as her deputy. As John Tanzer recollected:

> ...Virginia often went into bat for me ...and she put her head on the block ...and probably at times I did the same for her as well ...that level of trust builds a productive relationship... (John Tanzer, Executive Director, GBRMPA during the RAP/rezoning, PhD Interview, August 2015).

Several interviewees spoke of the importance of the Chair being of the 'same political colour' as the government, '...If the government had been of a different political persuasion, I don't think Virginia would have been able to convince them....' (Interviewee P5). One interviewee had an interesting perspective on the politics of RAP and the implications for future environmental programs:

> ... the Liberal Party hierarchy played a role as well... I think if the Labor Party had tried to do RAP, the Liberal Party would have opposed it. The fact that it was a conservative party taking this forward, I think that is a reason why it went forward, and it survived ... advocates like myself have learnt that if we want to make sustained environmental gains, we've got to do it during a conservative government... (Interviewee S10).

6.7 The Structural Adjustment Package – a contentious issue

One of the most contentious aspects linked to the RAP/rezoning was the Structural Adjustment Package (which became known as 'the SAP'). The SAP was introduced by the Federal government after the GBR zoning plan was approved by Parliament. Throughout the RAP/rezoning planning process there was no formal or official suggestion of 'compensation' for those who might be impacted by the zoning despite the fact that a precedent had occurred during the dugong wars.   The overall objective of the RAP/rezoning was about increasing the protection of biodiversity throughout the GBR, although the political expectation was that this would be done in a way that minimised the adverse impacts on users, recognising there would be at least short-term adverse impacts felt by some commercial and recreational fishers.

When the GBR zoning was tabled in Federal Parliament, a Regulatory Impact Statement was also provided, outlining the expected economic impacts from the rezoning. GBRMPA estimated that the new zoning plan would result in an economic impact of A$2.8 million per year, equal to the estimated net value of fish production in the areas to be closed under the new zoning. Fishers would be displaced from specific fishing grounds by some of the new no-take zones. This displacement could lead to lower catches or higher costs from having to fish elsewhere, at least in the short term. In turn, these impacts could have financial 'ripple effects' on fishing-related businesses (wholesalers, processors) and local communities on shore. The SAP was the means to compensate for such adverse effects.

After the new zoning plan was approved by Parliament, the Federal government introduced the SAP with an initial budget of A$10 million. The fishing industry was adamant they did not want GBRMPA

involved in the SAP negotiations and lobbied hard in this regard (it is assumed they believed they had a better chance of gaining financially if they did not have to confront the level of local knowledge and expertise within GBRMPA). The SAP was therefore managed by the Federal Environment Department based in Canberra, more than 1,500 kilometres from the GBR. The SAP provided multiple types of assistance: fishing license buyouts, business restructuring grants, direct payments to people who lost their fishing-related jobs, and more.

Minister Kemp had, by this time, left politics. Macintosh et al. (2010) explained the departmental bureaucrats who were responsible for the program were directed politically from time to time to expand the scope and the amounts of assistance available in the SAP, in part to garner political favour among affected communities. The Government kept adjusting the parameters of the SAP, so who was eligible for assistance, and how much they could receive, were changed a number of times. Over time, the costs of the SAP expanded to around AUD$250 million as payments were provided to fishers, fishery-related businesses, employees, and communities who maintained they had been adversely affected by the rezoning. The cap on business restructuring assistance was removed completely in 2006 and closing dates for applications were extended (Macintosh et al., 2010).

In the following years, the benefits versus the costs of the SAP have been widely debated. In a 2010 review of the SAP, Macintosh et al. (2010) wrote:

> …The roughly AUD$250 million that was spent [for the SAP] … was **an enormous and disproportionate sum to… mitigate the impacts of an MPA program that had only relatively minor impacts** [emphasis added] on the financial interests of the commercial and recreational fishing sectors... (p. 587).

One fisher who was interviewed acknowledged the commercial fishers went all out, '… to make this thing cost absolutely as much as possible, so that this never happens again… so the government is so burned by this process ...' (Interviewee S4). Another perspective came from a senior political player who observed:

> I **don't think the political process post-RAP was well handled** [emphases added] …. The floodgates opened in terms of **the compensation payments that were being made and these far exceeded the value of the damage to the industry that had been incurred**… I don't know how much of the political criticism of the RAP that occurred later resulted from this, but it could have been prevented by a different handling of the process ... (Interviewee P1).

Several sectoral interviewees commented on the Structural Adjustment program and the problems it caused:

> … remember we couldn't call it compensation …. **I would argue it was a political compensation that was paid …and it was paid for political, not real reasons** [emphases added] ...and the consequences of that have damaged future protected area management agendas. It will be decades before we get over it… **it left a nasty legacy for (GBRMPA)** and it left a very nasty legacy for other protected areas... (Interviewee S10).

One interview recollected, '...as it was, the fishers could basically self-assess and word spread like wildfire that it was basically an 'open trough'... the worst part was that it very likely aided an increase/expansion in real fishing effort, and funds were used to reequip their vessels to continue or expand what they were doing ... (Interviewee A2). Some of payouts from the SAP were questionable, including rumours that certain fishers who received compensation did not operate in the GBR. This resulted in considerable criticism within the community and hence concerns in the government.

Despite the fact GBRMPA was kept at arms-length from the SAP process, and the process became overtly political, GBRMPA was considered by many to be at fault. A senior GBRMPA officer explained why the SAP was considered such an acrimonious ending for the RAP:

> … part of the reason for the structural adjustment failure is that by the time we got to the legislative point, the organisation was exhausted …we'd had it … I've never worked so hard in my life … and at the point of the legislation, we were over it… **you've got to have a strategy for dealing with the after, and we didn't do that** [emphases added]. We fell over the line. And if ever Virginia had a failing, I think that might be one .. . she was getting ill at that stage[47] … and may have taken her eye off the ball … But we were in no way prepared, and so that hit us as a broadside … and **because fishers started to get money for it, that there was an automatic tacit understanding by a whole lot of people, that obviously there was a problem...** (Interviewee R4).

In hindsight, the SAP was the least successful aspect of the entire RAP/rezoning policy reform process. An independent review (Gunn et al., 2010) undertaken for the government, concluded that a major fault was the lack of a strict limit on the funding for the SAP:

> ...Without a well-defined set of...guidelines and boundary conditions (e.g., which elements of the affected industry and associated up- and down-stream industries will and won't be considered; whether or not compensation will be capped; how individual businesses will be evaluated), there is increased probability of "gaming", **"special circumstances" pleading and associated political influence, scope creep, cost overruns**, [emphasis added] and stakeholder dissatisfaction... (p. 7).

Gunn et al. (2010) also stated, '...There was a fundamental mismatch between stakeholder desires and expectations for adequate (and timely) financial compensation for impacts of the rezoning...[which] created an adversarial environment for development and implementation of the Package. This could have been avoided by simplifying the process...' (p.8).

As a consequence of the SAP, the Australian Government developed a Fisheries Adjustment Policy in 2004 and that policy was then revised in 2011 (Australian Government, 2011). There is anecdotal evidence that some of the problems associated with the Australian Government's attempts to establish a national network of Commonwealth marine reserves can be linked to the fallout from the SAP (Helene Marsh, personal communication, 6th November 2020), but this is yet to be formally assessed. This contentious issue also led the Federal Government to conduct a review of the GBRMP Act in 2006 (Chapter 7, section 7.4.3) and to get more involved in the GBR (Morrison, 2017)

6.8 Lessons for the future

The RAP/rezoning policy should be regarded as a combination of both 'top-down' and 'bottom-up' approaches. It was 'top-down' in that *the Act* and Australia's *Ocean Policy* provided an overarching policy framework, but it was also a 'bottom-up' approach in that a number of key players at the local level played important roles. As outlined in Chapter 3, the RAP was initiated by the scientists and then progressed by the planners in GBRMPA. On balance, it was more of a 'bottom-up' initiative to address the perceived inadequacy of the existing zoning to fully protect the range of biodiversity in the GBR. However, utilising the advantages of both approaches

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[47] Virginia Chadwick was suffering from cancer at this time, and this undoubtedly impacted her capacity to deal with work matters. Virginia retired from GBRMPA in July 2007 and passed away September 2009, aged 64.

enabled those who were involved to draw upon the strengths of each approach and minimising the weaknesses of both. This was reinforced by one of the political interviewees:

> … we were conscious from the very beginning that it was important … that **this wasn't just seen as an imposition from on-top. We would have liked it to be bottom-up…. Driven by community demand**, **but the system doesn't work that way** [emphasis added].. it's generally a combination between top down, the leadership exerting itself and public expectations, feeding their way up through the system, because basically politicians respond to public demands … otherwise, they may not be re-elected... (Interviewee P2)

My research has provided a number of lessons which might be useful for any major policy review in the GBR. One lesson was raised by an interviewee who spoke of the importance of political readiness, who said '... we relied so heavily on Virginia [Chadwick] and then David Kemp ... if you were doing it again, you'd want to make sure you had that area covered off …' (Interviewee S10).

The importance of political readiness and expertise was reinforced by John Tanzer in a recent email recalling about the RAP/rezoning:

> ...there would be few organisations as well situated to take on such an exercise as GBRMPA was .. as well as the Executive [i.e., Virginia Chadwick and John Tanzer], we had Fay Barker, Glyn Davis and Evelyn Scott on the Board[48] – maybe staff engaged in the technical planning didn't see this but then again the politics is by nature somewhat of a secretive or 'cards close to the chest' art. It is not a strict science or detailed plan that one can be entirely open about and certainly the key is not so much a detailed strategy but responsiveness and agility. This is why Virginia and I spoke every Sunday afternoon to run through where the process was at tactically. GBRMPA was uniquely well placed politically... certainly, better than most government agencies ...
>
> (John Tanzer, personal email communication, 16th October 2020)

A sectoral interviewee saw a fundamental lesson for any future review was about being pragmatic:

> … don't try to do too much too quickly or it may get completely reversed... doing a big hit sometimes makes you feel really good but it's often not sustainable in the environmental argument. So usually, you have to build up to things… put something in place and then build it up... (Interviewee S10).

What has been recommended above is effectively what occurred with the GBR zoning over the decades. The initial zoning plans completed in the late-1980s resulted in less than five percent of the entire GBR being protected in no-take zones. That was the socially and politically acceptable extent of no-take zones at that time. Today, the extent of no-take zones is over 33 percent of the GBR, but it took 29 years from the time the GBR Region was proclaimed to what was considered appropriate in 2004, recognising the best available knowledge at that time.

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[48] At that time, the GBRMP Board (= the Authority) consisted of four members (s. 10 of *the Act*). The Hon Virginia Chadwick was the full-time Chair of the Board. Ms Fay Barker, a Townsville businesswoman and Company Director, was appointed in October 2001 as a part-time member on the Board being "... a person with extensive experience in a field related to the functions of the Authority...'. Dr Glyn Davis was Director General of Queensland's Department of Premier and Cabinet and represented Queensland as a part-time member on the Board. Dr Evelyn Scott was the Chairperson of the Council for Aboriginal Reconciliation and a part-time member on the Board appointed '...to represent the interests of the Aboriginal communities adjacent to the Marine Park...'. (s. 10 (1)(b) of *the Act*).

It is important to recognise the different phases of a major policy reform. This was highlighted by an interviewee who considered the RAP/rezoning policy process as having two distinct phases:

> …at the beginning it was all planning and that .. was excellent.. that was a very considered process. But towards the end it was all politics ... so at the start, **the scientists were arguing a very purist agenda... whereas Virginia** [Chadwick] **was arguing a very pragmatic political agenda** [emphasis added] …and the politics were truly pragmatic... (Interviewee S10).

One of the Queensland interviewee remarked:

> ... the key element to any form of management planning… is the process, it's not the product …[or the] words on paper, it's the process that's gone into it… and ownership by the community if possible … certainly by the political masters for them basically to have the confidence that what they're about to approve, will not bring them down…. Give them the confidence that it would not fall over, and so engagement all the way along was absolutely essential ... (Interviewee Q2).

In a similar way, the importance of political windows should be considered as well as the need to undertake such a policy reform in one political term, as was recognised by several interviewees. It is also necessary to recognise that the politics at the time of the RAP/rezoning were different, and today a different political context exists. Consequently, while there are lessons from the RAP/rezoning policy process, any future attempts at a major policy reform in the GBR need to be mindful of the changes (political, social, economic, and technological) that have occurred since the RAP/rezoning was undertaken. For the GBR, Queensland's equivocating, which could have resulted in a failure of the complementary approach to GBR management, was a close call politically.

Many lessons about the role of politics are discussed in **Appendix A7** (specifically lessons #2, 8, 9, 14, 23, 33, 34, 37 and 38). Numerous lessons from the experience of the SAP are outlined in Macintosh et al. (2010) and Gunn et al. (2010). Recognising the significant philosophical and practical differences between politicians, scientists, and managers is also important as was addressed in Chapter 4.

6.9 Conclusion about the role of politics

The pre-existing level of intergovernmental cooperation as well as previous sectoral and community engagement undoubtedly helped with the politics in the RAP/rezoning:

> ...[it was] an example of successful multilevel governance, multiple use management, marine spatial planning and integration between jurisdictions, sectors and communities... overcoming the challenges with vertical and horizontal integration ... to achieve biodiversity conservation in the face of complex political conflicts...(Howlett et al., 2017, p. 74).

The importance of political will has been, and always will be, a key factor in Australian environmental governance (Morrison, 2017; Olsson et al., 2008; Vince, 2018). The political will and political roles of Minister David Kemp and Chair/CEO, Virginia Chadwick, during the RAP/rezoning were undoubtedly critical, especially their political leadership role in strategically managing all aspects of the politics and achieving the outcome. Given the actions of various Federal Environment Ministers since Minister Kemp, it was fortunate that David Kemp was the Environment Minister when the RAP/rezoning was introduced, and 'the planets happened to align' with other key actors at various levels.

Given the pressures from within, and outside, the government, it is questionable whether many Federal politicians would have maintained the political commitment that David Kemp demonstrated over the period of the RAP/rezoning. As one interviewee said, '...Virginia may have been a better politician than [Kemp] was, but she couldn't have done it without him... it was Kemp's commitment …' (Interviewee S10). The combined political legacy created by Minister David Kemp and Virginia Chadwick as CEO/Chair is therefore something that will long be remembered and not easily repeated.

Today, the longevity of the outcome of the RAP/rezoning has been demonstrated, remaining in place through eight successive Federal environment Ministers of different political persuasions. Successive governments on both sides have not been mindful to either review or abandon the policy to date (after more than 15 years). However, given the new and ongoing pressures facing the GBR (GBRMPA, 2019a), a review of the Zoning Plan is something that cannot be postponed indefinitely. As a result of the 2008 legislative changes to *the Act,* there will be greater involvement from the Federal Minister's office before such a review is able to commence. Furthermore, there is a need to periodically review the policy, and if necessary to reinforce or 'buttress' the policy to ensure it continues to achieve its objectives (Morrison, 2017).

The political influences and their combined roles in the RAP/rezoning are considered by a number of those interviewed to be the most significant of the four factors that determined the overall policy outcome, recognising that politics itself depended to varying degrees upon each of the other three key factors. The 'survival' of the RAP/rezoning depended totally on receiving continuing political support, and the political support was dependent upon many other key factors. This accords with Davis et al. (1993) who stated, '...**politics is the essential ingredient for producing workable policies, which are more publicly accountable and politically justifiable** [emphasis added]... politics is integral to the process of securing defensible outcomes. We are unable to combine values, interests and resources in ways which are not political...' (p. 257).

How the various key factors (including politics) interacted to produce the RAP/rezoning outcome as a major policy reform, is discussed more in the next chapter. The respective roles of the major political actors (i.e., how they interacted, or failed to do so), are a fundamentally important aspect of the reform and must not be overlooked if any policy reform is to be successful in the future. In Chapter 7, a broad-spectrum policy evaluation is applied, and part of that framework specifically considers the politics of the RAP/rezoning.

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CHAPTER 7 – Assessing the policy reform

7.1 Introduction

Prior to this research, little in the way of a comprehensive or systematic assessment of the overall RAP/rezoning policy reform process (other than Olsson et al., 2008) had been undertaken. In this chapter, I first examine the inter-relationships between and within the four factors that I identified in Chapters 3-6 as key to the success of the reform. I then undertake a variety of assessments of the policy reform to determine: (a) whether it was transformative policy reform; and (b) the extent to which it might be considered a policy success. I examine what is success and failure in policy terms, before drawing upon a theoretical and systematic assessment framework (McConnell, 2010) to evaluate the RAP/rezoning. This assessment considers specific components of a policy on a spectrum from policy success to policy failure. Applying this approach to the RAP/rezoning explains why some aspects were successful/positive, as well as identifying aspects that were less successful and could have been improved. Various indicators of the RAP/rezoning (ecological, social, economic, and other indicators) were assessed by the interviewees on a similar spectrum from success to failure, and their perspectives were analysed. I identified the relevant points from the independent *Review of the GBRMP Act* (Commonwealth of Australia, 2006), as a major part of that review was an assessment of the RAP/rezoning. The government justified the review as being a re-evaluation of the GBRMP legislation, although it was commonly considered the review was a political concession to those who were unhappy about the revised zoning. The lessons from the RAP/rezoning are then compared with the literature, considering marine and coastal-related literature as well as several recognised Australian policy guides. A brief discussion is provided about the level of innovation in the RAP/rezoning before the chapter concludes with a justification as to why the RAP/rezoning was both a transformative policy reform and, on balance, a policy success.

7.2 The inter-relationships between, and within, the four key factors (i.e., science, leadership, public engagement, and politics)

Chapters 3-6 have highlighted separately the significance of four key factors to the success of the RAP/rezoning of the GBRMP, namely:

- a sound underpinning of science
- a lattice of leadership and effective followership
- effective public engagement
- political ability and acumen.

I present this analysis before my assessments of the policy reform, which largely assesses each of the factors separately against established criteria, to demonstrate the importance of these inter-relationships and how the whole process was greater than the sum of these influencing factors.

While five of my interview questions specifically asked about the role of leadership, many of the interviewees' comments discussed the importance of the other three key factors (as highlighted in the previous four chapters), but also mentioned the inter-relationships between or within those factors. These interrelationships became more apparent during my research and were identified by various interviewees as they reflected on what contributed to the success of the policy process. It therefore became obvious that while each of the key factors was important for the success of the RAP/rezoning, the inter-relationships *between* my four factors as well as inter-relationships *within* each factor were also significant. For example, one of the interviewees reinforced the importance of sound science:

> …**if the science is wrong, then everything would be wrong …it's like the bottom of the house of cards** [emphasis added] …and if you haven't got your politics right, it's never ever going to happen... so there are various pillars… I think there's a science pillar, a 'political-nous' pillar and possibly a 'political-will' pillar…   (Interviewee T2)

Another interviewee explained:

> … without a good knowledge base and then innovation to manage that knowledge base, you can't show the community what it is you're trying to do or why, so you can't build community support, and **without community support, you can't build political support** [emphasis added]...and it's a mistake to think that political support somehow comes …without a good knowledge base…   (Interviewee R1)

This perspective about inter-relationships was reinforced by one of the politicians who, when explaining the elements that contributed to the politics, said; '.. it depends ultimately on the support of people, and the principal mechanism for achieving the support of the people is a political process of leadership. And no protection of the environment is safe without the continuing support of the political process...' (Interviewee P1). In a similar way, Minister Kemp admitted that the scientific underpinning was an important prerequisite for him to agree to commence the policy reform from a political perspective.

Another interviewee made the following comment when discussing leadership; '... you need competent people …and securing community support and securing political support… we could have lost half the scientists and the process would still have happened … it is entirely a political and social process …' (interviewee S5). Another important interrelationship was the cross-over between leadership and politics; as shown by Minister Kemp and the CEO/Chair, that proved essential to 'navigate' the political complexities in Canberra.

Building upon this navigational analogy, Lee (1993) indicated the importance of being guided by both 'the compass' of scientific experimentation, as well as 'the gyroscope' of civil discourse and debate. In his influential work on integrating science and politics for the environment, Lee (1993) noted '...the prudent voyager uses all the instruments available, profiting from their individual virtues...' (p. 6).

7.2.1 The interrelationships between the four key factors I identified

Having considered what was said about these interrelationships in the interviews and the discussions in the previous four chapters, I have chosen to represent the interrelationships *between* the four key factors in a matrix format (Table 7.1). Within this matrix, the blue column headings list the four key factors, and the rows indicate the extent to which the identified factor (shown <u>underlined</u>) influenced each of the other factors.

Colour-coding of each cell in the table indicates the level of influence (i.e., green = major influence; yellow = minor or moderate influence; red = little or no influence). For example, the top row of Table 7.1 ('influenced by science') shows the extent to which the science and scientists influenced the other three key factors. The key leaders in the RAP/rezoning were strongly influenced by the science, with the science providing the sound underpinning for the RAP/rezoning. Consequently, science is shown as having a major influence on leadership (coloured green). Moving across that same row, the influence of science on the extent of public engagement is coloured yellow indicating that science had a moderate influence on the level of public acceptance of the RAP/rezoning. Finally, under the heading 'politics', the cell is coloured green indicating the strong influence of science on the politics. The Minister acknowledged that sound science was a critical underpinning that provided him with enough certainty to approve the program. In contrast, looking across the bottom row of Table 7.1 politics *per se*, had little, if any, influence on the science that was used in the RAP/rezoning (coloured red) or on the public engagement (also coloured red), but politics had a major influence on leadership (coloured green).

The matrix can also be read vertically to show the *dependence* of each factor upon the other three key factors. For example, the coloured cells under the heading politics, indicates that politics was very dependent on the other three key factors (shown by the green cells down the column). Ranking the four key factors in order of their *dependence* upon the other factors (i.e., looking down each of the four columns), shows that politics was the factor most dependent upon the other key factors, followed by leadership, then public engagement, with science being the least dependent upon the other three factors. The three cells coloured red under the heading science, show that science used in the RAP/rezoning was not dependent upon, or influenced by, any of the other three factors.

Table 7.1   Matrix illustrating the inter-relationships between four key factors in the RAP/rezoning

	SCIENCE	LEADERSHIP	PUBLIC ENGAGEMENT	POLITICS
The extent to which other factors were <u>influenced</u> <u>by</u> <u>science</u>	N.A.	The key leaders in the RAP/rezoning were influenced by the scientific underpinning as a sound basis for the RAP/rezoning	Only a relatively small proportion of the public views about the RAP/rezoning were influenced by the science	While the Minister noted the scientific basis was not strong, he acknowledged science was a "critical underpinning" for the program
The extent to which other factors were <u>influenced</u> <u>by</u> <u>leadership</u>	The science used in the RAP/rezoning was not influenced by leadership	N.A.	Some aspects of engagement in various sectors (e.g., the fishers, ENGOs) were influenced by their own leadership	Navigating the political complexities in Canberra was a critical task for the key leaders (e.g., the Minister and GBRMPA's CEO/Chair)
The extent to which other factors were <u>influenced</u> <u>by</u> <u>public</u> <u>engagement</u>	Most of the science utilised in the RAP/rezoning was determined before any public participation was undertaken	Leadership *per se* was influenced to a moderate degree by public engagement; many of the key leaders were heavily involved in that engagement	N.A.	The politics (both Federal and State) was clearly influenced by the level of community support as a result of public engagement
The extent to which other factors were <u>influenced</u> <u>by</u> <u>politics</u>	The science behind the RAP/rezoning was not influenced by the politics at the time.	The key leaders recognised, that without political support, the RAP/rezoning was not going to happen	Only a few aspects of public engagement were influenced by the politics (e.g., the extra engagement requested by the federal Minister)	N.A.

<table>
<tr><td>   </td><td>Major influence</td><td>   </td><td>Minor-moderate influence</td><td>   </td><td>Little or no influence</td></tr>
</table>

7.2.2 The elements within the four key factors

Figure 7.1 is a schematic or conceptual diagram showing a number of elements (internal and external) that were influential in the RAP/rezoning. The different colours in the figure differentiate the key elements, and the most influential relationships between these elements are shown by the connecting arrows. Within this schematic diagram, it is important to stress only the *main influential elements* and the *main connecting arrows* are shown. Many other connecting arrows could be applied but to maintain a relatively uncluttered diagram, only those connections of greatest influence are shown. For example, the historical context has influenced most of the other elements in the diagram (i.e., history has shaped the international laws and conventions, federal politics, Queensland politics, federal and Queensland agencies, the patterns of socio-economic use, the scientific advice), but those influences were not considered as critical to the RAP/rezoning as those shown in this schematic diagram.
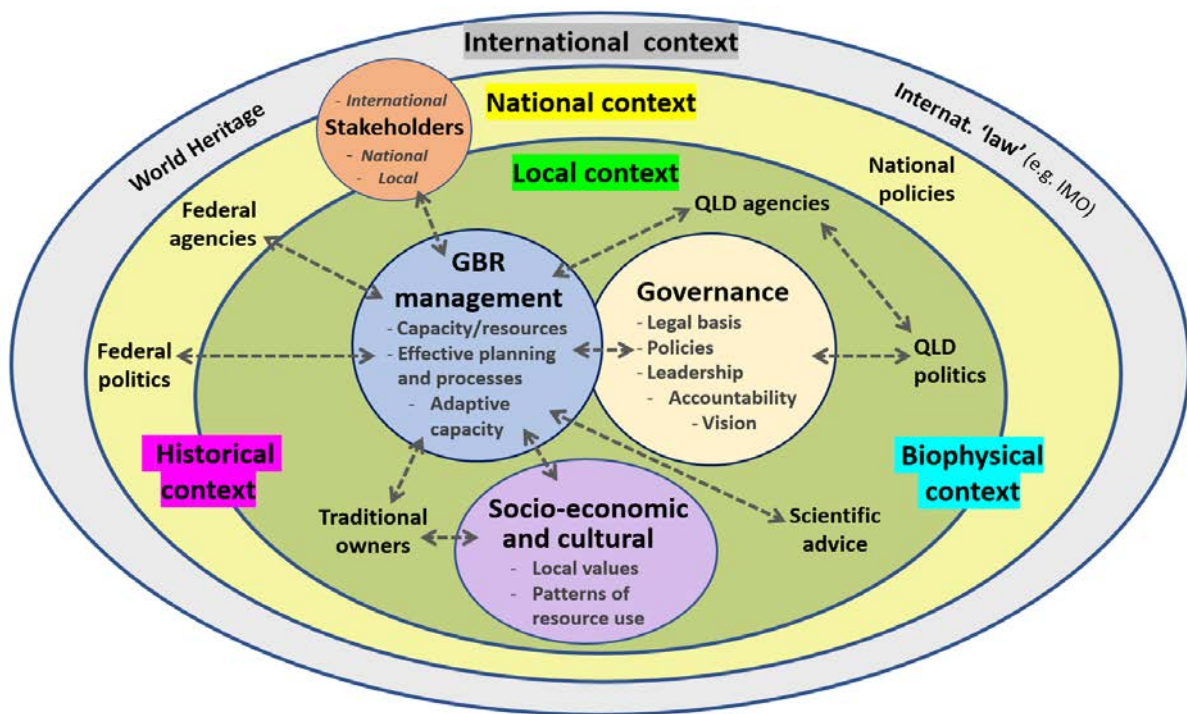
Figure 7.1 A schematic showing key elements that contributed to the RAP/rezoning policy reform

The grey outer layer in Figure 7.1 implies the international context in which there were only a few elements that had an influence upon the RAP/rezoning. For example, World Heritage had an influence during the policy reform process. At the time of the RAP/rezoning, the obligations under the World Heritage Convention had brought greater focus on the heritage values that collectively gave the GBR its global recognition (i.e., its Outstanding Universal Value). A compilation of the natural heritage values (Lucas et al., 1997) therefore proved useful for the planners to comprehend which values needed greater protection. Similarly, the planners were mindful of other relevant international conventions (e.g., the Convention on Biological Diversity; the UN Law of the Sea), and other global initiatives, but in comparison to local and national influences, such conventions were not a major influence during the RAP/rezoning.

Note that some elements (e.g., stakeholders) overlapped all three contextual layers (local, national, and international). The national context (yellow middle layer) shows a number of important elements of national influence (e.g., Federal politics, Federal agencies, national policies). The local context (i.e., innermost layer shown olive green) was where most of the influential elements occurred. Some local elements were within the GBRMP while others were within Queensland but external to the GBR (e.g., Queensland agencies, Queensland polities, scientific advice).

Shown in the middle of Figure 7.1 are the three elements considered central to the RAP/rezoning (i.e., GBR management, shown by the blue circle, was the common central element in all instances; governance shown by the light-yellow circle, partially overlapped with GBR management but also included some distinct sub-elements; and the socio-economic and cultural aspects shown by the purple oval). Within each of these elements, there are sub-elements (e.g., the dash points inside the blue circle are the sub-elements of GBR management being capacity/resources, effective planning and processes, and adaptive capacity). The number of connecting arrows to/from 'GBR management' indicates the influence of virtually all the surrounding elements upon GBR management.

Figures 7.2-7.5 builds upon the same broad schematic diagram (i.e., Figure 7.1) and shows the elements that were most influential *within* each of the four key factors. These four figures aim to show two notable aspects relating to the four key factors:

a) Outlined in red are those elements that were *the most influential* within each of the key factors.
b) Seeing all four key factors on two facing pages enables comparisons *between* the factors.

This conceptual representation of the most influential elements within the four key factors is based upon what was said in the interviews, reinforced by my analyses of the data and my own experience (as outlined in Chapter 2). I acknowledge Figures 7.2-7.5 are subjective assessments, but they build upon perspectives provided by the interviewees. Further research into these inter-relationships is therefore considered valuable (section 8.11). Comparing all four key factors (i.e., Figures 7.2-7.5) shows that different elements were more important within different factors. For example, elements that strongly influenced the scientific underpinning in Figure 7.2 included:

- the biophysical context and the historical contexts (and that included the biological sciences and the social sciences), and both the biophysical and historical aspects extended beyond the local context into the national context.
- local scientific advice, national policies, and the socio-economic and cultural elements were also major influences upon the scientific underpinning.

Figure 7.3 shows that the elements that primarily influenced leadership in the RAP/rezoning were GBR management, Federal politics, the stakeholders, and some aspects of governance. There were other influences upon leadership, but I consider that they were less important than those listed.

The importance of the inter-relationships between the key factors is also discussed in the literature (e.g., Adams et al., 2019; Lackey, 2007; Lee, 1993; Lubchenco et al., 2019; Olsson et al., 2008; Vince, 2015). For example, Lubchenco et al. (2019) wrote:

> ... for science to be considered seriously alongside a multitude of other factors, it needs to be not only available but also understandable, credible, salient, and relevant .. [therefore] relationships between scientists and stakeholders matter, and trust needs to develop over time with sustained and productive engagement... (p. 107).

The interrelationships *between* and *within* the factors that I identified was not a primary focus for my research. However, as a result of my preliminary investigations, I consider both these aspects (i.e., *between* and *within* the factors) are worthy of additional research, and further investigation is recommended (see section 8.11). For example, the institutional aspects (depicted by the two inner circles of GBR management and governance in Figs 7.2-7.5) were relevant for all four factors to varying degrees and would be worthy of further research. Similarly, the social and cultural aspects influenced all but the leadership factor and should be further explored along with the socio-ecological linkages.
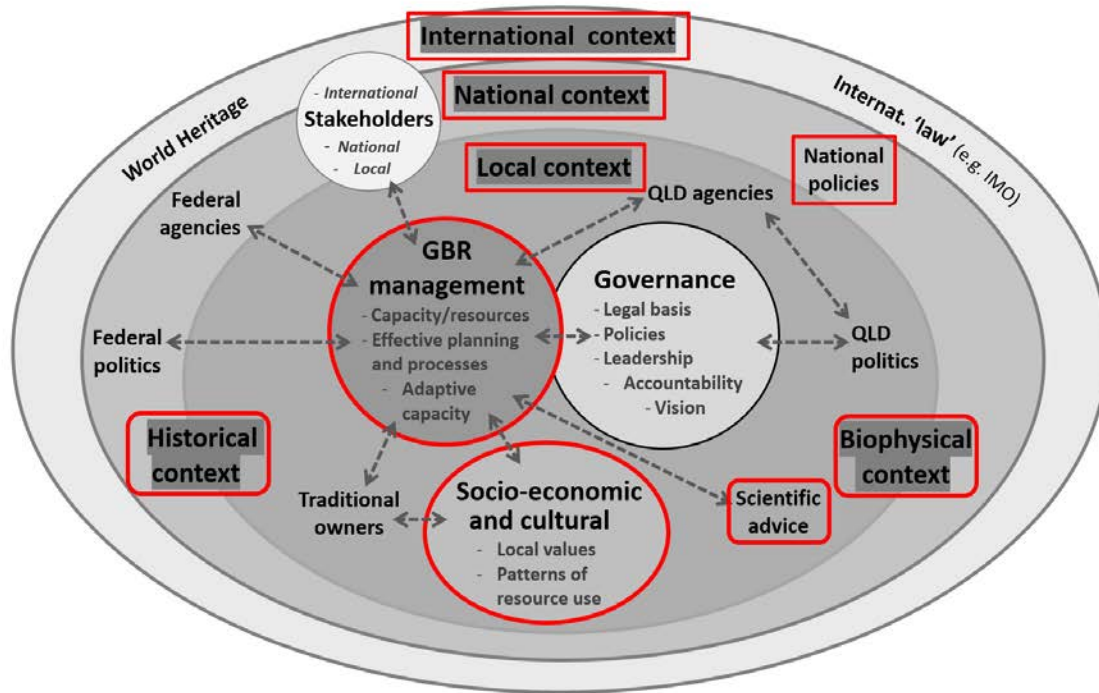
Figure 7.2 Schematic diagram of the elements that influenced SCIENCE and SCIENTISTS in RAP/rezoning, see Chapter 4 for justification (outlined in **red** are those elements that were most influential for the science, see Chapter 3 for justification)
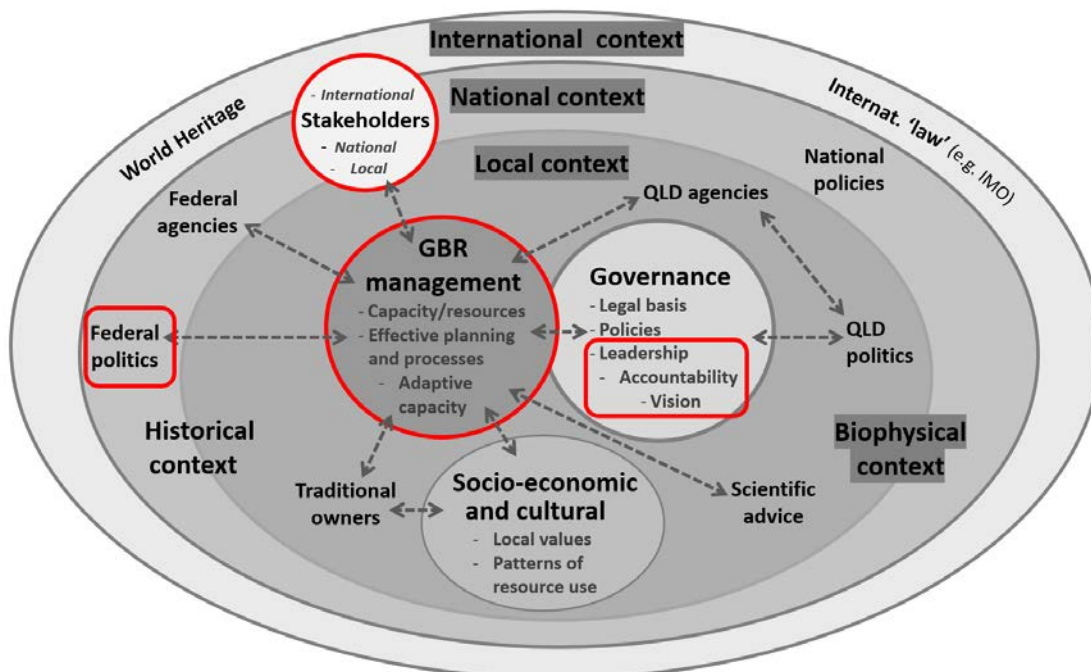
Figure 7.3 Schematic diagram of the elements that influenced LEADERSHIP in RAP/rezoning

(outlined in **red** are those elements that were most influential for leadership, see Chapter 4 for justification)
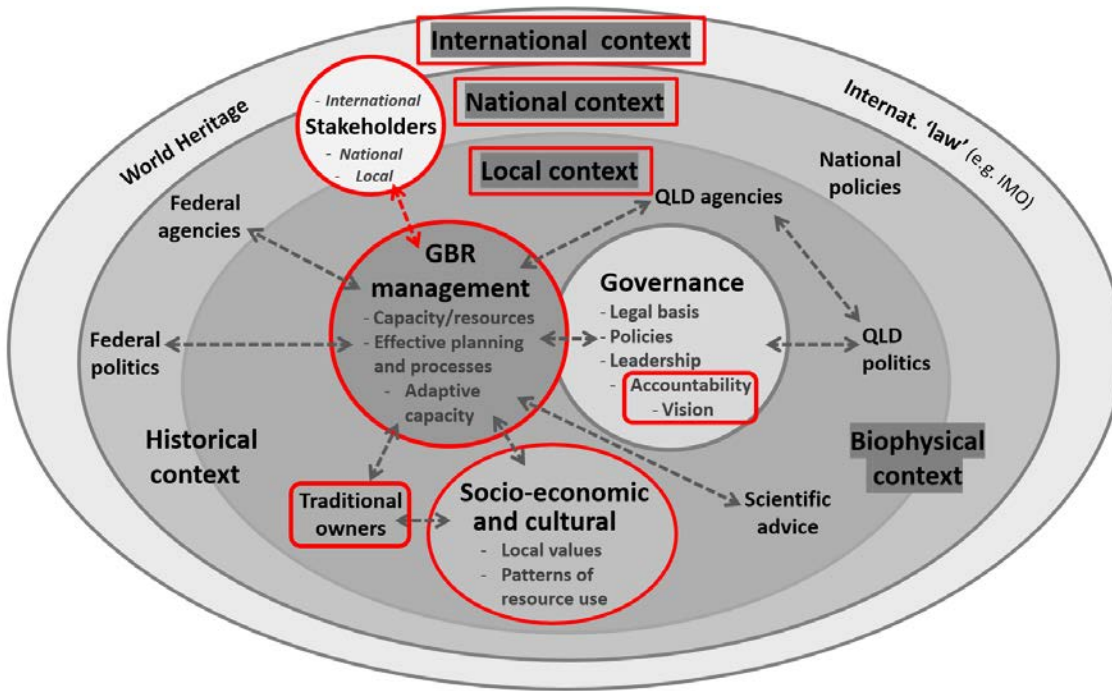
Figure 7.4 Schematic diagram of the elements that influenced PUBLIC ENGAGEMENT in the RAP/rezoning (outlined in **red** are those elements that were most influential for public engagement, see Chapter 5 for justification)
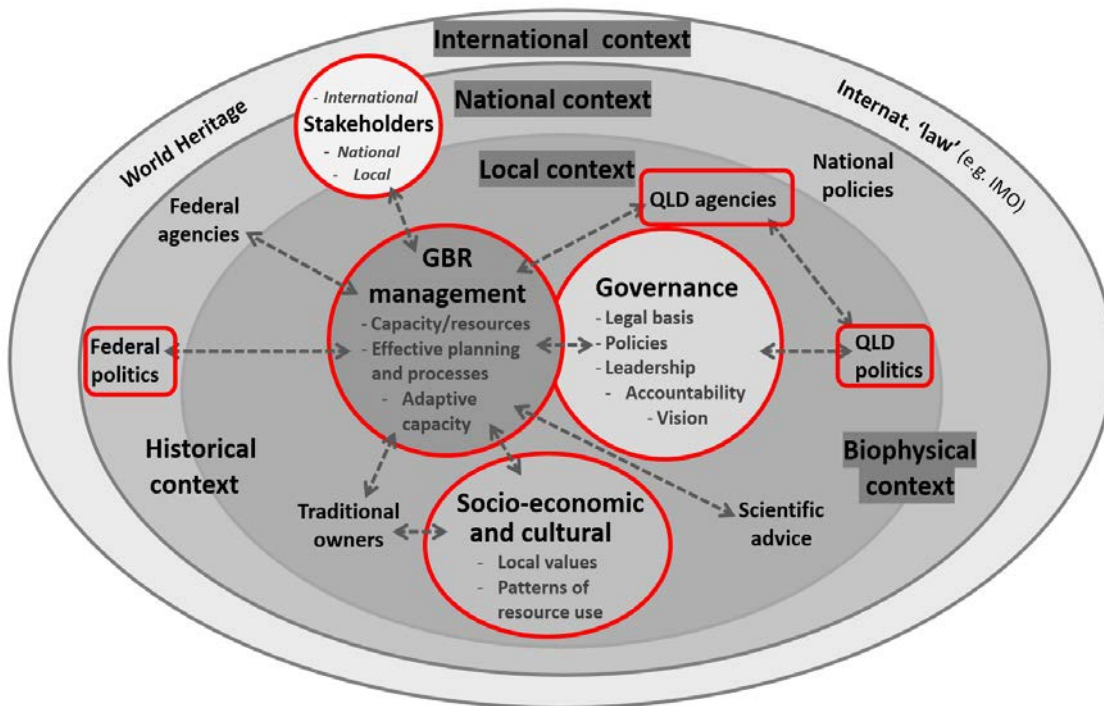
Figure 7.5 Schematic diagram of the elements that influenced POLITICS in the RAP/rezoning

(outlined in **red** are those elements that were most influential for the politics, see Chapter 6 for justification)

7.3 What is success or failure in policy reform?

Determining what is 'success' or 'failure' with regard to a policy reform is not easy. Compton & 't Hart (2019) noted that '... **policy successes are, like policy failures, in the eye of the beholder** [emphasis added] … they are not mere facts but stories…' (p. 3). Furthermore, Compton & 't Hart (2019) also noted that '… heterogeneous stakeholders have varied vantage points, values and interests… and thus may experience and assess [a policy] differently….' (p. 4). Howlett et al. (2015) systematically assess the roles played by politics, governance, and uncertainty in causing and perpetuating persistent policy failures, concluding:

> '…once a policy has descended into failure, recovery may not be possible without a change in government. However, … a government that attempts to address a policy or program that is perceived to be a failure risks taking ownership of the issue and can thereby be assigned blame for the failure even when it preceded … that government to power…' (p. 218).

McConnell (2010) described a spectrum from policy success to policy failure, noting '… a policy is successful if it achieves the goals that proponents set out to achieve and attracts no criticism of any significance and/or support is virtually universal...' (p. 351). At the other end of the policy spectrum (i.e., policy failure), McConnell (2010) considered '...a policy fails if it does not achieve the goals that proponents set out to achieve, and opposition is great and/or support is virtually non-existent...' (pp. 356-57). McConnell's spectrum provided various reasons for policy failure (see the right-hand columns in Tables 7.2, 7.3 and 7.4). Among the reasons for policy failure listed by McConnell were 'failure to achieve desired outcomes'; 'opposition to the process is virtually universal'; and 'damaging to the electoral prospects or reputation of governments and leaders, with no redeeming political benefit'. Vince (2015) conducted a detailed assessment of Australia's *Oceans Policy* and listed eight reasons for the failure of that policy, including 'poor policy design', 'issues with multiple jurisdictions', and 'a lack of communication and policy coordination between actors'. Dunleavy (1995) similarly cited various reasons for policy disasters in the UK, including 'inadequate scope for legislative scrutiny', 'over-confidence of a talented but inexpert administrative elite' and 'failure of internal checks and balances inside the core executive' (p. 68).

McConnell suggested there are three dimensions (or strands) of policy that should be considered when considering policy success or policy failure:

1. **Process** is concerned with understanding '…the means by which societies could and should make collective choices in the public interest… ' (McConnell, 2010, p. 349).
2. **Programs** are what governments do, combining the basic resources and tools of government (e.g., laws, public personnel, public expenditure, tax incentives).
3. **Politics** – recognising that programs have political repercussions i.e., their relevance to winning votes. So, politics has a lot to do with the timing of decisions and '…the symbolism of particular forms of action or inaction...' (McConnell, 2010, p. 350).

McConnell (2010) applied his five-point spectrum to each of these three dimensions/strands, maintaining that such a spectrum from overall success to failure '…makes it possible to differentiate intermediate categories between complete success or [complete] failure...' (p. 352).

> **Overall Success – Resilient Success – Conflicted Success – Precarious Success – Failure**

For example, *overall success* is obviously the best possible assessment. *Resilient success* is still a

relatively good outcome although less effective than *overall success* due to opposition to the policy and some shortcomings.   Policy success is a significant aspiration for governments and the likelihood of success will influence whether a proposed policy is given approval to commence. McConnell (2010) noted that political success was '…the holy grail of the political elites...' (p. 353), enhancing the reputation of the government, its leaders, and its electoral prospects. Kemp (2008) wrote, '…the core concern of political leadership is policy. It is by their policy successes and failures that leaders are judged, and on which they ultimately win or lose elections…' (p. 203).

7.4 Assessing the RAP/rezoning policy reform

In the following sections, I have made three separate but interrelated assessments of the RAP/rezoning policy reform. The first is against a theoretical framework described by McConnell (2010), assessing elements within the three dimensions/strands of policy (i.e., process, programs, and politics). The second assessment considers the RAP/rezoning against reasons for successful policy outcomes based upon work by Luetjens et al. (2019) who examined 20 standout public policy case studies. The third assessment benchmarks the RAP/rezoning against the eight reasons identified by Vince (2015) that led to policy failure for Australia's *Oceans Policy*. Each of the frameworks brings a different lens to the assessment of the policy reform. Whilst there is some reiteration of policy elements, it allows different perspectives to emerge about important aspects within the RAP/rezoning.

7.4.1 A theoretical consideration of the RAP/rezoning policy reform

In Tables 7.2-7.4, the wording within the cells in each table is exactly as provided by McConnell in his tables (2010, pp. 352-356). Each row describes various options on a five-point spectrum from policy success to policy failure. My assessment chooses the wording that most appropriately describes the outcomes of the RAP/rezoning along this spectrum. In making my assessments, I have viewed and assessed the RAP/rezoning as an entire or whole policy, rather than assessing smaller subsets within the broader policy. For example, in Table 7.3, the third line of the assessment refers to 'benefits for a target group'. In the case of the RAP/rezoning, the target group was the biodiversity of the GBR. If, however, individual sectors were assessed (e.g., fishers or ENGOs) rather than the whole policy, then different options in other columns might be more appropriate.

All of the wording in each of McConnell's descriptors have been reproduced in full within all the cells in Tables 7.2-7.4 because it enables my assessments to be placed into context on the continuum from success to failure (i.e., viewed against the other possible assessments along the row, especially those on either side of my chosen assessment). Within each row, I have highlighted in yellow what I consider to be the most applicable of McConnell's words for the RAP/rezoning (i.e., one cell per row). The optional wording in the other cells is shown in italics to minimize distraction and enable a focus on the assessments highlighted in yellow. For example, the first row of Table 7.2 assesses policy goals. Having considered the options along the row, my assessment considers the wording under 'Resilient success' best describes what happened with the policy goals in the RAP/rezoning (i.e., 'Policy goals and instruments preserved, despite minor refinements').

In the text below each of the Tables 7.2-7.4, I have underlined the relevant words taken directly from McConnell's (2010) spectrum, followed by my reasons justifying this particular assessment for each aspect of the overall RAP/rezoning policy. My assessments utilised my analysis of what the interviewees said, and my discussions in the previous four chapters. As can be seen from Tables 7.2-7.4, a level of success or otherwise in one dimension/strand, does not necessarily translate to a similar level of success in the other strands. As McConnell points out, '…locating policies in particular categories involves judgment rather than scientific precision…' (p. 357).

Table 7.2 Assessment of the RAP/rezoning considering policy as PROCESS using McConnell's spectrum (all wording from McConnell, 2010, Table 1, p. 352). Cells coloured yellow are what I consider are the most applicable wording within each row for the RAP/rezoning.

POLICY AS PROCESS: the spectrum from success to failure				
Overall process success	**Resilient success**	**Conflicted success**	**Precarious success**	**Process Failure**
Preserving government policy goals and instruments.	**Policy goals and instruments preserved, despite minor refinements.**	*Preferred goals and instruments proving controversial and difficult to preserve. Some revisions needed.*	*Government's goals and preferred policy instruments hang in the balance.*	*Termination of government policy goals and instruments.*
Conferring legitimacy on the policy.	**Some challenges to legitimacy but of little or no lasting significance.**	*Difficult and contested issues surrounding policy legitimacy, with some potential to taint the policy in the long term.*	*Serious and potentially fatal damage to policy legitimacy.*	*Irrecoverable damage to the policy legitimacy.*
Building a sustainable coalition.	**Coalition intact, despite some signs of disagreement.**	*Coalition intact, although strong signs of disagreement and some potential for fragmentation.*	*Coalition on the brink of falling apart.*	*Inability to produce a sustainable coalition.*
Symbolizing innovation and influence.	*Not ground-breaking in innovation or influence, but still symbolically progressive.*	*Neither innovative nor outmoded, leading at times to criticisms from both progressive and conservatives.*	*Appearance of being out of touch with viable, alternative solutions.*	*Symbolising outmoded, insular, or bizarre ideas, seemingly oblivious to how other jurisdictions are dealing with similar issues.*
Opposition to process is virtually non-existent and/or support is virtually universal.	**Opposition to process is stronger than anticipated but outweighed by support.**	*Opposition to process and support are equally balanced.*	*Opposition to process outweighs small level of support.*	*Opposition to process is virtually universal and/or support is virtually non-existent.*

The justification for my assessments in Table 7.2:

- Policy goals and instruments preserved, despite minor refinements. The initial policy goal (increase the protection of biodiversity) remained but was tempered by a political imperative to protect biodiversity in a way that minimised the impacts upon users. The substantial changes between the draft zoning plan and the final Zoning Plan demonstrates this. The final Zoning Plan met the overall goal and objectives of the RAP/rezoning despite those changes.

- Some challenges to legitimacy but of little or no lasting significance. Despite the concerns raised about the final Zoning Plan (and particularly protecting 33% of the GBR as no-take zones), the plan (i.e., the policy) has remained intact since it came into effect in July 2004. Consequently, the challenges to the rezoning, have had little or no lasting significance. The outcome was developed through due process (for example, exceeding the statutory requirements for public consultation) and complied with all legal obligations.

- Coalition intact, despite some signs of disagreement. Despite the concerns of some sectors and some local conservative MPs, the GBR Zoning Plan 2003 passed through both Houses of Federal Parliament without any disallowance motions or amendments. The concerns raised by local MPs were countered by the overwhelming view of the wider Australian public that greater protection of the GBR was warranted.

- <u>Symbolizing innovation and influence</u>. There were many aspects of the RAP that were innovative (e.g., the bioregions, the publicly available planning principles, the community engagement processes). These contributed to the high level of public interest including the 21,374 submissions in CP2 that were certainly influential in revising the draft plan.
- <u>Opposition to process is stronger than anticipated but outweighed by support</u>. Despite considerable opposition from commercial and recreational fishers, the wide range of supporting interests (including the politically influential tourism industry, the scientific community and the ENGOs) combined with the views of the wider Australian public, outweighed the concerns.

Table 7.3   Assessment of the RAP/rezoning considering policy as PROGAM using McConnell's spectrum (all wording from McConnell, 2010, Table 2, p. 354). Yellow cells = most applicable wording

POLICY AS PROGAM: the spectrum from success to failure				
Overall program success	**Resilient success**	**Conflicted success**	**Precarious success**	**Program Failure**
Implementation in line with objectives.	*Implementation objectives broadly achieved, despite minor refinements or deviations.*	**Mixed results, with some successes, but accompanied by unexpected and controversial problems.**	*Minor progress towards implementation as intended, but beset by chronic failures, proving highly controversial and difficult to defend.*	*Implementation fails to be executed in line with objectives.*
Achievement of desired outcomes.	*Outcomes broadly achieved, despite some shortfalls.*	*Some successes, but the partial achievement of intended outcomes is counterbalanced by unwanted results, generating substantial controversy.*	*Some small outcomes achieved as intended but overwhelmed by controversial and high-profile instances or failure to produce results.*	*Failure to achieve desired outcomes.*
Creating a benefit for a target group.	*A few shortfalls and possibly some anomalous cases but intended target group broadly benefits.*	*Partial benefits realised, but not as widespread or deep as intended.*	*Small benefits accompanied and overshadowed by damage to group that was meant to benefit. High profile stories of unfairness and suffering.*	*Damaging to a particular target group.*
Meets policy domain criteria.	*Not quite the outcome desired, but close enough to lay strong claim to fulfilling the criteria.*	*Partial achievement of goals, but accompanied by failures to achieve, with possibility of high-profile examples e.g., ongoing wastage when the criterion is efficiency.*	*A few minor successes but plagued by unwanted media attention e.g., examples of wastage and possible scandal when the criterion is efficiency.*	*Clear inability to meet criteria*
Opposition to program aims, values, and means of achieving them is virtually non-existent and/or support is virtually universal.	**Opposition to program aims, values, and means of achieving them is stronger than anticipated, but outweighed by support.**	*Opposition to program aims, values, and means of achieving them is equally balanced with support for same.*	*Opposition to program aims, values, and means of achieving them, outweighs small levels of support.*	*Opposition to program aims, values, and means of achieving them is virtually universal, and/or support is virtually non-existent.*

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The justification for my assessments in Table 7.3:

- Mixed results with some successes but accompanied by unexpected and controversial problems. While the objectives of the RAP/rezoning were achieved, the unexpected consequences of the Structural Adjustment Package during implementation were controversial and led to unforeseen resources being expended (discussed in Chapter 6). Applying McConnell's framework, this is the only assessment of *Conflicted success* within the RAP/rezoning.
- Achievement of desired outcomes. The desired outcome of increased protection for the full range of biodiversity across the GBR was achieved. At a minimum, 20% or more (and often much more) of every one of the 70 bioregions was protected in the new network of representative no-take zones.
- Creating a benefit for a target group. Assuming the target group for the policy was the full suite of species and habitats, there was clearly an ecological benefit. Furthermore, other groups (e.g., fishers, tourist operators) also benefited, because the new zoning network secured long-term sustainability for these industries given their futures depended on a healthy GBR.
- Meets policy domain criteria. The policy domain in this instance was the environment, and the RAP/rezoning set new standards or criteria for protecting representative areas of MPAs.
- Opposition to program aims, values, and means of achieving them is stronger than anticipated, but outweighed by support. There was considerable opposition from commercial and recreational fishers and various MPs, and the hostility over this issue was stronger than anticipated. However, this was countered by the views of the wider Australian public, endorsed by key sectors (e.g., tourism), and collectively this support reinforced greater protection for the GBR.

Table 7.4 Assessment of the RAP/rezoning considering policy as POLITICS using McConnell's spectrum (all wording from McConnell, 2010, Table 3, p. 356). Yellow cells = most applicable wording

POLICY AS POLITICS: the spectrum from success to failure				
Overall political success	**Resilient success**	**Conflicted success**	**Precarious success**	**Political Failure**
Enhancing electoral prospects or reputation of governments and leaders.	**Favourable to electoral prospects and reputation enhancement, with only minor setbacks.**	*Policy obtains strong support and opposition, working for and against electoral prospects and reputation in fairly equal measure.*	*Despite small signs of benefit, policy proves overall electoral and reputational liability.*	*Damaging to electoral prospects or the reputation of governments and leaders, with no redeeming political benefit.*
Controlling policy agenda and easing of business of governing.	**Despite some difficulties in agenda management, capacity to govern is unperturbed**	*Policy proving controversial and taking up more political time and resources in defence than was expected.*	*Clear sign that the agenda and business of government is struggling to suppress politically difficult issue.*	*Policy failings are so high and persistent, that it is damaging government's capacity to govern.*
Sustaining the broad values and direction of government.	*Some refinements needed but broad trajectory unimpeded.*	*Direction broadly in line with goals, but clear signs that the policy has promoted some rethinking, especially behind the scenes.*	*Entire trajectory of government is being compromised.*	*Irrevocably damaging to broad values and direction of government.*
Opposition to political benefits for government virtually non-existent and/or support is virtually universal.	**Opposition to political benefits for government is stronger than anticipated but outweighed by support.**	*Opposition to political benefits for government is equally balanced with support for same.*	*Opposition to political benefits for government outweighs small levels of support.*	*Opposition to political benefits for government is virtually universal and/pr support is virtually non-existent.*

The justification for my assessments in Table 7.4:

- <u>Favourable to electoral prospects and reputation enhancement, with only minor setbacks</u>. The Prime Minister and the Federal Environment Minister recognised the wider political benefits of providing greater protection for the GBR despite the concerns raised by some local conservative MPs. The Minister succeeded in having the Zoning Plan approved by Federal Parliament in December 2003. There was some internal political party wrangling, but my understanding was that no MPs lost their seat in the 2004 election due specifically to the RAP/rezoning. The 2006 *Review of the GBRMP Act*, was promised during the 2004 election campaign (as a consequence of the Structural Adjustment Package).

- <u>Despite some difficulties in agenda management, capacity to govern is unperturbed</u>. The capacity to govern the GBR was not impacted, although a few of GBRMPA's management activities were delayed given the re-allocation of resources to the RAP/rezoning. Considerable resources and time were required to develop, and then implement, the new zoning plan but this was managed within government. Similarly, management of the Structural Adjustment Package turned out to be more complex, and expensive than initially envisaged, although this did not affect the capacity to administer the GBR.

- <u>Sustaining the broad values and direction of government</u>. The planning process and the outcome were both in accord with the direction of government as stated in the GBR legislation and in Australia's *Oceans Policy*, and both increased Australia's profile as a global leader in marine management.

- <u>Opposition to political benefits for government is stronger than anticipated but outweighed by support</u>. There was considerable opposition from commercial and recreational fishers and some MPs, and the hostility over this issue was stronger than anticipated. The Prime Minister and the Minister recognised that the level of support from the wider Australian public for greater protection of the GBR outweighed such opposition.

Table 7.5 is a summary table drawing upon the results from Tables 7.2-7.4. Across Tables 7.2-7.4, fourteen policy elements were assessed, and the scores in Table 7.5 reflect the number of times the assessments in Tables 7.2-7.4 placed the wording under the heading most appropriate for the RAP/rezoning. I have then added the scores under the relevant headings along McConnell's spectrum. The results show for those 14 assessments, 99 per cent (n=13) were considered to be either *Complete Success* or *Resilient Success* (i.e., five assessments were assessed a *Complete success*, eight assessments were a *Resilient success*, and one was considered to be a *Conflicted success*).

Table 7.5   Summary of results of the RAP/rezoning when assessed against McConnell's spectrum from Success to Failure (based on Tables 7.2-7.4)

	Complete Success	Resilient success	Conflicted success	Precarious success	Complete Failure
Process	1	4	0	0	0
Program	3	1	1	0	0
Political	1	3	0	0	0
Totals	**5** *(35%)*	**8** *(64%)*	**1** *(1%)*	**0**	**0**

The RAP/rezoning achieved what the government intended with the policy, notwithstanding various modifications, and concerns (e.g., the Structural Adjustment Package as discussed in Chapter 6). Interestingly, the level of opposition to the outcome of the RAP/rezoning as shown by the last row in Figures 7.2-7.4 was greater than GBRMPA or the government had initially envisaged and so resulted in

an assessment of *Resilient success* in all three dimensions; such opposition was nevertheless outweighed by others sectors and the Australia-wide levels of support.

The one element of the RAP/rezoning that was rated as a *Conflicted success* was in the *Program* dimension (i.e., Table 7.3) and was due to the unexpected and controversial problems relating to the Structural Adjustment Package discussed in Chapter 6. The political backlash and the ongoing concerns led the Prime Minister to promise a review of the GBRMP legislation during a federal election campaign. The consequence was the 2006 *Review of the GBRMP Act* (Commonwealth of Australia, 2006b) as outlined in Section 7.7. The implications of that review for any future GBR zoning programs are discussed in Chapter 8.

Keating (1966) suggested, '…a good policy *process* is a vital underpinning of good policy development… good process does not necessarily guarantee a good policy outcome, but the risks of bad process leading to a bad outcome are very much higher…' (cited in Edwards, 2004 p. 5). As shown in the assessment against McConnell's spectrum (Table 7.2), the process that led to the RAP/rezoning, produced on balance, a resilient success. Edwards et al. (2001) maintained that a good policy should be expected to be durable and sustainable, and also should withstand the test of time. Compton & 't Hart (2019) recognized this temporal aspect, so they proposed adding a fourth dimension to McConnell's three dimensions/strands. Compton & 't Hart (2019) named the fourth dimension, *Endurance assessment,* explaining:

> … policies should be assessed not through a one-off snapshot but as a multi-shot sequence over time. Contexts change, unintended consequences emerge, surprises are thrown at history: robustly successful policies are those that adapt to these dynamics through institutional learning and adaptation …maintaining public reputation and legitimacy... (p. 5).

An assessment against the criteria developed by Compton and 't Hart is shown in Table 7.6.

Table 7.6 Assessment of RAP/rezoning against the endurance criteria proposed by Compton & 't Hart (2019)

Criterion *(from Compton & 't Hart, 2019, p. 6)*	**Assessment of RAP/rezoning**
Endurance of the policy's value proposition (i.e., the proposed 'high-level' ends–means relationships, underpinning its rationale and design, combined with the flexible adaptation of its 'on-the ground' and 'programmatic' features to changing circumstances and in relation to performance feedback).	The statutory Zoning Plan remains a cornerstone of GBR management, over 16 years after the plan came into effect. The objective of increasing the protection of the biodiversity across the GBR was achieved. The no-take zone network has since been demonstrated to contribute to the ecological sustainability of commonly fished species (e.g., Harrison et al., 2012; Williamson et al., 2004), and hence enhance biodiversity protection. It is believed these benefits will continue to develop over time with research showing increasing benefits if an MPA is in place for at least two decades (Edgar et al., 2009)

(Table continued on next page)

Criterion *(from Compton & 't Hart, 2019, p. 6)*	Assessment of RAP/rezoning
Degree to which the policy's programmatic, process, and political performance is maintained over time	The assessments made in Tables 7.2-7.4 assessed the policy's performance at the time of the policy implementation in 2004 but would be equally valid today. The policy has been maintained over time. Its longevity, however, could be symptomatic of a lack of political interest to re-open the zoning for possible amendment given the complexities of undertaking a similar planning program (discussed further in Chapter 8).
Degree to which the policy confers legitimacy on the broader political system.	The fact the 2003 Zoning Plan has continued through eight Federal environment Ministers in three successive federal governments on both sides of politics indicates that the policy remains 'durable and sustainable' (Edwards et al., 2001). Despite major changes in political priorities that have occurred over the last two decades, the policy remains in place, maintaining its public legitimacy.

Applying the same five-point spectrum developed by McConnell (2010) (i.e., overall success to failure), and considering both the assessment in Table 7.6 and the options available in Table 7.2 (*Policy as process*), the most appropriate rating for the RAP/rezoning against the temporal/endurance strand would be a *Resilient Success*. Considering the wording in the definition from Compton & 't Hart (2019) (e.g., 'maintaining public reputation and legitimacy'), it is noteworthy that one interviewee recognised the legislative basis for the zoning plan had stood the test of time: '… there's been no major changes to the Regulations underpinning the zoning plan. … they have largely remained the same and stood the test of time. ... given the Regulations can be more easily changed than the zoning provisions, I think that is one sign of success…' (Interviewee R7).

Compton & 't Hart (2019) also state:

> ...a policy is a complete success if (a) it demonstrably creates widely valued social outcomes; through (b) design, decision-making, and delivery processes that enhance both its problem-solving capacity and its political legitimacy; and (c) sustains this performance for a considerable period of time, even in the face of changing circumstances... (p. 5).

One shortcoming of a subjective assessment of a real-world policy is highlighted by Edwards et al. (2001) who noted, '...**it is inevitable in the assessment of policy processes that there is no counterfactual** [emphasis added]. We cannot answer whether a lesser process would have done as well, or whether a different process could have done better...*' (p. 174). The aim, therefore, of applying McConnell's framework (and the two further assessments in the following sections) was to reflect on the RAP/rezoning in order to (paraphrasing Compton & 't Hart, 2019), '...document, understand, and problematize the actors, contexts, ideas, and institutions that interact to produce the outcome ...' (p. 8).

7.4.2 Benchmarking the RAP/rezoning against other policy reforms

Luetjens et al. (2019) examined the genesis and evolution of 20 standout public policy case studies in Australia and New Zealand (the RAP/rezoning was not one of them). Within these 20 case studies, Luetjens et al. noted six recurrent patterns they considered promoted successful policy outcomes. These six patterns are shown in the left-hand column of Table 7.7 which benchmarks the RAP/rezoning against the reasons identified by Luetjens et al. (online, 2019) for successful policy outcomes.

Table 7.7 Benchmarking the RAP against six reasons for successful policy outcomes
(after Luetjens et al., online, 2019)

Six reasons for successful policy outcomes (Luetjens et al., online, 2019)	Benchmarking the RAP
Addressed a problem that was well defined and broadly acknowledged at the outset of the policy development process	Initially the problem was articulated in the 1994 Strategic Planning process for the GBR, but it was not widely acknowledged outside the science and ENGO groups who participated in the process and GBRMPA. The RAP was specifically designed to address the problem (i.e., that the biodiversity of the GBR was not adequately protected), and this was articulated at the start of the rezoning process.
Based on conceptually coherent, evidence-informed advice that has paid attention to the realities of implementation	The RAP/rezoning was based on a sound underpinning of science (e.g., the bioregions, the biophysical operating principles). The changes that occurred between the draft and the final plans showed the final zoning did consider the public concerns raised in the submissions as well as a series of modifications made to appease the commercial fishing industry. When the new Zoning Plan was implemented, 20% or more of every one of the 70 bioregions was protected in no-take zones.
Champions and stewards were key, not just during the design and decision-making phase, and also during the implementation phase	Key individuals, especially those mentioned in the 'leadership' chapter were champions throughout the design and decision-making phases, and also during the implementation phase.
Astute policy advocates carefully built the case for policy change, readying themselves to fit their workable solutions to the relevant crisis	Once the GBRMPA CEO/Chair and Minister Kemp were convinced of the merits of undertaking the RAP/rezoning, the team within GBRMPA developed the RAP/rezoning which ultimately led to the final approved zoning plan. Imogen Zethoven was described in various interviews as an astute policy advocate who was able to bring the ENGOs onside, ensuring they were supportive.
Policy had sufficiently broad appeal that it survived changes of government from the party that gave the policy initial support	Since the 2003 Zoning Plan came into effect (1st July 2004), the policy has been maintained through nine environment Ministers in three different Federal governments on both sides of politics: - The plan was developed and implemented under a coalition government: 1998-2007. - The plan was maintained through the Labor government: 2007-13. - The plan continues to be maintained through the coalition government: 2013-present (2020)
Implementation challenges dog any major policy initiative – when policymakers persevere, learn from experience, and adjust their approaches accordingly, they can help policies become major successes in the longer term.	There were numerous implementation challenges for the RAP/rezoning, especially ensuring all users were aware of the new zoning provisions. GBRMPA therefore undertook a wide-ranging program of public education. (section 5.8). The Structural Adjustment Package (SAP) was an unexpected and controversial outcome of the RAP/rezoning. However, the SAP led to improved government processes for subsequent zoning programs, both federally and in various States.

Australia's *Oceans Policy* (AOP) laid the foundation for the development of Regional Marine Plans around Australia within Commonwealth waters (generally from three nautical miles offshore to the edge of Australia's Exclusive Economic Zone), with the South-east Marine Region as the prototype. In 2006, the Australian Government commenced the Marine Bioregional Planning Programme for the South-west, North-west, North, and East (covering both the Temperate East and the Coral Sea) regions. The Marine Bioregional Planning Program was undertaken for Commonwealth waters only and sought to establish a network of Commonwealth marine reserves (CMRs) in each bioregion. Fourteen CMRs were proclaimed in the South-east Marine Region in 2007. In 2011, four draft Marine Bioregional Plans were released, and public feedback was sought on the proposals between May 2011 and February 2012. The CMRs came into effect on 17 November 2012.

Williams et al. (2009) showed the geomorphic features that were used as the basis for designing the network of reserves needed to be further modified to adequately represent the biodiversity of the South-east Marine Region. Barr and Possingham (2013) assessed Australia's progress in achieving marine representation (i.e., including the full range of marine ecosystems), which is a key principle of systematic conservation planning. This assessment concluded,'... except for the Great Barrier Reef, and the proposal for the Coral Sea marine park, the existing and proposed MPAs [CMRs] are far from representative...There was little improvement in representation of marine reserves in [the other Commonwealth] regions ... These results contrasted starkly with marine reserves in the Great Barrier Reef, despite the fact that the rezoning of the Great Barrier Reef was completed some years before the other planning exercises were initiated...' (p.45), and '...the current efforts in five of the most recent planning regions are not meeting even basic measures of representation...' (p.46). Devillers et al. (2015) also found the Australian CMRs to be strongly residual with poor representation, making almost no difference to 'business as usual' for most ocean uses.

A detailed assessment of the AOP was conducted by Vince (2015) who listed eight reasons for the overall failure of that particular policy. Given the AOP is another Australian marine policy, Table 7.8 'benchmarks' the RAP/rezoning against Vince's eight possible reasons for policy failure, with the right-hand column showing by colour-coding, how the RAP/rezoning is assessed when benchmarked against the generic reasons for policy failure.

Table 7.8   Benchmarking the RAP/rezoning against eight identified reasons for policy failure (adapted from Vince, 2015)

Legend for colour ranking in Table 7.8:
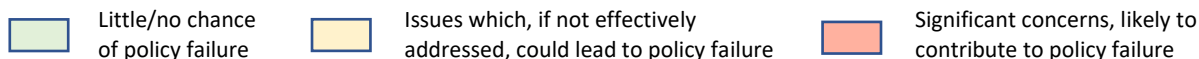
	Little/no chance of policy failure		Issues which, if not effectively addressed, could lead to policy failure		Significant concerns, likely to contribute to policy failure

Generic reasons for policy failure (adapted from Vince 2015)	How the RAP/rezoning should be regarded against the generic reasons for policy failure	My assessment of RAP/rezoning
Failed to achieve its intended objectives	The RAP/rezoning achieved its intended objectives (i.e., increased the protection of the biodiversity of the GBR) and in doing so, minimised the impacts upon the users (the political imperative).	
Failed to achieve its intended timeline	The RAP/rezoning failed to meet its original proposed timeline (i.e., late 2001) due to a number of factors (e.g., delays in obtaining Ministerial approval, the overwhelming number of public submissions, the complexity of the task, and the additional consultation required).	

(Table continued on next page)

Generic reasons for policy failure (adapted from Vince 2015)	How the RAP/rezoning should be regarded against the generic reasons for policy failure	Assessment of RAP/rezoning
Poor policy design	The policy design adapted the existing proven zoning process and the existing spectrum of zones. The zoning process and the resulting plan were both improved (e.g., improved public engagement processes, coordinate-based boundaries) and met the policy objective.	
Encountered issues with multiple sectors	Some sectors (e.g., commercial and recreational fishers) had concerns with the planning process. Other sectors, however, (e.g., tourism, ENGOs, science community) were ultimately happy with the zoning process and the outcome.	
Encountered issues with multiple jurisdictions	Multiple jurisdictions were involved. Queensland politicians withdrew their involvement during the planning process (see Chapter 6), but once they realised the likely problems if zoning was applied only in Commonwealth waters, they re-engaged and adopted a complementary zoning approach.	
Identifiable winners and losers	No one sector, user or community group got everything they wanted so there were no identifiable winners or losers. If there was a winner as a result of the RAP/rezoning, the GBR environment (including the full range of species and habitats) was the winner.	
Lack of communication and policy coordination between actors	There were effective levels of communication and policy coordination across the relevant actors (e.g., the existing Intergovernmental Agreement helped coordination between Federal and Queensland agencies; intra-government coordination between agencies was facilitated by interdepartmental committees; GBRMPA kept the community periodically informed through update newsletters).	
Problems due to a new institution	GBRMPA was known and recognized as a government agency, and zoning in the GBR had existed since the late 1980s. The GBR public had previously been engaged through similar planning processes, so there was prior understanding of the process and what zoning meant.	

7.4.3 The 2006 Independent Review of the GBRMP legislation

An independent assessment of the RAP/rezoning was made as part of a formal government review in 2005-06. The review was promised during the 2004 Federal election when a commitment was made by the Australian Government to review *the [GBRMP] Act* '...to improve the performance of the Great Barrier Reef Marine Park Authority, its office holders, and its accountability frameworks...' (Commonwealth of Australia 2006b, p. 4). Many considered the review was a political concession to those who were unhappy about the revised zoning. The then Federal Environment Minister (Senator the Hon Ian Campbell) acknowledged that the 2003 Zoning Plan represented a '... major transition point in the management and protection of the Marine Park...' (p. 4) when he formally announced the terms of reference for the review in August 2005. However, when the review report titled *Review of the Great Barrier Reef Marine Park Act 1975* was published in 2006 (Commonwealth of Australia, 2006), it was generally recognised the review delivered both positive and negative outcomes. For example, the recommendation for a five-yearly GBR Outlook Report and the prioritised hierarchy of

objectives in *the Act* were positive, whereas a reduction in the autonomy of GBRMPA as an independent statutory authority and the more onerous requirements prior to any subsequent zoning were widely considered as negative.

The formal review panel[49], having accepted submissions and heard various views, wrote:

> ...On the one hand, many stakeholders considered the RAP to be **a globally significant conservation achievement, an example of environmental leadership** [emphases added] and an initiative with robust scientific underpinning. This group considered **GBRMPA had handled the rezoning process well, particularly given the size of the undertaking**, and that the Authority had engaged constructively with different stakeholders to achieve workable arrangements that accommodated both economic and conservation needs. The stakeholder groups that were, on balance, satisfied with the process and its outcome included the tourism industry, shipping and maritime safety interests, the scientific community, conservation groups, the diving industry, sailboat operators and some local community groups... (Commonwealth of Australia 2006, p. 56).

> ...However, a number of other stakeholders, mainly recreational and commercial fishers, and related businesses, **disagreed with the Zoning Plan's scientific basis and considered that the process and approach were biased**, with inadequate consideration of the impacts on individuals and communities. Indeed, the 2003 Zoning Plan has resulted in short-term adjustment pressures that have been locally quite intense, particularly as its introduction came at a time when businesses were also being impacted by a number of State fisheries management changes, State coastal marine park zoning changes and external market factors... (Commonwealth of Australia 2006, p. 10).

The review did not revisit the outcomes of the 2003 Zoning Plan. However, the planning process itself was reviewed i.e., the consultation, accountability, and regulatory frameworks. The review acknowledged '...**the RAP/rezoning was a significant undertaking for which there was no precedent in terms of scale, scope and process** [emphasis added]...' (p. 166). The review also acknowledged that GBRMPA had '...a well-considered scientific basis... made extensive efforts to achieve effective engagement... held a large number of meetings with stakeholders ... and sought to achieve a balanced outcome between alternative uses...' (p. 166).

> ...To a large extent the concerns raised by stakeholders in regard to the 2003 Zoning Plan process arise from disagreement with the scientific underpinning, and perceptions of a lack of transparency, accountability, and due process. While not sharing all these concerns, the Review Panel proposes that any future zoning arrangements be undertaken following approval of the process and operational principles by the Minister, that they allow for extended public consultation and that they be based on substantive socio-economic and biophysical information... (p. 11)

The Review report acknowledged that more than 66 major changes were made to the Draft Plan to accommodate submissions made by the commercial and recreational fishing sectors. The review also presented a case study for one area of the GBRMP, the Capricorn Bunker Region, showing the

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[49] The three-person review panel comprised the Secretary of the Department of Environment and Heritage (Panel Chair), and two senior executives representing the Department of the Prime Minister and Cabinet, and the Department of Finance and Administration, all Federal government executives.

significant changes between the Draft Zoning Plan and the final 2003 Zoning Plan. As a result of the 2006 review, a variety of legislative changes occurred, including:

- establishing a prioritised hierarchy of objectives in *the Act*
- ensuring five-yearly GBR Outlook Reports
- improving alignment of *the Act* with Federal environment legislation to minimise duplication
- increasing transparency when developing zoning plans
- replacing the statutory GBR Consultative Committee, which previously provided advice to the Minister and the Authority, with a non-statutory Ministerial Advisory Committee[50].

7.5 Interviewees' views about the success or failure of the RAP/rezoning

In Question 10 of the interviews, the interviewees were asked to assess their views of success or failure of the RAP/rezoning against a range of indicators:

    a) **ecological indicators**: five (5) indicators were considered, being coral cover, seagrass extent, fish populations, iconic species (e.g., turtles), overall ecologically.

    b) **social indicators**: four (4) indicators were considered, being local communities, commercial operators, recreational users, overall socially.

    c) **economic indicators:** four (4) indicators were considered, being tourism, commercial fishing, ports, overall economically

    d) **national pride**: one indicator considered

    e) **international pride**: one indicator considered

    f) **other indicators**: interviewees were also able to add other indicators and rate them on the success/failure spectrum – examples that were chosen by interviewees included research, compliance, NGOs, science, Indigenous and expertise-sharing.

Interviewees were asked to rate their answers for each of the above 15 indicators (or more if they added one or more) on a four-point Likert rating scale of *Total success* to *Total failure* ... or *Don't know* as shown below:

Examples of the answers to Question 10 as provided by two of the interviewees are shown in Table 7.9 (Figure 7.6 shows a wider range of interviewees' views).

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[50] Currently, two [formal committees](#) advise the Australian and Queensland governments on implementation and review of the Reef 2050 Plan - an Independent Expert Panel and a Reef 2050 Advisory Committee.

Table 7.9 Example of data compiled from two sets of answers provided by interviewees
(Ticks or crosses inserted by interviewees were replaced with the number '1' to enable totalling for analysis)

Code	Indicator	Total success	Partial Success	Partial Failure	Total Failure	Don't know
Interviewee A1	Coral cover	1				
	Seagrass extent	1				
	Fish populations	1				
	Iconic spp, e.g. turtles	1				
	Overall ecologically	1				
	Local communities		1			
	Commercial operators		1			
	Recreational users		1			
	Overall socially	1				
	Tourism	1				
	Commercial fishers			1		
	Ports		1			
	Overall economically	1				
	National Pride	1				
	International	1				
	Other? – *Indigenous*	1				
	TOTAL	11	4	1	0	0
Interviewee S2	Coral cover		1			
	Seagrass extent		1			
	Fish populations		1			
	Iconic spp, e.g. turtles		1			
	Overall ecologically		1			
	Local communities		1			
	Commercial operators		1			
	Recreational users		1			
	Overall socially		1			
	Tourism	1				
	Commercial fishers		1			
	Ports					1
	Overall economically		1			
	National Pride	1				
	International	1				
	Other- *Research*	1				
	TOTAL	4	11	0	0	1

All the data from the interviewees were summed across this spectrum of success or failure. For the comparison shown in Figure 7.6, the responses from GBRMPA officers were excluded (on the basis they are likely to have a biased perspective). The scores were totalled within each of the other groups for comparison (by dividing the total score for each group by the number interviewed in that group) and then are shown in Figure 7.6 as a percentage.
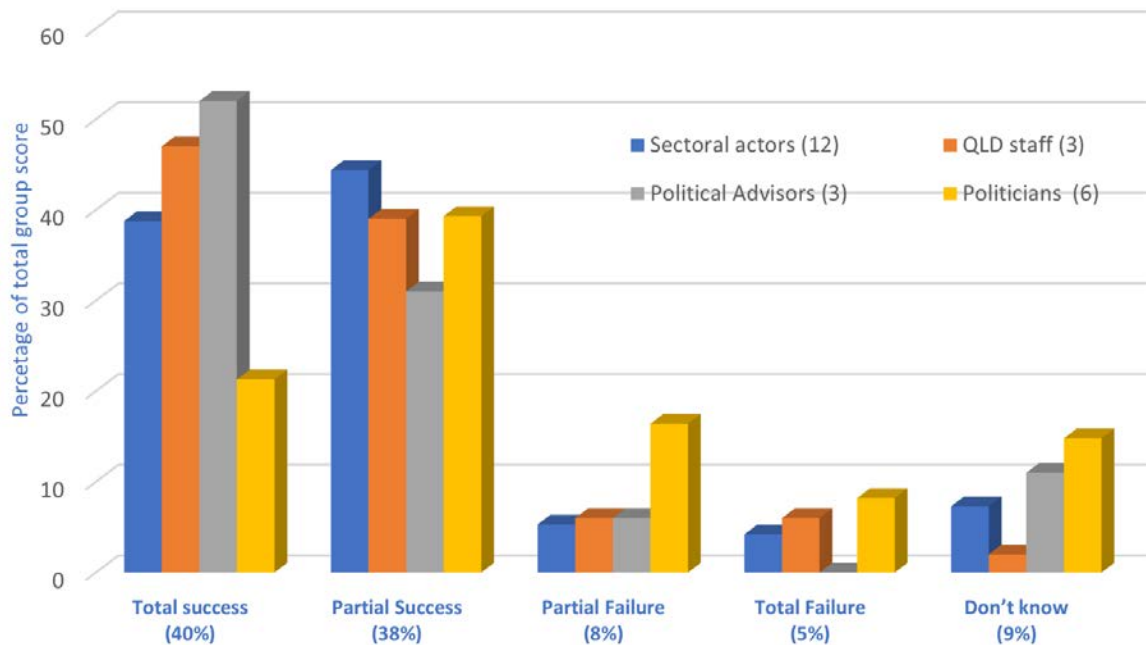
Figure 7.6 Interviewees' views of the success or failure of differing indicators within the RAP/rezoning outcome

As shown by combining the two left-hand groups of Figure 7.6, 78% of all scores provided by the interviewees considered the above indicators should be rated as either 'Total Success' or 'Partial success'. As the interviewees were making their assessments about the success or failure of various indicators of the RAP/rezoning outcome, they were also requested to explain their reasons for their ratings; these reasons and their thoughts were captured in the interview transcripts. The following excerpts from the transcripts provide examples of the range of views. For example, one of the scientific experts explained:

> … I'm a person who believes… any activity is measured relative to what would have happened if that activity didn't happen. So, this is the counterfactual. So, when I answer these questions, I have a counterfactual in my mind which is, if there was no RAP, what would have happened? **…** and I'm judging it against that… so that's why [for] coral cover for example… simple one, even though we know coral cover has declined, I am going to call it a partial success …because coral cover would have declined more if RAP hadn't been there...
>
> (Interviewee S5)

A sectoral interviewee stated:

> …overall, economically, I would say it's very successful. …an incredibly successful project … although the Structural Adjustment Package was ridiculously expensive… far too expensive for the network compared to what it should have been …**the benefits that come out of a healthy Reef are extraordinarily economically efficient and beneficial for the overall economy** [emphasis added]. RAP was about securing that ecosystem for the future so definitely a big success...
>
> (Interviewee S6)

Various interviewees expressed admiration that the RAP/rezoning was actually achieved, for example:

> …the fact that GBRMPA, with the guidance of Virginia, was able to steer through this consultation process …was fundamental in bringing this to the point …two or three years before that it would have seemed inconceivable … that such an outcome could be achieved without blood on the floor .. and to somehow cajole the RAP out of this, was almost a miracle … It was a brave project in hindsight … covering such a huge area with so many stakeholders and so many different camps… It would have been almost unachievable at many points… but it was a lesson of how you can eat the proverbial elephant...
>
> (Interviewee S1)

In his recollections about the RAP/rezoning, a key Queensland political advisor said:

> …I live in awe of the program and I wish I had been more integral to it … in those early days I was negative towards the program and it wasn't until towards the end, I suddenly realized "These guys are going to do this!"…and when you did achieve it, I acknowledged it then, and I acknowledge it now, as one of the great conservation achievements in this state and this country – and that it should forever be to the credit of people like you and John Tanzer to achieve that, and obviously Virginia Chadwick as Chairman obviously played a significant role … that's what makes the achievement even more important … the State government and many the stakeholders were not supportive and yet it was still achieved...
>
> (Interviewee A1)

One of the GBRMPA officers stated (indicating his sense of pride):

> …the way it was done… the process was excellent… the other thing, the ongoing ability to be flexible too … the ability to do that on the run was excellent too …you know we might not be perfect, but we were bloody close to it … looking back I think it's as good as it could have been… (Interviewee R10).

In contrast, several GBRMPA officers expressed disappointment when recalling the RAP/rezoning, for example:

> …. One of my biggest disappointments is the fact that we could get something with ministerial support, through the Cabinet, lie before two Houses of Parliament for the requisite period of time with no disallowance motion …yet after it had gone through, **the Authority was basically hung out to dry … there was no responsibility taken by politicians** [emphases added]… somehow, there was a perception out there, that [GBRMA] had somehow acted unilaterally… we were an organisation that was out of control … and ultimately, you know, we had to be reined in **for something that was such a success, internationally and even nationally, the organisation was hung out to dry** … and that links obviously to the structural adjustment …that cost the government a lot more money than should have been paid out … (Interviewee R7)

Another key GBRMPA officer expressed his disappointment:

> … GBRMPA had by the end of RAP elevated itself to be able to engage with the Queensland coast very strongly and the rest of Australia less so … and driven that whole debate. **The government took the view that GBRMPA had to be penalised for what it did** [emphasis added]. That was part of the trade-off… and because we'd lost Virginia, there was no one to fight… and [Minister] Kemp had moved on. There was no one to fight the good fight. … the government just frittered away millions of dollars' worth of bought position .. that's effectively what we did… spent millions of dollars to buy a position in the community… and then they just let it go… (Interviewee R4)

A senior officer reflected on the RAP/rezoning and what he considered might have happened:

> …if we hadn't been severely distracted [by the Structural Adjustment Package], then I think we'd be able to better implement the rezoning [that] had three characteristics:
> o ... most important, was ongoing community engagement … we really needed to continue to engage those constituents that we built up over that five-year period … we missed an opportunity to have genuine strong devolution of management responsibility and strong community engagement in the ongoing adaptive management of those areas...
> o the second part was the monitoring – money wasn't allocated to monitoring and AIMS, whose primary responsibilities included the Reef, didn't devote resources for comprehensive monitoring of the zoning plan...
> o and the third part was implementation... there weren't new or extensive resources devoted to enforcement of the zoning plan… we made a good start, [but failed] to put in place a comprehensive and linked enforcement program…
> (Interviewee A2).

7.6 How innovative was the RAP/rezoning?

The four key factors that contributed to the success of the RAP/rezoning are outlined in Chapters 3-6.

However, various other less obvious factors also contributed to the success and many were innovative in the way they contributed to the overall policy reform process. The following two examples required a systematic and comprehensive approach, innovation, and a substantial effort to complete the tasks within tight timeframes. Due process was essential, and the legal complexities needed to be carefully considered when undertaking each task.

a) Generating *legal boundary definitions* for every part of every zone with a high degree of accuracy was not an insignificant task. Each coordinate needed to be specified in degrees and decimal minutes, accurate to three decimal places for compliance purposes. For example, Figure 7.7 shows the legal boundary description for a single green zone north-west of Cairns and includes numerous coordinates. Lewis et al. (2003) explained:

> '...a boundary description... could not be developed manually without human error. ...there is no tolerance for error because the boundary description, not the map, is the legal definition of each boundary... we automated the process and generated a boundary description schedule directly from the GIS coverage...' (p. 7).

The statutory 2003 Zoning Plan includes 150 pages of detailed boundary descriptions covering every zone in the GBR. The Spatial Data Centre in GBRMPA worked closely with the Legal Services Unit to develop appropriate wording for all boundary descriptions but the descriptions themselves could not be developed until the final locations of all zones were agreed.
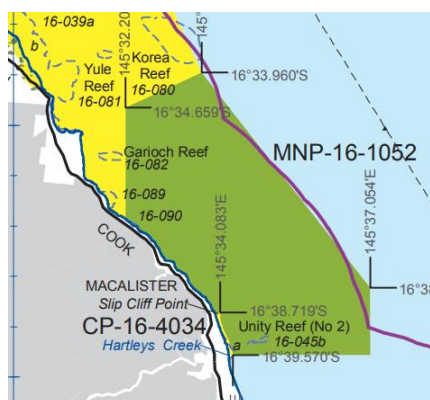
A

This example of a single green zone occurs on the coast, 40 km north-west of Cairns.

The unique identifier (MNP-16-1052) corresponds to the zone description in Schedule 1 of the Zoning Plan.

For the location of this zone, or a more comprehensive map, see
http://elibrary.gbrmpa.gov.au/jspui/bitstream/11017/604/4/Map5-EditionV-Cairns.pdf

B

[MNP-16-1052] Unity Reef (16-045) and adjacent coastline
The area bounded by a line commencing at 16° 33.960' S, 145° 33.722' E then running progressively:
1. south-easterly along the geodesic to 16° 38.225' S, 145° 37.054' E
2. south along the meridian to its intersection with latitude 16° 39.570' S
3. west along the parallel to its intersection with longitude 145° 34.332' E
4. northerly along the geodesic to 16° 39.482' S, 145° 34.319' E
5. northerly along the geodesic to 16° 39.292' S, 145° 34.267' E
6. north-westerly along the geodesic to 16° 39.204' S, 145° 34.215' E 7. Northerly along the geodesic to 16° 39.132' S, 145° 34.189' E
8. north-westerly along the geodesic to 16° 39.030' S, 145° 34.143' E
9. northerly along the geodesic to 16° 38.883' S, 145° 34.096' E
10. northerly along the geodesic to 16° 38.719' S, 145° 34.083' E
11. westerly along the geodesic to the intersection of the mainland coastline at mean low water and the parallel 16° 38.721' S (at or about 16° 38.721' S, 145° 33.969' E)
12. along the mainland coastline at mean low water to its intersection with the meridian 145° 32.204' E (at or about 16° 36.870' S, 145° 32.204' E)
13. north along the meridian to its intersection with latitude 16° 34.659' S
14. north-easterly along the geodesic to the point of commencement.

Figure 7.7   One example (A) of a single green zone (MNP – 16-1052), along with (B) the legal boundary description for that single green zone from the statutory Zoning Plan (adapted from GBRMPA, 2004, p. 162).

b) The Zoning Plan is a statutory (legal) document which has the force of law. It needed to be legally correct and accord with other legislation before it was passed by both Houses of Parliament. The Legal Services team worked across all areas of the agency to refine and translate the underlying policy of the Zoning Plan and the supporting GBRMP Regulations into drafting instructions for the government's Office of Legislative Drafting. Both the Zoning Plan and the Regulations are statutory instruments, so they needed to be legally compliant and conform with prescribed drafting protocols. The legal team also worked with the Commonwealth Director of Public Prosecutions to ensure the Plan's enforceability, and with GBRMPA's Communications team to prepare interpretative materials (such as zoning maps and brochures) to assist with compliance 'on the water'.

Prior to 1 July 2004, when the 2003 Zoning Plan came into force, the GBRMP had been comprised of 33 sections (with five of these sections having their own zoning plans and the other 28 coastal sections never having been zoned as explained below). The timing of the revocation of the old sections, the declaration of the new Amalgamated Great Barrier Reef (AGBR) Section[51], and the commencement of the new Zoning Plan was crucial. This needed to ensure that no part of the GBRMP legally ceased to exist, that the existing zoning continued until it was legally replaced, and that all permits and other instruments referencing the old zoning were seamlessly transitioned to the new Zoning Plan. The Regulations were fundamental to implement the Zoning Plan, so a complete rewrite of the GBR Regulations also occurred. Throughout the RAP/rezoning, the Legal Services team ensured that the planning process complied with the legislative process outlined in *the Act* because a failure to do so could have resulted in a successful legal challenge.

The addition of 28 coastal areas that were previously excluded from the GBR Marine Park was another important but little-known aspect that occurred concurrent with the RAP/rezoning. In January 1999, the Federal Environment Minister announced that certain coastal areas that had previously been retained for potential industrial or port developments would be added to the Marine Park. This occurred in a staged process between August 2000 and July 2001, with the declaration of 28 new coastal Sections undertaken in parallel with the RAP/rezoning. These new sections were incorporated into the new AGBR Section when it came into force in mid-2004. Some areas around major ports and urban centres continued to be excluded from the GBRMP, although this was not without some controversy. As one interviewee recollected, '… some ports were really p****d off … after the boundary got changed, their spoil [dumping] ground fell within the marine park …' (Interviewee S10).

Innovations in the RAP/rezoning can be grouped below into four core themes identified by Moore et al. (2014) for innovations that occurred in water policy reform:

1. *Legal and political reforms.* The RAP/rezoning led to various legal reforms (e.g., revised Zoning Plan definitions and objectives; how the zone boundaries were described; the amended provisions in the legislation as to how a zoning review is initiated). Political reforms also occurred after the 2006 Review of the GBRMP Act (as outlined above) and the independent review into the Structural Adjustment Package (Gunn et al., 2010)

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[51] The *Great Barrier Reef (Declaration of Amalgamated Marine Park Area) Proclamation 2004* also commenced on 1 July 2004. This had the legal effect of revoking the existing 33 sections of the GBRMP and declaring the Amalgamated Great Barrier Reef Section (AGBR).

2. *Policy entrepreneurs/change agents.* (i.e., influential individuals who influenced policy change and shared a willingness to invest time, energy and/or reputation). The majority of those identified in Chapter 4 (Leadership) were change-agents who invested time and energy into the RAP/rezoning. Such change agents existed at all levels within GBRMPA; not just those who were leaders by virtue of their position in the agency. Almost everyone in GBRMPA invested additional time and energy to accomplish the rezoning in the time available.

3. *Social learning.* The community information sessions used so effectively in the RAP/rezoning built upon the experience from planning programs in Parks Victoria (Chapter 5). This sharing of experience led to a cross-pollination of knowledge and processes. Many of the GBR planning methods and zoning approaches have subsequently been replicated in other MPAs in Australia (e.g., Moreton Bay and Great Sandy Marine Parks in southern Queensland) and overseas.

4. *Adaptive, integrated approaches.* Various approaches developed in previous GBR zoning programs (e.g., zone names) were adapted and improved in the RAP/rezoning, and new approaches (e.g., coordinate-based zone boundaries) were also introduced. The development of the bioregions built upon work undertaken previously in Australia and Canada. The application of the planning principles was innovative in that the scientific advice was integrated via the eleven biophysical operating principles into the GBR decision-making. Many aspects of the successful public participation program adapted existing techniques to suit the GBR planning situation (e.g., the community information sessions, telephone polling to engage the silent majority) and other innovative approaches were introduced (e.g., the zoning coordinates being made available for downloading onto personal GPS devices).

Technology is constantly changing so aspects that were innovative at the time of the RAP/rezoning might today seem commonplace. More recent approaches (e.g., how to best engage the public using social media) will need to be considered in any future policy reforms in the GBR.

7.7 Was the RAP/rezoning transformative policy reform?

In Chapter 1, the question was posed whether the RAP/rezoning might be considered to be an example of *transformative policy reform*. This question is examined in the light of previous and emerging research, especially that occurring in recent years with social-ecological transformations receiving greater focus (e.g., Herrfahrdt-Pähle et al., 2020; Olsson et al. 2014; Patterson et al., 2017; Walker et al., 2004).

Some researchers may believe the RAP/rezoning is an example of a 'radical policy reform'. Modifying the words of Boston (1999, quoted in Aberbach & Christensen, 2001, p. 403), the RAP/rezoning policy reform might be described as 'radical, bold, coherent and innovative'. There may be connotations, however, when applying the term 'radical' in policy reform, that suggest an extreme view of how the reform was conducted. The RAP/rezoning was unprecedented, influential, and far-reaching, so it could be considered radical in some senses of the word. However, I consider there are more appropriate primary descriptors than 'radical' for the RAP/rezoning. The descriptors in the left-hand column of Table 7.10 collectively describe the complexity of the policy reform process using words/phrases garnered from the literature (e.g., Dietz & Rogers, 2012, p. 22; Sen, 2014, p. 364) as defined in Chapter 1. Table 7.10 also provides a summary of the evidence from Chapters 3-7 demonstrating that the policy reform was transformative. I therefore consider the term 'transformative' is the most appropriate overall descriptor for what happened during the RAP/rezoning policy reform process.

Table 7.10   Evidence the RAP/rezoning policy reform was transformative

Was the RAP/rezoning …	Evidence demonstrating the RAP/rezoning policy reform was transformative
…innovative? …original?	A range of the innovative approaches adopted during the RAP/rezoning is examined in Section 7.8. There were few precedents prior to the RAP/rezoning, so parts of the approach have become the benchmark for planning large scale MPAs elsewhere.
…large scale? …system wide?	The RAP/rezoning was large scale and covered the entire GBRMP, an area of 340,000 km^2 (about the same size as Italy, Japan, or Malaysia). It was also system wide in that it covered all parts of the GBR ecosystem that were within the GBRMP.
…science based? …exploratory?	Chapter 3 describes the array of science that was used to provide a sound scientific underpinning that provided a fundamental basis for the RAP/rezoning.
…comprehensive? …thorough? …bold?	Three quantifiable indicators of the thoroughness of the policy process were: - the extent of public engagement (>31,500 public submissions and many 100's of meetings) - the level of scientific input as outlined in Chapter 3 - the degree of changes that occurred between the draft and final zoning plans to address the concerns raised by users (see Fig 5.10).
…complex? …multifaceted?	One indicator of the complexity of the process was the inter-relationships between the four key factors examined earlier in this chapter. Other indicators were the effective analysis of 31,500 submissions, and the complementary zoning approach that was adopted across two jurisdictions
…coherent? … logical?	The process undertaken for the policy reform complied with (and in some instances exceeded) the requirements set out in the legislation. While the process was comprehensive, it was considered by most stakeholders to be logical and reasonable enabling all perspectives to be considered.
…radical? …high risk? …unconventional?	As explained above, the term 'radical' could imply an extreme or drastic approach. The RAP/rezoning was unprecedented, influential, and far-reaching, and at the time was unconventional. As shown in Figure 1.4, the increase in no-take zones from less than 4.6% to over 33% might also be considered a 'radical change'. Taking on the policy reform was also high-risk politically.
…creative? …"difficult to recognize at the time of creation"?	The spectrum of zone types in the GBR was well known at the time of the creation of the RAP/rezoning, although no-one was able to predict what the final spatial extent of the new zoning network might be. The final figure of 33% in no-take zones was also difficult to comprehend at the commencement of the rezoning but today is largely accepted, even by those who were initially opposed.
… a policy reform? …paradigm-challenging?	Given the definition of 'reform' refers to a <u>major</u> policy change, the RAP/rezoning was undeniably policy reform. With no precedents, an increase from <4.6 per cent of no-take zones to over 33 per cent was also a major change.
… effective over time?	The reform process took longer than initially envisaged, mainly because of the complexity and the need for decision-makers to be satisfied before proceeding. The outcome of the RAP/rezoning has now remained in place through eight successive Federal environment Ministers of different political persuasions. To date, consecutive governments on both sides of politics have chosen to neither review nor abandon the policy. This may be because it does not need a review or, alternatively, because revision would be too hard; most evidence indicates the latter.

The assessment in Table 7.10, albeit supported by the evidence provided, is a personal evaluation that is to some degree, subjective. In the following section, the perspectives of other researchers about the RAP/rezoning are also considered.

7.8 Other perspectives – was the RAP/rezoning regarded as effective policy?

It is not easy to determine categorically whether the RAP/rezoning was an effective policy. As Edwards et al. (2001) noted, '...there is no universal answer to the much-debated question of what is good policy or a good policy outcome – what is meant by "good" is inherently subjective... one expected response is that good policy is policy that achieves its objectives ...' (p. 2). In the case of the RAP/rezoning, the primary objective was to increase the protection of the GBR biodiversity by increasing the extent of no-take zones, and to ensure the new zoning network included representative examples of all habitat types in the GBR. As pointed out by various researchers (e.g., Pressey et al., 2017; Fraser et al., 2019), it is not possible to say definitively that the biodiversity in the GBR has been better protected as there has not been an effective monitoring program to demonstrate this. As explained further in Chapter 8 (section 8.2), it would be very hard to separate the effects of the RAP/rezoning from the multitude of other factors influencing the GBR (especially climate change), even if there had been a more effective monitoring program.

Considering the perspectives of others in the peer-reviewed literature is one way to gauge whether a policy has been considered notable or effective. The following quotes indicate the level of recognition of the RAP/rezoning from a range of papers authored by recognised experts, noting most papers were multi-authored. The institution and country of the primary author after each quote shows this recognition is widespread; however, clearly some authors were more independent in their evaluation.

> ...The RAP, and its use in the rezoning of the reef, is an innovative approach... becoming a role model for policy development elsewhere... (Olsson et al., 2008, p. 9493). [primary author was from Stockholm Resilience Centre, Sweden; two of the three authors were independent of the RAP/rezoning].

> ...The Great Barrier Reef ... boasts a system-wide spatial management approach that is arguably the world's most sophisticated and extensively implemented example of marine zoning... (Ruckelshaus et al., 2008, p. 59). [primary author was from Stanford University, USA; all four authors were independent of the RAP/rezoning]..

> ...The Great Barrier Reef Marine Park... may well provide the best example of large-scale ocean zoning in existence today... (Agardy, 2010, p. 60). [primary author was from Sound Seas Foundation, USA and was independent of the RAP/rezoning].

> ... In one of the few global examples of adaptively managing marine reserves, the zoning of the [GBR] was subsequently modified to increase the total area protected in marine reserves from 4.5% to 33%, which encompassed a minimum of 20% of all identified bioregions in the park ... (Gaines et al., 2010, p. 18253) [the primary author was from University of California, USA; all five authors were independent of the RAP/rezoning].

> ... the 2004 rezoning of the GBR was exemplary (p. 480)... it remains one of the world's best examples of representing marine biodiversity... (p. 498) (Devillers et al., 2015). [primary author was from Research Institute for Sustainable Development, France; six of the seven authors were independent of the RAP/rezoning].

> ... The level of representation achieved in the Great Barrier Reef is exceptional... (Barr and Possingham, 2013, p. 45) [the primary author was from the University of Queensland, Australia; and was independent of the RAP/rezoning although the co-author was involved].

> ... The GBRMP is singularly the most successful large-scale zoned MPA derived from a spatial planning framework and is universally recognised as setting the MPA global benchmark for multiple use forms of MPA... (Ward & Stewart, 2016, p. 282) [the primary author was previously with CSIRO, Australia; the co-author of the article was independent of the RAP/rezoning].

Furthermore, the RAP/rezoning has received a number of national and international awards[52] in the years following its implementation. In more recent years, the outcome from the RAP/rezoning continues to be mentioned in publications discussing resilience and adaptability (e.g., Anthony et al., 2015; Folke et al., 2010; Hock et al., 2017; McCook et al., 2010; Westley et al., 2013). Of these recent publications, the vast majority of the authors (with the exception of five authors in McCook et al., 2010) were independent of the RAP/rezoning. Consequently, if the views of peers and professionals are an indication, then the RAP/rezoning would be regarded as effective in policy terms.

7.9 Theoretical implications of the RAP/rezoning

7.9.1 Lessons for marine/coastal policy reform theory

Recognition in my research that science, leadership, political support, and public engagement all played important roles, accords with the views of other authors in the literature concerning marine and coastal management. For example, Giakoumi et al. (2018) determined the key factors commonly attributed to 'success' and 'failure' identified from 27 MPAs around the world through group discussions and a literature review:

> ... Stakeholder engagement was consistently selected as the most important factor affecting MPA success; its absence was most often linked to failure. Other factors that were reported as crucial for success, and their absence as drivers of failure, included: surveillance, leadership, political will, and the existence of sanctioning and conflict resolution mechanisms... (p. 2).

Another example of a marine planning process and its resulting governance that has numerous parallels with the RAP/rezoning was the creation of California's network of MPAs. After a contentious ten-year collaborative public process, a network of 124 protected areas was established in 2013. This was considered '...nothing short of miraculous, having navigated political and interest-based polarization, bureaucratic delays, evolving science, and historic financial difficulties...' (Open Channels, online, 2020). In this webinar, Steven Yaffee described how the planning process, and the broader governance in the Californian MPA network process, were linked to the politics by stating, '... **process is always surrounded by politics** [emphasis added]...' (Open Channels, online, 2020; Yaffee, 2020). Fox et al. (2013) noted that in the California MPA network, '... strong political support and leadership at multiple levels enabled the [Marine Life Protection Act] Initiative to overcome barriers to planning and implementation...' (p.17). The conclusions of Osmond et al. (2010), having examined three case studies (of which the RAP/rezoning was one), stated '...there are clear lessons that can be derived from the

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[52] The RAP/rezoning received 11 national and international awards included the Australian Museum's *Eureka Prize for Biodiversity Research* (2004); the Banksia Foundation's *Environmental Award* (2004); the Planning Institute of Australia's *Award for Planning Excellence* (2005); the UNESCO/Sultan Qaboos *Prize for Environmental Preservation* (2005); and the World Future Council's *Silver Future Policy Award* (2010).

case studies … regarding governance, planning process, public input, and the role of science...' (pp. 49-50).

Similarly, Gunderson and Light (2006) outlined some of the factors important for adaptive management and adaptive governance in the US Everglades coastal ecosystem. They emphasized the importance of integrating science, policy, and decision-making, and also highlighted leadership was a critical element in preparing for change, as were political windows. They recognised problems of political costs and compromises. They also recognised some issues with some scientists, as explained by the following quote; '...rather than acknowledge that it is currently unknown what it would take to restore the lost environmental values, **some chose to replace scientific uncertainty with political certitude, as false as it may be** [emphasis added]...' (Gunderson & Light, 2006, p. 330).

The similarities of the key factors with other marine and coastal situations is notable, as is the complexity of such programs. Olsson et al. (2008) noted:

> ...the GBRMPA case illustrates that policy development and implementation are complex, highly dynamic, and sometimes abrupt... The RAP, and its use in the rezoning of the Reef, … adopted at the highest political level in Australia, and actively used to improve the governance of the GBR... (p. 9493).

One aspect which warrants improvement in the GBR (but also elsewhere in marine and coastal areas) is the need to recognise and address the threats that originate outside the current extent of most marine 'protected' areas. Very few MPAs globally or their governing legislation, are compatible with the need for a broader ecosystem-wide management approach including adjacent catchments. However, such areas are fundamental for effective protection of downstream MPAs and coastal areas given the significance of land-sourced pollution. The RAP/rezoning was not able to extend landward of high water, even under a complementary zoning approach. There is a need for improved scientific and community understanding of which parts of these linked ecosystems have been grossly altered or are in decline, and what are the environmental implications for adjacent MPAs.

In terms of Australian examples, there are few comparable examples of marine or system-wide environmental policies against which the RAP/rezoning can be bench-marked. The Australian *Oceans Policy* (AOP) is the best (and possibly the only) example for any comparison as the AOP similarly occurred over a large area and involved a Federal government planning process (Table 7.8). Vince and Day (2020) conducted a comparison of the RAP/rezoning and the AOP considering 21 principles for effective policy integration. They noted that integration is '...a decision-making process designed for multilevel governance and the involvement of multiple actors, with the potential for these to be applied across multiple timeframes ...' (p. 318). Integration is a key aspect of policy development and, if designed and implemented effectively, can increase horizontal (e.g., interagency) and vertical (e.g., inter-jurisdictional) consistency (Stead & Meijers, 2009). Successful integration can increase synergies and cooperation between sectors, reduce duplication in the policy process and provide longevity to the policy process (Vince & Day, 2020).

One factor that undoubtedly played a significant role in the success of the outcome of the RAP/rezoning was the organisation itself at the centre of the reform, the Great Barrier Reef Marine Park Authority. The existence of a robust and effective institutional setting within which such a policy reform can occur is significant. At the time of the RAP/rezoning, the organization (GBRMPA) and the statutory settings around it were quite particular and rare[53], being an independent statutory authority that operated with

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[53] How and why changes have occurred to the institution that was GBRMPA and to the governance around the GBR since the RAP/rezoning have been examined in various publications (e.g., Commonwealth of Australia, 2006; Evans et al., 2014; Howlett et al., 2017; Hughes et al., 2015; Morrison, 2017).

considerable autonomy, had its own legislation, and for which there was strong and effective leadership. This was crucial for not only the success of the policy reform but also to its very possibility. Many policy attempts eventually fail or falter due to a lack of an effective institutional setting, yet this factor was mentioned in only a couple of the interviews. In hindsight, an extension of the interview question asking about their interviewee's views about success (or otherwise) of the RAP/rezoning may have been more useful if it also sought views about the additional factors behind that success, including the institutional role.

7.9.2 Comparisons with other large-scale environmental issues in Australia

Various environmental policies have been developed (or are being developed) for broad-scale and/or complex environmental areas in Australia that have some parallel issues with the GBR. For example, the Murray Darlin Basin (MDB) has even more complex inter-governmental arrangements involving four Australian States (New South Wales, Queensland, South Australia, and Victoria), the Australian Capital Territory and the federal government. It is also an area of significant cultural importance to First Nations people. The same four interrelated factors discussed in this thesis are likely to apply in the MDB, including the use of the best available environmental, social and economic science along with local and traditional knowledge. Similarly, there is the ongoing challenge of balancing the needs of local towns and communities, resource utilisation, cultural interests, and the environment amidst many compounding threats. Consequently, there are numerous similarities between the MDB and the GBR, so there may be mutual learnings for each location.

Similarly, the Wet Tropics in north-east Queensland has some similarities. Despite covering a much smaller area compared to the GBR, the Wet Tropics also has a statutory authority responsible to both the Australian and Queensland governments, has its own specific legislation, relies upon effective partnerships with many industries and interested parties, shares many of the same Indigenous Traditional Owners with the GBR, and it too is World Heritage listed.

It is likely the same four key factors would also be relevant in other areas involving large-scale environmental issues around Australia, especially those where federal and State/Territory governments and Traditional Owners all have interests (e.g., Tasmanian Wilderness; Fraser Island, Kakadu, Greater Blue Mountains). A resulting research question is therefore posed in section 8.11.

7.9.3 Comparisons with the literature on transformative policy change

Recent global research supports several of the conclusions from my research. In particular, my research conclusions demonstrating the importance of politics in gaining a successful policy outcome, the critical role of leadership, the value of an effective program of public engagement and how the RAP/rezoning was a combination of a top-down and bottom-up approach. Examples of recent global research supporting these conclusions include:

- Patterson et al. (2017) recognised politics are central to understanding and analysing transformations. 'The fundamental importance of governance and politics in regard to societal transformations should be clear because transformations are likely to have re-distributional impacts, resulting in (actual or perceived) winners and losers ...' (p. 10).
- Patterson et al. (2017) also confirmed '... that transformations emerge from [the] interplay between top-down institutional conditions and bottom-up (catalytic, disruptive) innovation...' (p. 9).

- Olsson et al. (2014) identified the important role of policy or institutional entrepreneurship and transformational leadership in sustainability transformations.
- Olsson et al. (2014) also noted the need to overcome existing social and ecological structures and processes during transformative processes.

The stages of the RAP/rezoning policy development as outlined in Chapter 1 (i.e., Table 1.3 and Figure 1.5) can also be related to the three phases identified by Herrfahrdt-Pähle et al. (2020) as they examined the role of some governance aspects of sustainability transformations:

1. *Preparation phase.* In the GBR, the lack of effective biodiversity conservation, leading to anticipated implications for the future health of the ecosystem and for the industries that depended on a healthy GBR, led to the proposal for the new zoning network.
2. *Navigation phase.* The planning process included developing and evaluating new initiatives and combining a range of available, and sometimes competing, ideas and approaches which led to the adoption of the new zoning network.
3. *Stabilization phase.* The new zoning network was institutionalized within new governance regimes and was embedded at the ecosystem-wide level. Processes included implementing and enforcing new rules and regulations, as well as new practices.

7.10 Conclusions about the policy reform and level of success

This chapter demonstrates the RAP/rezoning was undoubtedly a transformative policy reform. As discussed in this chapter, there is an overall consensus view that the RAP/rezoning was a success; however, there are a range of views on the level of that success. Having considered the various assessment approaches, the results on balance, indicate the RAP/rezoning should be considered a partial or resilient success 'for its time'. Two important points are inferred from the arguments presented in this conclusion:

1. The evidence demonstrates the level of success of the policy, when viewed in its entirety, was not a complete or total success. This evidence includes:
   - Table 7.5 indicated that 64 per cent of the policy elements were assessed as *Resilient Success* and one per cent as *Conflicted success*.
   - Table 7.8 showed the RAP/rezoning failed to achieve the timeline as originally envisaged.
   - Fig 7.2 showed that 38 per cent of the scores provided by the interviewees considered the indicators in the five diverse groups should be rated as 'Partial success'.

2. The caveat 'for its time' is also important. It is now more than 16 years since the policy was developed and implemented. Considerable research has been undertaken since the RAP/rezoning policy was implemented and this has highlighted various limitations and shortcomings of the RAP/rezoning. Many of these shortcomings have become evident in the years following implementation and as researchers have had opportunities to examine specific aspects more closely. Notwithstanding the relevance of this more recent research, the various national and international awards recognised the significance of the RAP/rezoning at that time.

My final chapter considers the limitations of the RAP/rezoning and the implications for the future.

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CHAPTER 8 – Conclusions

8.1 Introduction

This chapter concludes the thesis. I begin by drawing upon recent research and new knowledge to highlight various limitations and shortcomings with the approach used in the RAP/rezoning. In the previous chapter, the outcome of the RAP/rezoning was assessed as '...a partial or resilient success for its time'. The caveat, '...for its time' is particularly important in the light of the new knowledge and understanding that has occurred in the 16 years since the new zoning was implemented. I then briefly summarise how my five research questions have been addressed in the thesis and some resulting considerations for the future. This also leads to various important research gaps and policy questions. An overview of the additional implications of the RAP/rezoning is presented, followed by a discussion of the potential for the transfer of the lessons from this policy reform to other locations. Explaining what zoning can and cannot achieve for marine conservation is particularly important in the light of new and emerging threats facing MPAs. These new and emerging challenges will require extensive consideration in any future major policy reforms in the GBR. Finally, I discuss why a rezoning in the GBR in the future will necessarily be different and conclude by summarising the contributions of my research.

8.2 Limitations and shortcomings of the RAP/rezoning

Research and monitoring subsequent to the completion of the RAP/rezoning have identified a number of limitations and shortcomings, especially with regard to the effectiveness of the current zoning and the requirements for any future zoning. Some of these would appear relatively easy to address, whilst others are complex and multifaceted, making them harder to address. Regardless, considering this latest research has raised important questions. For example, Pressey et al. (2017) questioned whether conservation policy and planning, and any resulting management actions, have made a positive difference for biodiversity. Furthermore, the uncertainty as to whether those management actions actually made a difference over and above the counterfactual (Ferraro, 2009; Maron et al., 2013) of no action or a different action. What difference has increased zoning protection made to biodiversity relative to what might be expected without that protection? Pressey et al. (2017) cautioned '...instead of doing what is necessary for conservation, we do what seems politically pragmatic and professionally rewarding ... or even what seems possible and reasonable, but at the risk of compromising our supposed goal of making a positive difference...' (p. 342). This assessment makes sense in an ideal world but is a dilemma that is not easily addressed under real and pragmatic or politically driven conditions.

A more pragmatic perspective is that of Kelleher and Kenchington (1991), who considered '...it is better to create and manage successfully an MPA which may not be ideal in ecological terms but which nevertheless achieves the purpose for which it is established than it is to labour futilely and vainly to create the theoretically "ideal" MPA... (p. 14). The community and political expectations regarding conservation in the GBR meant that the RAP/rezoning was closer to Kelleher and Kenchington's perspective. Nevertheless, that should not preclude GBRMPA from addressing the concerns raised by Pressey et al. (2017).

In the case of the GBR, there are various reasons why it will be difficult to determine how much biodiversity loss has been avoided or recovery promoted because of zoning, or what would be the state of the GBR if the multitude of management actions had not been applied (Day, 2017b). Firstly, zoning is only one of many management actions that has occurred at varying scales over the years since the GBRMP was declared. Secondly, there are numerous compounding factors (e.g., water quality, climate change, illegal fishing, disease, Crown-of thorns starfish, underwater noise) that impact the GBR irrespective of the zoning. Thirdly, the extent to which the GBR was already a 'disturbed baseline' when the MPA was initially declared and then rezoned will be hard to quantify. Lastly, there has been a paucity of effective monitoring to assess the impact of the GBRMP's zoning (both the initial zoning and the 2003 rezoning) which might otherwise help to evaluate the effectiveness of the outcome. This lack of effective monitoring is a fundamental shortcoming of the policy reform and, as outlined in the following section, should be addressed to better quantify what was achieved by the RAP/rezoning and prioritise what needs to be done in the future.

8.2.1 Limitations with evidence-based monitoring of the outcomes of the RAP/rezoning

Given that zoning provides a key foundation for management of the GBR, the failure to establish an effective evidence-based monitoring program of the zoning outcomes is a significant gap in the ongoing management of the GBR. The Australian Institute of Marine Science conducts a Long-Term Monitoring Program (LTMP) in the GBR, but this was established to assess the status, trends, and

conditions of coral reefs and their associated species[54] as an indicator of the overall health of the GBR system, rather than to evaluate policy interventions. A subset of the LTMP has been reconfigured to monitor the impact of the 2004 rezoning (Emslie et al., 2015; Sweatman et al., 2018), but that monitoring is largely confined to a relatively small number of reefs within the lower half of the GBRMP, south of Cairns. Where possible, the zoning that was in place prior to the implementation of the 2003 Zoning Plan has become part of the monitoring so the program is able to draw long-term datasets (2004–present and 1983–present). There is an acknowledged absence of pre-2004 data from offshore reefs and non-reef bioregions, but some before-after-control-impact (BACI) analyses of the effects of the RAP/rezoning have been undertaken in inshore areas.

Significant research showing the benefits of comparing no-take zones with fished zones was outlined in Chapter 3 (section 3.8.2). Additional research continues to demonstrate the importance of no-take zones; for example, lower levels of coral disease (Lamb et al., 2015), fewer and less severe Crown-of-thorns starfish outbreaks (Mellin et al., 2016) and benefits for non-target species (Ayling & Choat, 2008; Sweatman et al., 2015). However, significant research gaps remain, particularly assessing the ecological and social impacts across the spectrum of all zone types. Two examples of research showing interesting results for zones other than no-take zones are for 'no-go' zones (i.e., Preservation [pink] zones; Ayling and Choat, 2008) and limited fishing zones (i.e., Conservation Park [yellow] zones; Boaden and Kingsford, 2015).

Fraser et al. (2019) examined 48 studies reporting 782 measures of impact in the GBR based on comparisons of biological indicators in no-take zones with fished areas. They noted that monitoring ecological measures does not necessarily reflect the impact of policy measures, stating, '...there is a strong case for resourcing proficient monitoring programs that rigorously evaluate impact, not only status. Without improved evaluations, we risk spending limited monitoring budgets on data that have no power in drawing causal inferences to tell us if our interventions have worked...' (p. 11). The strongest evidence of positive impacts determined by Fraser et al. (2019) was from the oldest no-take zones (i.e., from the original GBR zoning prior to the RAP/rezoning) where 41% of the impacts were positive. This accords with the research by Edgar et al. (2009, 2014) who demonstrated ecological changes continue to develop in MPAs over two decades or longer. Fraser et al. (2019) also stated:

> ...The [2004] highly protective zonings might be effective in avoiding loss of biodiversity, but it is difficult to determine their precise impact without undertaking rigorous impact evaluations that consider a range of assumptions, identify suitable counterfactual sites, and effectively control for observable and unobservable confounding factors ... (p. 9).

While the studies examined by Fraser el al. (2019) were based on understanding the ecological context of the no-take zones and the chosen indicators, most failed to appropriately consider multiple aspects of the context (i.e., the social, economic, and political contexts), which directly affected the ability of those studies to attribute causation. Few of the studies considered the causal relationships between an intervention and an outcome, or the confounding factors that could mask or imitate the effects of an intervention. In Ferraro's (2009) view, clarifying causal relationships through counterfactual thinking is critical in environmental policy. To assist in addressing this need, Fraser et al. (2019) developed a diagram depicting the causal pathway of the RAP/rezoning (i.e., showing the assumptions about the RAP/rezoning, the inputs, outputs, immediate outcomes, final outcomes, and the impacts).

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[54] Coral reefs are unquestionably an important part of the GBR but they only comprise around 10% of the area of the entire GBRMP. Furthermore, while the LTMP is a long term (>30 years) monitoring program, it has focussed on a limited number of midshelf and offshore reefs.

Fraser et al. (2019) identified a number of shortcomings with the current monitoring approach in the GBR:

- A bias towards sampling only certain areas; the majority of impacts were recorded from just seven locations in the GBR, where repeated sampling had been undertaken. This severely limits the inferences that can be drawn from such monitoring.
- '...results from across regions have been combined to report impact as one homogenous Reef-wide value ... obscuring the heterogeneity of reef systems and biological responses...' (p. 11).
- Failure to construct credible counterfactuals across most studies and the limited application of key principles of impact evaluation when designing the research.
- A missed opportunity to use the RAP/rezoning as a natural experiment to reliably measure the impact of zoning, applying BACI methods to produce rigorous conclusions across the width and length of the GBR.

Pressey et al. (2017) acknowledged there are methods available to estimate conservation impact retrospectively (Ferraro & Hanauer, 2014) and predictively (Fulton et al., 2015; Visconti et al., 2015). Furthermore, in light of the inherent dilemmas in the evaluation process, Pressey et al. (2017) advised:

> ... for those who want to use them ...the methods vary in expense and rigour (Margoluis et al., 2009), and the most rigorous might be reserved for a representative sample of conservation actions and socio-economic contexts to support decisions more broadly. Retrospective assessments yield lessons but, ultimately, predicting impact is essential if we are to make more difference in the future... **one choice for decision-makers is therefore: stay with measures that can be estimated accurately but might bear no relationship to impact, or deal with the uncertainty inherent in making a difference** [emphasis added] ... (p. 342).

A more effective evaluation program to determine the effectiveness of the rezoning over time should have been an integral part of the design and/or implementation phases of the overall RAP/rezoning policy reform. Such monitoring has been advocated previously (e.g., Mapstone et al., 1999), along with a call to enable manipulative field experiments in different zones within zoning plans. These experiments are essential and the controversy over a proposal to conduct the *Effects of line fishing* experiment[55] in the GBR demonstrated why zoning plans must legally have that capability (Mapstone et al. 1996; Marsh & Kenchington, 2004). Given that the long-term outcomes in the GBR depend on social-ecological feedbacks and interactions, future monitoring should also examine the outcomes for people and the environment simultaneously. This requires the development of linked monitoring and the evaluation of social-ecological systems (discussed further in section 8.4.2).

8.2.2 Limitations with the bioregionalization used in the RAP/rezoning

The GBR bioregions provided a key underpinning of the RAP/rezoning (Chapter 3). However, in the years following the finalization of the bioregionalization in 2003, substantial relevant research has

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[55] The *Effects of Line Fishing* experiment was a controversial program that required Australia's Federal parliament to approve changes in the zoning status of certain GBR reefs to enable a large-scale experiment. This manipulative field experiment involved opening and closing certain reefs to fishing in a controlled way to allow scientists to measure the effects of different fishing regimes on target fish populations and reef communities; the experiment was opposed by many conservation groups (Marsh & Kenchington, 2004).

been undertaken in the GBR (e.g., Beaman, 2009; Beaman et al., 2008; Bridge et al., 2011a, 2011b, 2012; McNeil et al., 2016; Pitcher et al., 2007; Webster et al., 2008). Whilst GBRMPA used the best available information to develop the bioregions, Devillers et al. (2015) considered this information was '...generally not sufficient to understand heterogeneity of biodiversity within bioregions...' (p. 495). Since 2003, new features have been identified and the ranges of some habitats and species expanded. For example, the *Seabed Biodiversity* project (Pitcher et al., 2007) mapped the non-reef biodiversity in a far greater detail (see Figure 3.10). Similarly, Bridge et al. (2011b, 2012) and Harris et al. (2013; see Figure 3.11) have greatly increased knowledge about the extent of mesophotic reefs. The spatial extent and heterogeneity of recent coral bleaching which has led to changes in coral cover and speciation is also an important consideration for any future GBR planning.

If a future rezoning of the GBR is contemplated, an up-to-date and potentially more spatially explicit bioregionalization should be developed and the findings of Bridge et al. (2016) considered (outlined in section 3.8.1). Bridge et al. (2016) showed that a broader bioregional subdivision would have made minimal difference to the overall zoning outcome due to the subsequent planning methods used in the RAP/rezoning.

8.2.3 Limitations with the planning principles used in the RAP/rezoning

In the RAP/rezoning, the biophysical operational principles and the social, economic, cultural and management feasibility operational principles (Chapter 3) played important roles in the zoning outcome. For example, the principle of protecting a minimum of 20% per bioregion within each of the 70 bioregions was achieved, but that was undertaken in a way that minimised the impact on users, especially fishers. This corresponds with Devillers et al. (2015) who acknowledged that costs resulting from marine conservation planning should be minimized by reducing the extent to which MPAs impinge on extractive activities. Devillers et al. (2015) questioned, however, whether '...minimizing opportunity costs to trawling led to residual protection of physical and biological variation within bioregions...' (p. 495), suggesting that '...perverse outcomes of minimizing opportunity costs are possible... (p. 499).

Devillers et al. (2015) concluded the approach of using uniform requirements for representation '...should not be emulated...' (p. 495) and suggested a refinement of the planning objectives might improve protection. Devillers et al. (2015) therefore proposed:

> ... the 20% representation objective for all bioregions in no-take zones, although testing political will at the time, could now be improved. More sophisticated, variable objectives for individual ecosystems and species are needed to reflect factors such as spatial turnover of species within ecosystems, genetic heterogeneity within species, and exposure of features to threatening processes... (p. 498).

In their evaluation of the RAP/rezoning, Fernandes et al. (2005, p. 1740) demonstrated that more specific objectives for individual habitats (e.g., seagrass, *Halimeda* beds) and species (e.g., turtle nesting sites, dugong) were already applied, and largely achieved. Nevertheless, given the increased knowledge about these habitats and species in recent decades, these objectives should be reviewed and updated. Any future rezoning in the GBR therefore needs to develop revised and improved operational planning principles. Section 8.9 explains the 2008 amendments to *the Act* means these principles must now be approved by the Minister before planning in the GBR can commence.

8.3 Revisiting the research questions and the lessons learned

8.3.1 The role of science and scientists in the policy reform process

Chapter 3 outlined how the best available science provided an important underpinning for the policy reform and influenced the policy outcome. The key lessons regarding the role of science and scientists for environmental policy reforms in the future include consideration of the following:

- Scientists have a role to '…help change the political reality…' (Wilhere et al., 2012, p. 944). This includes the need for scientists to work more effectively with policy makers and advisers, so both groups understand their differences and concerns (Table 3.1).

- Planning should be undertaken using the best available ecological and social knowledge with the expectation to adapt when new information becomes available. Any improvement in scientific understanding, however, will not necessarily equate to a more defensible policy outcome.

- The bioregions and the operating principles were both fundamental building blocks for the GBR policy reform, and both will need to be updated. However, the social sciences are equally important when it comes to balanced environmental decision making. This was reinforced by Bennett et al. (2017) who maintained '…the conservation social sciences are not an optional complement, but rather a vital component …' (p. 104); the issue is further addressed in section 8.4.2.

- Policy can be built on the basis of scientific knowledge that is neither proven nor certain at the time of the policy development, provided that knowledge reflects a consensus of expert scientific opinion. For example, the belief in the RAP/rezoning that appropriately sited no-take zones would provide 'spill-over' benefits for fishing in adjacent fished areas was not proven until after the zoning had been in place for several years (Harrison et al., 2012; Wen et al., 2013).

In terms of research and policy gaps, a number of the deficiencies raised in this chapter are fundamental for improving planning and management (e.g., the need for effective monitoring, increased consideration in planning and management of climate change and other major disturbances – see section 8.4.1). Another important research gap is an improved understanding of Traditional Ecological Knowledge (TEK)[56], and then effectively combining TEK with 'the best available western science' (Berkes et al., 2000; Charnley et al., 2017; Drew, 2005; Weiss et al., 2013) in an integrative knowledge approach (Weiss et al, 2013). This is one of the key challenges today for contemporary natural resource management, especially in areas where there is an increasing need to recognize and enable traditional use in conjunction with other forms of sustainable use.

The more that is learnt about marine ecosystems, the more questions are raised about the complexity of such systems and how they function. For example, ecological connectivity is increasingly being recognised as important in the design of effective MPAs (e.g., Balbar & Metaxas, 2019). A greater understanding of ecological function is emerging as one of the new challenges for coral reef researchers (e.g., Bellwood et al., 2019; Harborne et al., 2017). What that means for future planning efforts is one of many important questions for today's (and tomorrow's) scientists. This functioning includes the linkages between social and ecological systems. More effective integration between scientists and policy makers is another important policy gap that needs to be addressed.

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[56] TEK is defined as '…a cumulative body of knowledge, practice and belief evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment…' (Berkes et al., 2000, p. 1252).

8.3.2 The role of leadership in the policy reform process

Chapter 4 addressed various aspects of leadership in the RAP/rezoning including the complementary 'lattice of leadership', the relationships built between those leaders, the significance of political leadership and the reality that leadership occurred at many levels during the RAP/rezoning. The key lessons regarding the role of leadership for environmental policy reforms in the future include consideration of the following:

- Political leadership will always be essential for the success of conservation efforts, especially given the importance of the political process for policy approval. This is reinforced by Ross and Dovers (2008) who maintained '... strong leadership and a supportive political and administrative culture are needed to establish and maintain direction and whole of government collaboration...' (p. 256).

- Given the many competing interests associated with different stakeholders and interest groups, trying to please everyone equally is rarely the answer to achieving a realistic outcome in environmental policy development. Leaders therefore need to make, and implement, hard decisions even if that means disproportionately affecting certain stakeholders or interest groups.

In terms of a research gap, there is a need for further research into the role of leadership for developing effective environmental policies. Considering the complexities with most environmental policies, a focus on the advantages and disadvantages of shared leadership, and the relevance of a lattice of leadership, will make an important contribution to such research.

8.3.3 The role of public engagement in the policy reform process

Chapter 5 outlines the comprehensive program of public participation that played a significant role in securing political support for the policy reform. This remains important despite '...the trend in recent years of reduced civil society roles in higher level policy formulation. Participation is relevant and needed across scales of governance...' (Dovers, 2008, p. 220). Dovers (2008) went on to stress that effective participation needs to be a long-term strategy for governments, rather than being used solely to address short-term difficulties.

The key lessons regarding the role of public engagement for environmental policy reforms in the future include consideration of the following:

- Expect that conflict is likely, especially when planning processes will involve reconfiguring resource use and access, or where it will involve a number of competing stakeholders or interest groups. 'Conflict also highlights that there are commonly trade-offs among different people in MPA design and management, and that win–win situations are rare and difficult to negotiate ...' (Ban et al., 2019, p. 528).
- It is critical not to ignore those who may be affected but who choose to remain silent; the wider community attitudes are as important politically as hearing from 'the noisy minority'.
- Public engagement should not be seen as a short-term task that is easily undertaken. The more that GBR users understand how and when they can engage, what is negotiable and what is not, the range of perspectives, and the reasons for any proposed changes to management, the more likely the outcome will be a success.
- A policy needs to continue in the community after it is finalised or becomes law. Effective implementation is critical, and that is likely to necessitate ongoing public education and community involvement to maintain support for the outcome.

In terms of research gaps, proposals for more deliberative processes for public engagement need to be investigated. In terms of policy gaps, further work is required to improve the effectiveness of future engagement between GBRMPA, Traditional Owners and other Indigenous groups (Chapter 5). Improvements in social impact assessment (SIA) and socio-economic analyses are also required, as well as an understanding of their linkages to public engagement. The RAP/rezoning was cited by Voyer et al. (2012) as an example where the SIA was not effectively addressed by the three independent socio-economic impact analyses, especially as those analyses failed to effectively correlate with the extent of public engagement. Voyer et al. (2012) observed that public participation has become a substitute rather than one tool within SIA:

> .... the aim is to attempt to minimise the social impacts ... but this is being done without any rigorous multidisciplinary attempt to accurately determine what those impacts might be or who might be most likely to feel them... public participation is a means of informing and guiding SIA and separating these two processes reduces the efficiency and efficacy of both... (p. 436).

8.3.4 The role of politics in the policy reform process

The political context of the GBR was introduced in Chapter 1 and explained more fully in Chapter 6. This stressed the importance of political involvement throughout any policy process. The key lessons regarding the role of politics for environmental policy reforms in the future should include consideration of the following:

- It is essential to have a clear and strong legal and political mandate for the agency overseeing the process. Where multiple agencies are involved, a clear understanding of who has jurisdiction over which areas, and having clearly delineated responsibilities, are also fundamental.

- It is also essential that politics be regarded as an integral part of any policy development or planning from the very start of the program, not waiting until the planning and/or public engagement have already commenced.

- Better integration of politics into the planning process needs to be mindful of timing and any 'political windows', as well as the need for the policy process to be of sufficiently broad appeal to enable the policy to survive any political changes.

- Those involved in policy reforms need to weigh up the options that a relatively small intervention will usually be more socially or politically acceptable and have some positive effect, than a big intervention which may 'feel good' but not be politically palatable and therefore achieve little or nothing. Conversely, even though political success is not certain, it is worth trying to do something worthwhile because the outcome might be successful. Certainly, nothing meaningful is likely to be accomplished if one does not take some political risks ("Nothing ventured, nothing gained").

In terms of a policy gap, there is a need for improvements in interactions between scientists, managers, and political decision makers as explained in section 3.2.2. To be effective, these interactions must be ongoing to build the relationships and rapport rather than waiting until a policy challenge is proposed or underway. Ongoing interactions, however, are not easy given the number of ongoing policy issues across these sectors. Another predicament is the apparent lack of political will amongst many of today's politicians given the importance of this as explained in section 6.6.1.

8.3.5 General lessons about the policy reform process

The phases of the RAP/rezoning (Table 1.3 and Figure 1.5) can be related to the eight steps identified by Kotter (1995) for transformational policy change. Kotter's steps were developed primarily for business/company managers considering transformation within their company or industry, but they provide a useful checklist for any transformative efforts.

1. Establishing a sense of urgency
2. Forming a powerful guiding coalition
3. Creating a vision
4. Communicating the vision
5. Empowering others to act on the vision
6. Planning for and creating short-term wins
7. Consolidating improvements and producing still more change
8. Institutionalising new approaches

Kotter (1995) also recommended:

> ...The most general lesson to be learned from the more successful cases [of transformative policy change] is that the change process goes through a series of phases that, in total, usually require a considerable length of time. Skipping steps creates only the illusion of speed and never produces a satisfying result. A second very general lesson is that critical mistakes in any of the phases can have a devastating impact, slowing momentum and negating hard-won gains... (p. 59-60).

Other general lessons from the RAP/rezoning included:

- Prioritised planning objectives and a stepwise timeframe should be publicly available at the start of any planning process. Since complex planning processes rarely happen as initially envisaged, foreshadowing flexibility with timing to deal with unforeseen circumstances is essential.
- A proactive and adaptive approach to management actions is important as opposed to waiting until the impacts are obvious. This may be difficult when opponents insist on 'evidence-based' reactive management before they will accept, or are willing to act (e.g., awaiting definite evidence of degradation) ... by which time it may be too late.
- There needs to be recognition that the context surrounding an MPA is critical. Even the best managed MPA in the world depends heavily on what happens around it. Often the lack of effective management outside an MPA can lead to the most pressing problems inside an MPA.
- While the cause of an impact might be known or suspected, rarely is it solely a single issue causing that impact; more often, it is the complexity of multiple and sometimes additive cumulative impacts that need to be managed.

While some aspects of the RAP/rezoning are now dated, many aspects remain useful. As such, a lot of relevant information remains on the GBRMPA website, although it is not easy to find on the main webpages[57].

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[57] Search for 'Representative Areas Program' or 'Overview of the RAP' – https://www.gbrmpa.gov.au/our-work/our-programs-and-projects/rap

8.4 Questions and challenges for GBR policy reforms in the future

8.4.1 Climate change

Climate change was an emerging threat for the GBR during the preparation of the 2003 Zoning Plan, although it was not a major determinant throughout the zoning process. Supporting documentation during the RAP/rezoning referred to the revised zoning as providing '... resilience against human and natural catastrophes' (GBRMPA, 2002). However, other than the replication of zones, minimal explicit consideration was given to enhancing ecological or social resilience through the placement of zones as advocated by Carr et al. (2017), or the consideration of likely impacts. Three years after the zoning was implemented, a comprehensive *Vulnerability Assessment* for the GBR (Johnson and Marshall, 2007) identified the GBR ecosystem as highly vulnerable to climate change impacts, with far-reaching implications for species, habitats, processes, and humans. The first GBR *Outlook Report* (GBRMPA, 2009) identified climate change as one of four priority issues reducing the resilience of the GBR in 2009. Five years later, the 2014 *Outlook Report* explicitly stated '....climate change remains the most serious threat to the GBR ... with far-reaching consequences in the decades to come...' (GBRMPA, 2014, p. *v*). Two consecutive severe mass-bleaching events in 2016 and 2017 resulted in back-to-back bleaching impacts on shallow-water corals along two-thirds of the length of the GBR (Hughes & Kerry, 2017; Hughes et al., 2017). The 2019 Outlook Report highlighted that climate change remains the single most pervasive and persistent influencing factor, with four climate change-related threats (sea temperature increase, ocean acidification, altered weather patterns and sea level rise) posing very high risks (GBRMPA, 2019b; Mongin et al. 2016). A further mass bleaching event in 2019/2020 – the third in just five years, was the most severe and widespread ever recorded (Hughes & Pratchett, 2020). Some scientists believe that unless major changes are achieved to reduce global warming, that any gains made for more effective marine conservation will soon be overtaken by climate change. GBRMPA's 2019 *Position Statement* reinforces the concern:

> ...of particular concern are projections that the Reef could be affected by bleaching events twice per decade by about 2035 and annually by about 2044 if greenhouse gas emissions continue to increase at the current rate. If bleaching becomes more frequent and more intense, there will not be enough time for reefs to recover and persist as coral-dominated systems in their current form... (GBRPMA, 2019b, p. 3)

Other scientists take a more optimistic view. Research by Mellin et al. (2016) demonstrated that no-take zones can increase the resilience of coral reef communities to a range of natural disturbances, including coral bleaching, coral diseases, outbreaks of Crown-of-thorns starfish outbreaks and storms, and this has been reinforced by Duffy et al. (2016) and Roberts et al. (2017). Mellin et al. (2016) used a 20-year time series from the GBR to demonstrate that inside no-take zones:

1) The reef community composition was 21–38% more stable.
2) The magnitude of disturbance impacts was 30% lower.
3) Subsequent recovery was 20% faster that in adjacent unprotected habitats.

If effectively enforced, no-take zones have the potential to increase the resilience of marine communities to future climate impacts. In the GBR, climate change impacts are continuing to occur, with February 2020 bringing the highest monthly sea surface temperatures since records began in 1900. More intense storms, tropical cyclones, and flood events are predicted to continue to impact the GBR in the near future, so any future policy changes including a rezoning, must ensure climate change is a strategic consideration. Addressing these issues, however, will pose significant governance and

management challenges in the future (Bellwood et al., 2019; Graham et al., 2003; Morrison et al., 2020).

Policy makers face complexities when there is a wide range of opinions, perspectives, and convictions such as occurs around climate change. Oreskes (2004) noted experts in different fields weigh evidence differently (see also Sarewitz, 2004) and this may be '... based on their education and training, personal affiliations and loyalties, or their philosophies of science... these preferences and prejudices affect how scientists weigh evidence, with a tendency to give greater weight to evidence that is near to hand, with 'nearness' being experienced physically, socially, and epistemologically...' (p. 375). Hall (1993) observed this as a problem with economic policy reforms, noting such complexities have wider ramifications:

> ... it is often impossible for the advocates of different paradigms to agree on a common body of data against which a technical judgment in favour of one paradigm over another might be made... Faced with conflicting opinions from the experts, politicians will have to decide whom to regard as authoritative, especially on matters of technical complexity, and the policy community will engage in a contest for authority over the issues at hand... (Hall, 1993, p. 280).

8.4.2 Linked social-ecological systems

There is increasing recognition of the human dimensions of natural resource management issues (e.g., Ban et al., 2013; Charles & Wilson, 2009; Christie et al., 2017; Evans et al. 2014; Gray et al., 2017) and of social and ecological sustainability and resilience as being inter-related (e.g., Charnley et al. 2017; Cumming et al. 2015; Gurney et al., 2019: Westley et al., 2013). This highlights the importance of considering linked social-ecological systems and applying social science when undertaking decision-making for natural resource management. While the RAP/rezoning considered the social, economic, and cultural aspects (Chapter 3), improvements in understanding and more effective ways to engage need to be considered with any future rezoning.

Since 2011, the Social and Economic Long-Term Monitoring Program (SELTMP, https://research.csiro.au/seltmp/) has collated a wide range of useful information on the human dimensions of the GBR. Over 4,000 local residents, other Australians, commercial fishers, marine-based tourism operators and tourists were surveyed in 2017 to augment the 8,300 people surveyed in 2013 (Marshall et al., 2019). Data about resource dependency, use, well-being, values, aspirations, stewardship, capacity, satisfaction, understanding, perceptions of management, networks and economic viability will all prove useful in any future planning processes in the GBR. Planners and policy makers should be mindful of the problems of *shifting ecological baselines* (Pauly, 1995)[58], but equally there is a need to be mindful of *shifting social and moral baselines*. This reinforces the importance of systematic social monitoring such as SELTMP.

Evans et al. (2014) outline how complexity and scale affect the classical interpretation of eight design principles. They conclude, '... the size of the resource system ... the increased number of actor groups and types of use rights seem to be principal drivers that constrain the applicability of design principles, albeit not all of them in equal manner. For example, both collective choice arrangements and minimum recognition of rights to organize are limited given that participation by all or most of

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[58] 'Shifting baselines' is a term coined by marine biologist Daniel Pauly (1995) and refers to the situation when each generation resets their ecological baseline to what they have seen or know. That usually overlooks the ecological conditions seen by previous generations, leading over time to a loss of knowledge about the real changes that are occurring with ecological systems, because people do not perceive the extent of changes that are actually taking place.

resource users in large scale SES is impractical...'(p. 421). Evans et al. (2014) therefore posed the question whether other mechanisms, such as higher-level representation or broad trust in science and law, fully compensate for these design principles at larger scales or at least mitigate against governance failures.

8.4.3 Emerging deliberative processes for public engagement

Methods of public engagement are continually changing and improving (e.g., online comment forms, interactive planning tools, online informational videos, and the widespread use of social media). Any future planning programs or major policy reforms in the GBR will need to consider emerging methods of public engagement (Bäckstrand, 2003). Various authors (e.g., Lee & Kwak, 2012; Nabatchi & Amsler, 2014; Sayce et al., 2013; Wang & Bryer, 2013) discuss more innovative ways to engage such as social media, targeted outreach, online comment forms, online mapping tools, and live webcasts of public meetings, noting these newer methods have both advantages and disadvantages.

A recent report for the OECD (Chwalisz, 2020) recommends moving towards 'representative deliberative processes', as a more effective way for citizen participation in public decision making. This equates to Level 4 in the Petts and Leach (2000) framework (Table 5.1), and usually involves '...randomly selected citizens, making up a microcosm of a community, [who] spend significant time learning and collaborating through facilitated deliberation to develop informed collective recommendations for public authorities...' (Chwalisz, 2020, p. 3). In contrast to the more traditional ways of 'participatory democracy' (i.e., involving large numbers of people, including all those likely to be affected by a decision), a more targeted 'deliberative democracy' involves one or more relatively small, representative groups of people, who become well-informed about a topic and consider different perspectives to arrive at public collective recommendations for policy makers. Citizens' Juries/Citizens' Panels are the most widely used model of representative deliberative process (Chwalisz, 2020) and similar processes include Citizens' Assembly, Consensus Conference, Citizens' Council, or Citizens' Dialogue.

Chwalisz (2020) suggested various reasons for this recommended approach. It gives citizens an effective role in public decision making, maintaining that people are more likely to trust a decision made by 'ordinary people' than one made solely by government. Other reasons include (adapted from Chwalisz, 2020):

- The promotion of better policy outcomes because deliberation results in considered public judgements rather than public opinions.
- Making governance more inclusive by involving a more diverse group of people and those who might otherwise be underrepresented. Categories such as youth, the disadvantaged, women, the elderly, or other minorities who typically are excluded, may therefore be brought into the public policy process and decision making.
- Strengthening integrity and preventing corruption by ensuring that groups and individuals with money and power do not have undue influence on public decisions.

When deciding whether this approach might be suitable for major policy making in the GBR in the future, several considerations are important. Such representative and deliberative processes cannot be used in isolation. They need to be a central part of a wider strategy of citizen participation around a specific policy issue, and '...participants should have access to a wide range of accurate, relevant and accessible evidence and expertise...' (Chwalisz, 2020). Consequently, a number of the other methods of engagement outlined in Chapter 5 will still be required to inform the representative group(s) and

ensure they are aware of the wider community views when making their recommendations (e.g., through online calls for proposals/ submissions). Deliberative processes are not meant to occur too frequently so citizens may get a chance perhaps once or twice in their lives to be involved in crafting policies that shape and affect their future. Also, deliberative processes are not a panacea and there are some decisions for which the process would not be suitable (e.g., for urgent decisions, problems in the late stages of decision making, where possible solutions are limited, or for resolving binary questions (Chwalisz, 2020)).

8.4.4 Indigenous land and sea management

As discussed in Chapter 5, future planning and policy processes in the GBR must ensure Indigenous interests and knowledge are meaningfully considered, especially with the Traditional Owners of the area (Rist et al., 2019; Smyth & Isherwood, 2016). As outlined by Drew (2005) and Weiss et al. (2013), there is a rich body of knowledge about the environment derived from the experience and traditions of Aboriginal and Torres Strait Islanders that has been passed down over thousands of years. Traditional Ecological Knowledge (TEK, see section 8.3.1) includes an enormous amount of many types of knowledge that 'western science' researchers can draw upon to bolster their own research, but also conduct their research in a more equitable and culturally sensitive fashion. TEK differs from 'western science' in that '... it also encompasses social and legal dimensions, and there is an emphasis on a web of social relationships not only among humans, but also between humans and other species, the land, and spirits/ancestors...' (Weiss et al, 2013, p. 286). TEK has the potential to augment existing natural resource management programs and help define new ones (Drew, 2005). However, Weiss et al. (2013) highlight several important notes of caution regarding the utilization of TEK in resource management; namely (a), '...aligning Western and indigenous values for co-management was an ongoing challenge fraught with misunderstandings and a lack of communication...' (p. 293), and (b) recognizing that '... there is not a ''universal'' solution to many natural resource management issues, without proper consideration of the geographic, sociocultural, or political scales at which the use of [TEK] is relevant or appropriate ...' (p. 289).

The application of TUMRAs and ILUAs in the GBR continue to support Indigenous people's aspirations to regain and strengthen their involvement in the management of their sea country, providing opportunities for '... the continuation of an ancient and inherent cultural right, but also a propitious employment niche in 21st century Australia...' (Smyth & Isherwood, 2016, p. 322). It will be interesting to see if precedents, such as the Blue Mud Bay High Court decision, means there are any implications for areas within or adjoining the GBR (this High Court decision in 2008 resulted in the Yolngu Traditional Owners in the Northern Territory being granted Indigenous fishing rights over the tidal lands/waters between high and low water marks, with the consequence that commercial fishing licences previously issued by the Territory government to fish in these tidal waters were invalid (Korff, 2020)). Any future policy changes in the GBR must ensure Indigenous interests are meaningfully and assiduously considered in accordance with the guiding principles in the *Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park* (GBRMPA, 2019c, p. 21).

8.5 Brief summary of some RAP/rezoning outcomes

In Chapter 1, Table 1.2 provided brief answers to questions about the RAP/rezoning process. Table 8.1 provides similar brief answers about the *outcomes* of the policy process.

Table 8.1 Questions and answers about the outcomes of the RAP/rezoning

Question	Brief answer
How long did the RAP take?	The RAP/rezoning task took over 5 years to complete. What was initially envisaged as a focussed planning program with a small team over 2-3 years evolved into comprehensive policy reform that subsequently involved most GBRMPA staff (see **Appendix A5**). Planning commenced in 1999, and the final plan was tabled in the Federal Parliament in December 2003, after which the Minister determined the plan would formally come into effect (i.e., commence as law) on 1st July 2004. The period between parliamentary approval and coming into effect was to enable the new zoning materials to be prepared and widely communicated (see Chapter 5, section 5.8).
How much change occurred between the draft and the final zoning plans?	Many modifications were made to the draft zoning plan as a result of the detailed information provided in submissions and other information received. Figure 5.10 shows the extent of changes between the draft plan (GBRMPA, 2003) and final Zoning Plan (GBRMPA, 2004). In some locations, particularly inshore coastal areas, fewer options were available to modify the proposed no-take zones, while still achieving the recommended minimum levels of protection for each bioregion.
How many written public submissions were received during the RAP program?	The 31,650 written public submissions received (10,150 in the first phase of public participation; 21,500 in the second phase commenting on the draft zoning plan) were unprecedented for any previous planning programs in the GBR and significant for any MPA program in Australia. At the time, RAP was the most comprehensive process of community involvement and participatory planning for any environmental issue in Australia.
What were the main success factors for the successful outcome of RAP/rezoning?	The primary success factors were: • Using best available scientific knowledge – *Chapter 3* • Effective leadership (both within agency & politically) – *Chapter 4* • A high level of public participation - *Chapter 5* • Political support and political will – *Chapter 6* Other factors that contributed to the success of the RAP/rezoning included innovation (Chapter 7, section 7.6), commitment, passion, and trust (Chapter 4, section 4.12).
How much did the RAP/rezoning cost?	In 2010, I prepared a 'best-guesstimate' of the cost of RAP with the Director of Financial Services at GBRMPA for a publication; '…the total cost to GBRMPA to develop a new zoning plan for the entire GBR (including staff salaries, time and operating costs) was in the order of between AUD$12–$15 million spread over the 5-year period. … accurately costing the rezoning is virtually impossible given the complexity of the task, the variety of staff within GBRMPA and other agencies who became involved, and an indeterminate amount of in-kind input from other agencies during planning and implementation...' (Osmond et al., 2010, p. 51). The total planning costs, while significant, can be justified in terms of an investment in the future resilience and ecological sustainability of the GBR. The size of the area being managed, and its complexity warrant significant planning costs for a World Heritage property that generates over A$6 billion every year for the national economy (Deloitte Access Economics, 2013).
Does the above cost include the Structural Adjustment Program (SAP)?	The above cost does not include the Structural Adjustment Package (SAP) that was subsequently introduced by the Federal government to assist fishers, fishery related businesses, employees and communities thought to be adversely affected by the rezoning. The costs of the SAP have been widely debated, and Macintosh et al. (2010) estimate it was roughly AUD$250 million. More detail about the SAP is in Chapter 6.

(Table continued on next page)

Question	Brief answer
What was the percentage of no-take areas before and after the rezoning?	When the new zoning plan became law in July 2004, the extent of no-take zones increased from 4.6% of the GBRMP to 33.3% (or 114,530 km^2 – see Figure 1.4). More importantly, the new network protected representative examples of all 70 bioregions (Figure 3.2). In terms of additional biodiversity protection, there were numerous benefits beyond the new no-take zones, e.g., the doubling of the Habitat Protection Zone was a major increase in the protection of benthic habitats.
What benefits have accrued as a result of RAP?	Research and monitoring in the GBR continue to show the benefits of the amended zoning network (e.g., Emslie et al., 2015; Harrison et al., 2012; McCook et al., 2010; Russ et al., 2008; Sweatman, 2008; Williamson et al., 2016). There were numerous benefits beyond the new no-take zoning network, e.g., the protection of benthic habitats and spill-over to adjacent fished areas. The resulting zoning plan maximized the protection of biodiversity while minimizing the impacts on all other users, including fishers.
Were the benefits worth the costs?	The RAP was highly contentious and there was an initial reticence to undertake such a controversial and untested approach, but the outcome is now widely acknowledged as 'best-practice'. Accepting the planning costs were ~AUD$12 million over the 5-year period, achieving increased protection for the entire GBR cost approx. AUD$35 per km^2. If the SAP is included as part of the implementation costs of the rezoning (and assuming it was AUD$250 million), the cost increases to AUD$761 per km^2. These costs may seem high; however, they can be readily justified when compared to the A$6 *billion* per year generated by the GBR (Deloitte Access Economics, 2013).

8.6 Additional implications of the policy reform

In addition to the limitations and the shortcomings outlined above, there were other implications that arose following the RAP/rezoning. For example, one interviewee recognised the significance of a successful outcome for GBRMPA:

> …**clearly this was a defining moment for GBRMPA**. …**this could have gone wrong and may well have spelt the end of GBRMPA frankly as we knew it** [emphasis added] …because it was struggling to effectively fulfill its role in view of the hostility around... if this had not been achieved, I don't know what would have happened to GBRMPA… (Interviewee S1)

Another interviewee identified the impact on the environmental NGO movement as another implication of the policy reform:

> …**RAP had a significant impact on the conservation movement** [emphasis added]… [it] gave significant heart to many other people about how you could successfully get better management… there were so many good lessons … people who left or were touched by that process went on to provide good advice and good planning in a whole raft of new areas...   (Interviewee R8).

One thought-provoking question is whether the RAP/rezoning process would have been initially approved if there had been prior comprehension of the political complexity of the reform, its overall cost (especially the SAP) and the five years it took to complete. Certainly, at the start of the planning process, there was little appreciation that the reform would turn out to be as complex as ultimately transpired. The planners were focused on their primary objective to increase the protection of

biodiversity throughout the GBR. The public material introducing the RAP released in May 1999[59], indicated an estimated completion by late 2001. The initial reaction from the incoming CEO/Chair when she commenced in January 2000, was that the RAP/rezoning was to be "...largely a desk-top study...", and " ...[without] too much time or resources" (see section 4.7), but fortunately the CEO/Chair subsequently changed her mind. There was always a political expectation that the RAP/rezoning would be done in a way that minimised the adverse impacts on users, but no one had any idea of the full extent of the reform or its final cost and effort. Table 8.1, however, puts the seemingly high costs into context. If the full implications had been known when formal approval was initially being considered, I suspect that the RAP/rezoning would not have been approved to proceed.

While the RAP/rezoning has stood the test of time and is still a major basis for management in the GBR, the lack of adoption elsewhere by the Federal environment department was seen as disappointing by one interviewee:

> … for such a major success to have been in a sense, quietly swept under the carpet in federal circles is a loss ….and it speaks to a desire to chop down 'tall poppies' and a reluctance to learn from others' experience ...   (Interviewee R1)

Following the finalisation of the policy reform, the staff within GBRMPA who had invested so much effort into the final months of the RAP/rezoning had little energy for maintaining the policy momentum. At this same time, Virginia Chadwick was unwell (see section 6.7, Footnote 47) and within three years there was a change in the leadership team at GBRMPA. Externally, however, some sectors felt the impetus of the RAP/rezoning success should not have been lost:

> …I think we should have maintained the momentum a bit more … we had everybody so keyed up and maybe focused and conscious of the Reef and its challenges and issues….I think we maybe have **given the wrong impression to many people that we solved all the issues** [emphasis added] **…** we should have kept going ...   (Interviewee S1)

Table 8.2 lists some additional implications of the RAP/rezoning, summarising what are considered the positive, neutral and negative implications.

Table 8.2 Implications following the RAP/rezoning: positive, negative, and neutral implications

Implications		Comments
Positives	Complementary management (Queensland Marine Parks)	The complementary management approach effectively means all the waters from Highest Astronomical tide level out to the edge of the federal GBRMP in deep oceanic waters have 'mirrored' rules and regulations, irrespective of the jurisdiction. The benefits for users and managers are significant.
	Widespread adoption of the zoning approach including national and international recognition	As outlined in Chapter 1 and 3, there has been widespread adoption, and endorsement, of the marine zoning approach developed in the GBR. This includes national and international adaptation of many aspects and the widespread acknowledgement of the approach (e.g., Ban et al., 2011, 2013; Giakoumi et al., 2012; Gleason et al., 2013; Osmond et al., 2010).

(Table continued on next page)

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[59] '*An overview of the GBRMPA Representative Areas Program*' (GBRMPA, 1999).

Implications		Comments
Neutral	An independent review led to amendments to the GBRMP legislation including a requirement for periodic Outlook Report	The 2006 independent review that resulted from the RAP/rezoning, as outlined in Chapter 7, had both positive and negative implications. Despite the negative aspects outlined below, there were some positives out of the review process. The review importantly determined that GBRMPA had done the best possible job with the RAP/rezoning given the resourcing and time constraints. Another of the review recommendations led to the legislative requirement to prepare a five-yearly Outlook Report. The consequence of that legislative change has been very positive, with a comprehensive and effective 5-yearly report produced by GBRMPA that has helped focus efforts on the real issues and has now set benchmarks elsewhere around the world (e.g., the IUCN World Heritage Outlook report, see IUCN (2017)). There were other positive implications (e.g., prioritised objectives for the GBRMP, better alignment with other Federal legislation).
	A more rigorous approval process required prior to commencing any further GBR zoning.	As mentioned, the 2006 independent review that resulted from the RAP/rezoning, also had negative implications. Section 8.9 explains the additional legislative requirements and the new specific timeframes were not applicable when the RAP/rezoning was undertaken and will necessitate a more rigorous approval process in the future.
Negatives	Loss of GBRMPA's autonomy as an independent statutory authority	The decision-making independence of GBRMPA has become considerably constrained compared to the situation prior to the RAP/rezoning; this is explained more by Morrison (2017). Globally, many national governments are moving towards a more direct and monocentric governance approach despite the benefits of a polycentric approach. Some central government steering is required, but the key role of decentralised agencies is to ensure the mandate, statutory and administrative competence prevail, along with the skills and resources to carry out their functions (Ross & Dovers, 2008)
	Differences with Commonwealth Marine Reserves, esp. those in the Coral Sea	Two Federal agencies having different regulatory rules for adjoining marine waters has complicated public education and enforcement. The zone colours and zone provisions in the Coral Sea CMR today are better aligned to the adjoining GBRMP compared to those that were originally proposed but still differ from those that exist in the GBRMP.

The lack of consistency across governmental agencies within the one department as outlined in the last row of Table 8.2 is exemplified by Australia's national network of Commonwealth Marine Reserves (CMR). In November 2012, the Commonwealth Environment Department declared the Coral Sea Marine Reserve, east of the GBRMP in the adjoining oceanic waters. The initial Coral Sea CMR had zones, and despite the fact some were named similarly to GBRMP zones, they had different regulatory provisions and some different colours. This meant two Federal agencies in the same department had different regulatory rules for adjoining waters which complicated public education and enforcement. Today the zone colours and provisions in the Coral Sea are better aligned (but are still not the same) to those that that exist in the GBRMP.

8.7 Assessing the transferability of this policy reform

The GBRMP '...has inspired comparable large-scale action around the world (e.g., the US west coast, Hawaii, Mediterranean, and Coral Triangle Initiative)... because of its global importance, there is general interest in how the GBRMP performs...' (Emslie et al., 2015). As a subset of GBRMP management, the RAP/rezoning has influenced marine conservation efforts both within Australia and internationally and set world-wide benchmarks in marine conservation. However, when considering the various lessons from the RAP/rezoning, it is important to recognise that what worked as an effective policy process in the GBR may not necessarily work elsewhere:

> ...Lesson-drawing is contingent. One cannot borrow blindly ... for **the success of a programme is affected by the specifics of context as well as generic attributes**...' (p. 4)... a programme that has brought political satisfaction elsewhere does not guarantee that it can be transferred effectively... (Rose, 1991, p. 5)

> ... an **exact replica of a programme whose success elsewhere is no guarantee of successful importation**. At the end of the process what is required is not descriptive detail but knowledge that can be transferred because it is both generic and applicable... (Rose, 1991, p.20).

When considering the lessons from the RAP/rezoning, it is therefore important to consider the specific political, economic, social, cultural, and managerial contexts of the GBR and the different circumstances that existed 16 years ago. Most MPAs around the world have differing management models and objectives, and these need to be considered when determining which of the lessons from the GBR might be transferable to other areas. Marine planners and managers also need to understand there are many tools available for MPA management, and zoning may not always be the best tool for the task.

8.8 What no-take zones can, and cannot, do for marine conservation

The RAP was initially publicized as increasing the protection of biodiversity through a comprehensive and representative network of no-take zones. This position led to a misconception that the new network of no-take zones alone was sufficient to achieve widespread marine conservation. A major problem is that many of the pressures facing the GBR (and other MPAs) originate outside the marine realm and are not directly ameliorated by no-take zones or any other zone type (Brodie & Waterhouse, 2012). Examples of such external confounding factors include water pollution, marine heatwaves, ocean acidification, and unsustainable coastal industries. There are conflicting views about whether no-take zones are able to help 'build resilience' to cope with the range of external pressures including climate change. The 2016-17 and 2020 bleaching events in the northern GBR showed that severe bleaching can impact all zone types. Coral reefs in all zones (including Marine National Park Zones and Preservation Zones), were impacted by the bleaching, so no-take and no-go zones appeared to be no more resilient compared to fished zones. What is yet to be determined is whether the zones with less pressures may recover more readily over time. Recent research has also confirmed that zoning can help build resilience. Mellin et al. (2016) (section 8.4.1), demonstrated that no-take zones in the GBR have increased the resilience of coral communities to natural disturbances, including bleaching. Similarly, Kroon et al. (2020) explained why no-take zones closed to commercial and recreational fishing tend to have fewer starfish than areas where fishing is allowed.

The 2019 Outlook Report for the GBR (GBRMPA, 2019a, p. 250) listed 45 threats to the GBR ecosystem. The main threats – climate change and poor water quality – are unquestionably the most

publicised, but it is the cumulative and synergistic effect of all the 45 threats that collectively is leading to the GBR suffering 'death by a thousand cuts' (Day & Heron, 2019). **Only six out of the 45 listed threats are able to be directly ameliorated by no-take zones, with a further six partly ameliorated by no-take zones**. In terms of the risk to the GBR's values, the Outlook Report shows ten of these 45 threats are considered of *very high risk* to the ecosystem and heritage values; eleven are of *high risk* to the ecosystem; and 15 are *high risk* for the heritage values (GBRMPA, 2019a, p. 250). All but two of these 45 threats are happening now – and most are steadily getting worse in intensity and/or frequency.

8.8.1   Other management tools that complement zoning in the GBR

Given that zoning cannot address the full range of pressures facing biodiversity in MPAs, other 'tools' in addition to zoning are also necessary for effective marine conservation. For this reason, a diverse range of other management tools (spatial, non-spatial and temporal) are applied in the GBR. As shown in Figure 8.1, these other management tools overlie the zoning, and many of these statutory layers may themselves be overlapping.
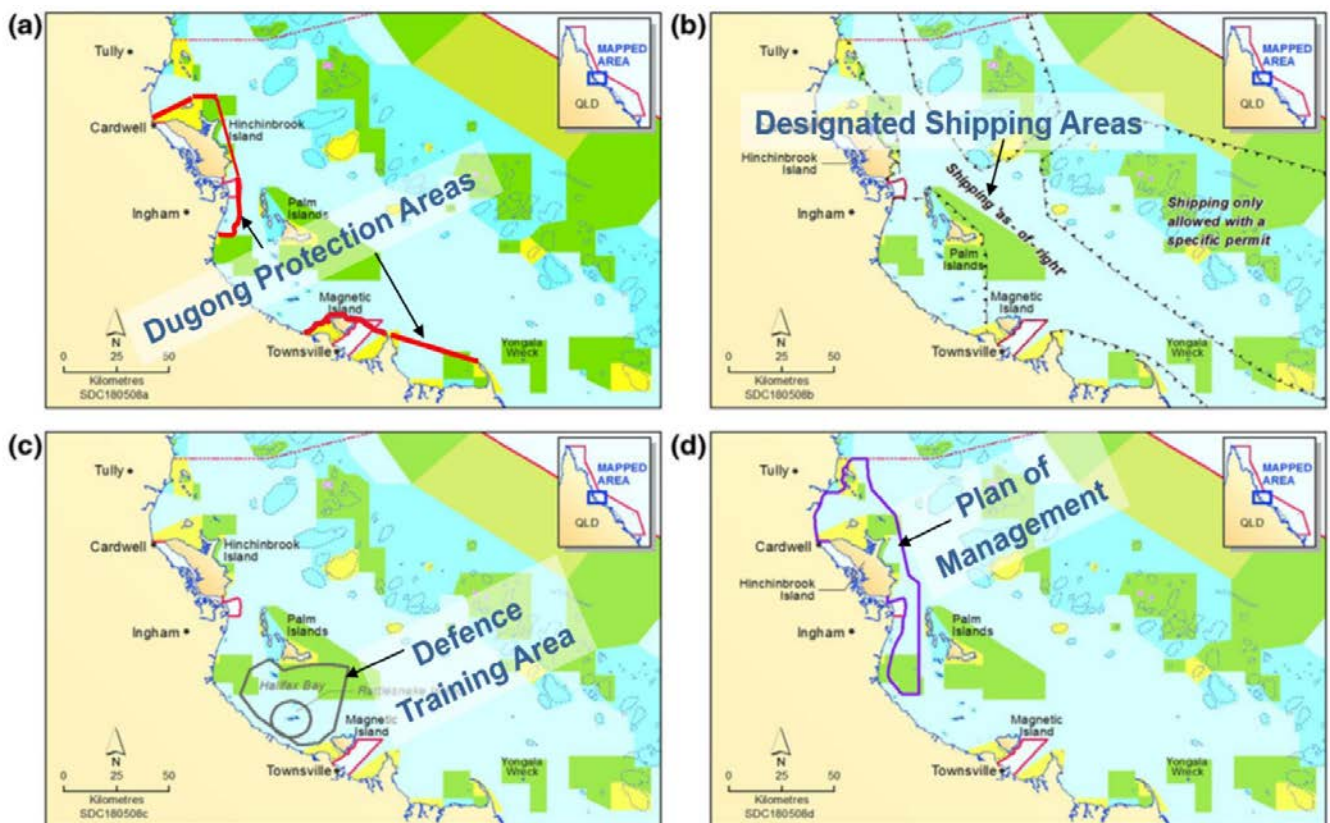
Figure 8.1 Small subset of the GBRMP showing various spatial management layers on top of the zoning (a) Dugong Protection Areas; (b) Designated Shipping Areas; (c) Deference Training Area; and (d) Plan of Management (adapted from Day (2015); maps prepared by GBRMPA)**.**

Some of the management tools shown in Figure 8.1 are part of the statutory Zoning Plan (e.g., Designated Shipping Areas), while other management tools are in other statutory or non-statutory documents (e.g., Plans of Management, site plans, TUMRAs, Defence Training Areas, other fisheries management arrangements). All these management tools or layers may be regarded as components of marine spatial planning (e.g., zoning plans, plans of management, other spatial plans) and are utilized in conjunction with various management approaches (e.g., education, planning, partnerships,

enforcement). Non-spatial management arrangements include permit conditions or position statements; temporal management tools include short-term closures to enable temporary activities such as military training. A number of the management tools utilised in the GBR are the responsibility of other sectoral agencies (Federal and State) who apply their own legislation to develop tools that complement the underlying zoning approach (e.g., fisheries management plans, port plans, shipping plans).

Clearly no single management tool in isolation can effectively and adequately address all the key pressures facing the GBR. Rather than a single management plan for the GBR, what exists is a complex three-dimensional management `system` comprising a variety of layers comprising Federal agency plans, Queensland agency plans and other spatial and temporal arrangements. Many of these plans or arrangements cover different areas or relate only to a specific issue. If all these management plans or arrangements were shown in a single two-dimensional zoning plan, it would be extremely complicated and confusing. Therefore, many of the multiple layers of spatial and temporal management used in the GBR are not shown in the publicly available zoning maps. Consequently, the management complexity is not apparent to most users. For example, while the Designated Shipping Area boundaries are shown on the zoning maps, most other shipping management aspects do not appear in the Zoning Plan (e.g., those areas that require compulsory pilotage). Similarly, commercial fishers need to know all the details pertaining to fisheries management, but the zones are only one of the relevant fishery management tools. To ensure sustainable fisheries in the GBR, additional statutory tools are utilized in combination with the s*patial management tools* (i.e., the zones showing where fishing is allowed and where it is prohibited or limited). These additional tools are not shown on the GBR zoning maps but include *non-spatial management tools* (e.g., fisheries management plans, size limits, in-possession limits, quotas, gear restrictions such as by-catch reduction devices or turtle excluder devices), and *temporal management tools* such as closures to protect fish spawning aggregations.

The full suite of management tools and management approaches have been adaptively improved over the past three decades, and today comprise a comprehensive framework, which is integrated and coordinated across agencies, across sectors and across jurisdictions (Brodie et al., 2019; Day, 2015; Grech et al., 2013; Hughes et al., 2015). It is the combined 'total package' of all these management tools which enables effective management of the complex area that comprises the GBR.

8.9 Why a further major policy reform in the GBR will be different in the future

When another major policy reform in the GBR might be undertaken remains uncertain. Any effective ongoing management of such a complex and dynamic ecosystem requires monitoring, evaluation and adapting the management approach (Day, 2008; Etheredge & Short, 1983; Schultz et al. 2015). A 2018 management initiative from GBRMPA to build a 'resilience network' states that network, '...will not include changes to the (existing) Zoning Plan 2003 — instead, it will function as an interconnected network of reefs complementing the zoning network...' (GBRMPA, 2018, p. 11). However, given the ecological, social, cultural, and political changes occurring in the GBR, it is likely that a future rezoning will someday be contemplated. GBRMPA's Chief Scientist emphasised the role of zoning in the GBR during a symposium in 2018 when he emphasised that improved marine park zoning and management were part of a multi-pronged approach necessary to protect the GBR into the future (Wachenfeld, 2018). Any rezoning of the GBR in the future is likely to be very different to the process of the RAP/rezoning in 1999-2004. The reasons for this are many, including those outlined in Day et al. (2019, Supplementary Material Table T6). These reasons include:

- Different legal requirements. As a result of the 2008 amendments to *the Act,* the requirements prior to commencing, and during, a rezoning program have changed. For example, Section 35A of *the Act* now requires planning principles addressing '... the environmental, economic and social *objectives* of the proposed plan..' to be approved by the Minister before planning can commence. Also, after preparing a zoning plan, the Authority '...must prepare a statement covering the expected environmental, economic and social *effects* of the plan...'. These 2008 amendments effectively codified what was done in the RAP/rezoning and are reasonable given the need to ensure political support.

- Greater consideration of heritage aspects, including World Heritage and Indigenous heritage, needs to be incorporated in any subsequent rezoning. The current legal objectives for zoning in *the Act* include '… protect the world heritage values of the GBR World Heritage Area...' Given that the definitive summary of the 'world heritage values' for the GBR includes specific aspects of Indigenous heritage (UNESCO, n.d.), these will need to be protected in any rezoning. There is also a precedent of using Special Management Areas to provide regulatory protection for key heritage locations.

- There is a need to review the locations and types of existing zones and consider whether any new zone types are needed. For example, Scientific Research Zones may no longer be necessary; a permit can be obtained to undertake approved research in any zone. Furthermore, the need for special provisions around research stations can be handled by other regulatory provisions such as a Special Management Area.

- New scientific reference areas (building on the existing no-go Preservation Zones) should be considered to improve the quality and robustness of baselines for assessing climate change. These are essential for monitoring change in areas unaffected by other direct human uses and are increasingly important as climate change impacts manifest themselves. Where possible these scientific reference areas should be relatively large to minimise edge effects of disturbance. An opportunity exists to establish such areas as reference points for future study during any rezoning process, noting that they need to be buffered from adjacent high use areas.

- The effective acquisition and incorporation of all available use data, in particular fisheries data and Traditional Ecological Knowledge, is critical in the design of, and stakeholder acceptance of any zoning program. Any future zoning will also need to consider the Australian Government's Fisheries Adjustment Policy (Australian Government, 2011). Zoning therefore can provide a responsible overarching framework to consider the need for any adjustment to fishing effort.

Furthermore, technological advances and greater use of digital applications will mean different ways the work is undertaken inside GBRMPA (e.g., improved decision-support systems, use of artificial intelligence, virtual teams), and also different ways to engage the wider public to gain their views and input (e.g., social media, electronic newsletters, online community forums, online comment forms/submissions, webcasts of meetings). Many of the ongoing complexities will mean the GBR in the future will continue to be challenging for the planners, managers and policy makers who will need to adapt to navigate these challenges. Larson and DeChurch (2020) identified a range of challenges given the rapid advances in technology and new approaches to teamwork, leadership and communications.

8.10 The contributions of my research

This thesis provides a comprehensive insight into a system-side example of environmental policy reform. It addresses the totality of the policy process, from its genesis through all stages of its

development that together contributed to the overall policy outcome. The following specific contributions to the theory and practice of environmental policy, marine park planning, and transformative policy reform have resulted from the outcomes of my research:

Contribution 1: The thesis provides a deeper understanding than previously existed of how the RAP/rezoning occurred in the GBR. In doing so, it has drawn upon a wide range of perspectives and highlighted the respective roles of four key interrelated factors: a sound underpinning of science; a lattice of leadership and effective followership; effective public engagement; and the importance of political ability and acumen. The thesis adds previously undocumented aspects to the historical record of the RAP/rezoning and provides clear insights into the connections between research, policy, and practice.

Contribution 2: The thesis is a comprehensive assessment of a real-world environmental policy reform process. It demonstrates the challenges faced in developing environmental policies amidst social, economic, political, and jurisdictional tensions. An analysis of the interrelated key factors that led to the successful policy outcome also demonstrated that the process was a transformative policy reform. The thesis outlines practical advice for effective environmental policy reforms and provides useful guidance for MPA planning programs elsewhere. This includes valuable lessons for others to build upon in marine planning and conservation considering the respective roles of science and scientists, leadership, public engagement, and politics. To my knowledge, few researchers elsewhere have assessed the inter-related aspects of the four key factors that I identified in my research.

Contribution 3: The thesis contributes to the theory and practice of leadership in policy development. It suggests the 'lattice of leadership' as outlined in Chapter 4 is a more realistic overview of the role of leadership in complex policy situations and highlights the importance of effective leadership in environmental agencies.

Contribution 4: The thesis also demonstrates the value of a complementary approach for effective marine management in marine and coastal areas. In most coastal MPAs around the world, the differences between different jurisdictions (e.g., national, state/provincial levels) means legislation, and therefore types of management, stop at imaginary lines on the water which have little if any relationship to ecological functioning. While the GBR experience still needs to more effectively incorporate land-sea linkages (Waterhouse et al., 2016), the inclusive approach for virtually all the marine and coastal waters, irrespective of the jurisdiction, is a fundamental first step towards true ecosystem-based management and more effective marine management (Arkema et al., 2006). The complexity of these arrangements, and the advantages of the complementary approach, have not been previously described in detail as explained in this thesis.

8.11 Further research opportunities

This research has identified some possible areas for further research regarding the RAP/rezoning specifically, participatory planning or transformative policy reform more generally, especially relating to environmental policy. These research questions include:

- The limitations and shortcomings outlined in section 8.2 should be addressed; namely:
  - Limitations with evidence-based monitoring of the outcomes of the RAP/rezoning, and in particular a more holistic assessment of the conservation impact of the RAP/rezoning as recommended by Pressey et al. (2017) and more in accordance with the suite of indicators proposed by Roberts et al. (2018).

- o Limitations with the bioregionalization; and
- o Limitations with the planning principles.

- Building upon a suggestion in Patterson et al. (2017), the governance, institutional and political aspects of effective environmental transformations remain under-researched in the global sustainability literature.

- The significance of effective leadership, and particularly the lattice of leadership approach, should be further examined with regard to all types of policy reform.

- Given the significance of the 'silent majority' in many environmental issues (Stephenson & Lawson, 2013), further research is recommended to explore opportunities to expand from a reliance on public submissions in planning to a wider variety of consensus-building approaches.

- Building upon the interrelationships *between* and *within* the factors identified in section 7.2, both these aspects would be worthy for additional research.

- A comparative assessment of policies or policy challenges between some of Australia's large- scale environmental areas (see section 7.9.2) may help to determine what might be mutual learnings.

- Given the advantages of a complementary approach across differing jurisdictions in coastal areas, examining why more locations have not adopted a similar cross-jurisdictional complementary approach.

- An assessment as to whether effective 'no-go' areas (i.e., fully protected and large enough to minimize other anthropogenic influences) set aside as scientific baselines might be more resilient to climate change over time and therefore able to act as natural source areas.

8.12 Concluding thoughts

Thomas (2007) observed that '...designing policy that actually produces the changes you seek is extremely difficult...' (p. 7). This research has demonstrated the RAP/rezoning, whilst difficult, was both a transformative policy reform and on balance, a resilient success for its time. Today, more than 16 years after the GBR Zoning Plan came into effect, the zoning continues to be one of the cornerstones of management for the GBR (Commonwealth of Australia, 2018). The RAP/rezoning has been widely recognised and despite the technical, environmental, social, economic, cultural, and political complexities, was considered on balance to be a success. Other MPAs continue to look to the GBR as an exemplar, and many aspects of the RAP/rezoning policy reform are able to provide lessons for the future. How the RAP/rezoning occurred in a real-world, system-wide example was therefore important to document, along with the positive and negative results.

Over the period of my PhD candidature, this research evolved. Initially the project began by documenting how the RAP/rezoning occurred, and the lessons learnt. The task then transitioned to an academic assessment of the key factors that led to a significant policy reform, assessing how these components in this real-world policy example related to the literature. Finally, the thesis incorporated both a systematic analysis of a major policy reform, and an historical record of the complexities of developing and implementing an actual environmental policy reform, documenting various perspectives that were critical to the overall outcome that were not widely known.

During my research, one interviewee said, '…I've previously seen parts of the RAP story written up …[but] it's being written up in very academic sense … and it doesn't reflect what I know happened on the ground...' (Interviewee S10). This thesis documents in a substantive way, 'what happened on the ground', drawing upon the experiences of the interviewees and their wide range of perspectives. Notwithstanding this comprehensive real-world policy analysis, it is recommended the insights in this

thesis be revisited in due course to further inform future policy and practice. There is ample scope for further analyses that delve deeper into lessons from a wider range of environmental policy cases, especially regarding the social and political aspects and the impacts of implementation. In the meantime, implementation efforts that are inclusive, pragmatic, adaptive, and multi-disciplinary can bear fruit even where knowledge gaps remain. Future planning and policy efforts that explicitly consider uncertainties and alternative future trajectories are likely to be more resilient than those which are based entirely on past conditions.

While the four key factors discussed in the preceding chapters have been shown to be highly significant, it is also important to acknowledge there were additional factors that led to the success of the RAP/rezoning. Consequently, in addition to the four key factors (namely, a sound underpinning of science, a lattice of leadership and effective followership, effective public engagement, and political ability/acumen and political will), a more inclusive list of the contributing factors would also comprise sound *institutional support, commitment*, *passion*, *trust,* and *luck*. These additional factors were all mentioned in the interviews and are apparent in many of the quotes provided throughout the thesis. In the future, there will be new and different policy challenges in the GBR compared to those in the RAP/rezoning, but this research provides a foundation for any subsequent policy reforms to build upon.

Olsson et al. (2014) concluded, '... transformative change is emergent and **context specific, which makes each transformation unique** [emphasis added] ...' (Art 1). Nevertheless, all the factors mentioned above, and especially the four key factors I identified, are relevant for other major conservation challenges elsewhere today, whether those challenges are in the Australian Murray/Darling Basin, the Californian San Joaquin Valley, the Tasmanian Tarkine wilderness or somewhere else. Similarly, anywhere that a transformative policy reform might be contemplated (such as tackling the future of the GBR under climate change or addressing integrated land-sea solutions), these four interrelated factors will continue to play an important role.

While the context and complexity of other locations or other conservation challenges may differ to the GBR, the four key factors identified in this research remain essential for effectively addressing environmental challenges and any associated policy reforms.

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APPENDIX A1: INTERVIEW QUESTIONNAIRE

A copy of my Interview questionnaire is provided below; the four yellow pages shown at the end of this Appendix were the four tables the interviewees were asked to complete during the interview.

Thank you for agreeing to be interviewed as part of my research study. As outlined in the Information Sheet that I sent you and as explained in the Consent Form that you are about to sign, this research aims to:

• Assess the significant lessons learned over 30+ years of conservation planning and adaptive management in the Great Barrier Reef (GBR); and in particular reflect on the lessons from the RAP and the comprehensive rezoning of the GBR which became law in 2004;

• Guide what needs to be considered in preparing for any future zoning program in the GBR; and

• Provide effective guidance for new/emerging large MPAs around the world.

By signing this consent form, you acknowledge that:

1. taking part in this study is voluntary and you may cease taking part in it at any time without explanation or prejudice and to withdraw any data you might have provided.

2. that any information you do provide will be kept confidential, and.

3. you will not be identifiable in my PhD thesis or any associated research articles without your express permission; however broad identifier 'labels' (e.g., politician XX) may be published – but these will not specifically identify you unless you have provided me with written approval to do otherwise.

[Wait while they sign the Consent Form]

I assume you remember about the RAP/rezoning? ….pls let me start with a brief informal 're-cap' about RAP. Prior to the Representative Areas Program (or RAP), there were concerns that the levels of protection were inadequate to ensure that the Great Barrier Reef remained a healthy, productive, and resilient ecosystem into the future. In the late 1990s, the extent of no-take zones was less than five per cent and these areas were largely confined to coral reefs.

Rezoning the entire Marine Park was a five-year process (1999-2003) with considerable scientific input and innovation. At the time it was also one of the most comprehensive processes of community involvement and participatory planning for any environmental issue in Australia's history.

The result was a zoning network that included green zones covering one-third of the entire GBR which achieved the aim of increasing the protection of plants, animals and habitats across the Great Barrier Reef while also helping to ensure the activities taking place throughout the Great Barrier Reef are done so sustainably. Today, the comprehensive, multiple-use zoning system governs all human activities. It provides high levels of protection for specific areas, whilst allowing a variety of other uses including shipping, dredging, aquaculture, tourism, boating, diving, commercial fishing, and recreational fishing, to continue in other zones.

APPENDIX 1

1. Would you please describe your position (or title?) during the period of the RAP (i.e., 1999-2004)?

   ………
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2. *Pls outline your responsibility in that position…*

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   and briefing explain your role during RAP (i.e., 1999-2004)………………………………………..

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3. What are your main recollections of the RAP/rezoning?

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4. Please refer to Table 1 (below): this aims to determine who were the key players during the RAP and the extent to which they may have had differing roles at different stages of the RAP *(shown by the 3 columns below).*

Firstly, you will be asked to consider in turn each of the players listed [(a) to (l)] and determine the role of each person/position by writing one number (using the legend shown below**) in each column (they played a major role; a minor role, No role etc)

==** *Legend for marking up table*==

| 3 | Major role | | 2 | Medium role | | 1 | Minor role | | 0 | No role |

NOTE:

- If you recognize yourself as one of the players listed, please do **not** use the same numbering but instead indicate which of the three phases you consider you were the **most** involved and in which phase were you **least** involved (write NIL if not involved in a certain phase).
- I hope you may also provide comment for the audio tape after completing this table noting all your comments will be recorded as part of the analyses

TABLE 1

	Prior to official start of RAP (pre -2000)	*During RAP* (2000-2003)	*Approving/finalising RAP* (incl. parliamentary approval in 2003-2004)
a) **The Minister**			
b) **The GBRMPA Chairperson**			
c) **The GBRMPA Senior Executive Officer(s)**			
d) **The GBRMPA Director responsible for the RAP**			
e) **The RAP Planning team**			
f) **The Federal cabinet**			
g) **Local MPs**			
h) **Both Houses of Parliament**			
i) **Key scientists**			
j) **Key players in major GBR industries (pls specify which** ………………….…… …………………….…… …………………….……			

k) Key players in other government agencies			
l) NGOs ……………………………			
m) Indigenous representatives			
n) Other (pls specify…………... ………………………… ……………………………..)			

==(Note: If an interviewee is not sure, they may leave a cell blank)==

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5. Against those players who you have indicated as having a major role (i.e.. score 3) anywhere in Table 1 above, please rank the **top 4** in priority order of importance as the key players during each phase of the RAP - write names in priority order under each phase (You may list several as EQUAL priority)

TABLE 2

	Prior to official start of RAP (pre -2000)	*During RAP* (2000-2003)	*Approving RAP* (incl parliamentary approval in 2003-2004)
Most important in that phase **= Priority 1**			
Priority 2			
Priority 3			
Priority 4			

6. As you are completing the table above, please explain for the audio tape why their role in RAP was critical?….

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7. Pls also put a circle around those players listed above [i.e.. in Table (2)], who you consider had a primary role(s) in the deliberations/negotiations during the development of the final RAP zoning network?

I would now like to discuss your views of leadership and its role in RAP:

8. Considering the four key players that you believe had a major role in RAP (from Table 2 above), please insert their surname (or initials) in line two of Table 3 below and use the same legend (i.e.. 3, 2, 1 or 0) to indicate which of the following leadership traits do you consider they showed during the RAP process? (it is easier to work <u>down</u> the column)

TABLE 3

Leadership traits	Which persons in RAP showed these traits?			
Surname/ initials of key player				
Visioning				
Knowledge-building				
Innovating				
Securing community support				
Securing political support				
Linking actors				
Trust building				
Conflict resolution				
installing the right team				
Securing additional resources				
Delivering results				
Ability to switch thinking between 'big' picture and detail				

9.   Please describe in your own words (for the audio recording), the importance in terms of leadership of the people/positions you have listed above …. or mark by circling those aspects of leadership that were critical at various stages of RAP?

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I would now like to discuss your views as to whether RAP should be viewed as a success or not…

It is now **ten years** after RAP (in effect July 2004); some people view the outcomes of RAP as a success story…while others have a different view.

10.   Please consider your view of success or otherwise of RAP by putting a cross somewhere on the following 4-point scale for each line in Table 4 (ranging from Total Success to Total Failure) – please indicate only one answer per line; you will subsequently be asked to give reasons to explain your answers.

TABLE 4

	4 *Total* *success*	*3* *Partial* *success*	*2* *Partial* *failure*	*1* *Total* *failure*	*Don't* *know*
Ecologically					
• Coral cover					
• Other marine habitats (e.g., seagrass)					
• Fish populations					
• Iconic species (e.g., turtles)					
• Overall ecologically					

Socially					
• Local community					
• Commercial operators (<u>in total</u>, noting they are broken down below)					
• Recreational Users					
• Overall socially					

Economically					
• Tourism operators					
• Commercial Fishers					
• Ports					
• Overall economically					
National pride					
International pride					
Other ………?					

11.   Please briefly explain (for the audio recording), the reasoning behind your answers in Table 4.

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12.   Did your opinion or your perspective of RAP change over the course of the planning period (i.e.. between 1999-2003)? If so, how much?

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13. Has your opinion or your perspective of RAP and its outcomes changed in more recent years? Please explain why?

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14. If RAP were to occur again in the future, what lessons would you think need to be learned?….. and what worked well that you consider should be repeated? ….. or didn't work well?

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Do you have any final comments?………………………………………………………………………………
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Thank you ….and for the tape, pls confirm that you have signed the consent form.

APPENDIX 1

If you have any questions about this study, please contact one of the persons listed below

Principal Investigator:

Jon Day

ARC Centre of Excellence for Coral Reef Studies

James Cook University

Phone: (07) 4781 6058 or (07) 4750 0803

Mobile:

Email**:** jon.day@my.jcu.edu.au

     Or j.day@gbrmpa.gov.au

Primary Supervisor:

Prof Bob Pressey

Program Leader (Conservation Planning)

ARC Centre of Excellence for Coral Reef Studies

James Cook University

Phone: (

Email: bob.pressey@jcu.edu.au

Supervisor:

Dr Nadine Marshall

Senior Social Scientist

Team Leader

CSIRO Ecosystem Sciences

Phone: (

Email: nadine.marshall@csiro.au

Supervisor:

Prof Helene Marsh

Dean of Postgraduate Studies

Graduate Research School

James Cook University

Phone: (

Email: helene.marsh@jcu.edu.au

TABLE 1 – Roles of key players during different stages of RAP

	Prior to official start of RAP (pre -2000)	*During RAP* (2000-2003)	*Implementing RAP* (incl parliamentary approval in 2003-2004)
a) The Minister			
b) The GBRMPA Chairperson			
c) The GBRMPA Senior Executive Officer(s)			
d) The GBRMPA Director responsible for the RAP			
e) The RAP Planning team			
f) The Federal cabinet			
g) Local MPs			
h) Both Houses of Parliament			
i) Key scientists			
j) Key players in major GBR industries *(pls specify which …………………..)*			
k) Key players in other government agencies			
l) Indigenous representatives			
m) Other (pls specify………........)			

Legend for marking up table

3	Major role		2	Medium role		1	Minor role		0	No role

==Your responses will be strictly confidential, and you will not be specifically identified by name in the PhD or any publication without your express permission.==

TABLE 2 – Key players in each phase

	Prior to official start of RAP (pre -2000)	*During RAP* (2000-2003)	*Implementing RAP* (incl parliamentary approval in 2003-2004)
Most important = Priority 1			
Priority 2			
Priority 3			
Priority 4			

Your responses will be strictly confidential, and you will not be specifically identified by name in the PhD or any publication without your express permission.

TABLE 3 - Leadership traits

Insert Surname/ initials of key player here →	Which persons in RAP showed these traits?			
• Visioning				
• Knowledge-building				
• Innovating				
• Securing community support				
• Securing political support				
• Linking actors				
• Trust building				
• Conflict resolution				
• installing the right team				
• Securing additional resources				
• Delivering results				
• Ability to switch thinking between 'big' picture and detail				

Legend for marking up table

3	Major trait	2	Medium trait	1	Minor trait	0	Did not show trait

Your responses will be strictly confidential, and you will not be specifically identified by name in the PhD or any publication without your express permission.

TABLE 4 – Your view of the success of RAP

	4 *Total success*	**3** *Partial success*	**2** *Partial failure*	**1** *Total failure*	*Don't know*
Ecologically					
• Coral cover					
• Other marine habitats (e.g., seagrass)					
• Iconic species (e.g., turtles)					
• Overall, ecologically					
Socially					
• Local community					
• Commercial operators (in total, noting they are broken down below)					
• Recreational Users					
• Overall socially					
Economically					
• Tourism operators					
• Commercial Fishers					
• Overall economically					
National pride					
Other ………?					

To complete this table: Please put a cross somewhere on the 4-point scale for each line above (ranging from Total Success to Total Failure) – please indicate only one answer per line; you will also be asked to give reasons to explain your answers.

Your responses will be strictly confidential, and you will not be specifically identified by name in the PhD or any publication without your express permission.

APPENDIX A2: DETAILED TIMELINE FOR THE RAP/REZONING

Some early discussions and a workshop addressing a representative area approach for the Great Barrier Reef occurred in 1996-97, but the Representative Areas Program (RAP) itself did not commence until mid-1998.

late 1998	Internal commencement of the RAP, including compilation of datasets
30 March 1999	GBR Consultative Committee briefed re RAP.
May 1999	Formal advice to public about RAP program (release of booklet "*An overview of the GBRMPA Rep Areas Program*")
Early – late 1999	Further compilation of biophysical and socio-economic datasets
8-9 Sept 1999	GBR Consultative Committee briefed re RAP
Sept 1999	Reef Experts Workshop
Oct 1999	Non-Reef Experts Workshop
27 Oct 1999	Plenary workshop to finalise bioregions
9 Nov 1999	GBR Consultative Committee briefed re RAP
29 March 2000	GBR Consultative Committee briefed re RAP
May 2000	RAP *Update 1* released
April 2000	Public release of brochure *"Protecting Biodiversity"*
8-9 August 2000	GBR Consultative Committee briefed re RAP
August 2000	Draft map of bioregions produced
Sept 2000	RAP *Update 2* requesting public comment on draft map of bioregions; Formal questionnaire also distributed seeking comment on bioregions
10-11 Aug 2000	Combined CRAC/SEC Meeting
Sept 2000	Further refinement within GBRMPA of map of bioregions.
Sept-Oct 2000	Internal workshops re zoning issues
11 Sept 2000	Scientific Steering Committee Meeting #1
Oct-Dec 2000	300+ people attended workshops about RAP incl peak bodies, recreational fishers, tourism, LMACs etc.
Nov 2000	GBR Board approved use of bioregions as basis for RAP process
5-6 Dec 2000	GBR Consultative Committee briefed re RAP
24 Jan 2001	Scenario Workshop
9 Mar 2001	Scientific Steering Committee Meeting #2
14 - 15 Feb 2001	Stakeholder Technical Workshop
March 2001	RAP *Update 3* – advised about 9 fundamental changes occurring to bioregions on basis of public feedback. New maps of bioregions available on web and in hardcopy
Sept 2001	Board noted BOPs and SEC principles as basis for planning.
Dec 2001	*Update 4* released, incl. advice that CP1 delayed (public not told why , but it was due to declaration of Far Northern Section ZP) ; also, advice that the bioregions had been finalised.
18 March 2002	Scientific Steering Committee Meeting #2
April 2002	FNS ZP formally released.
April 2002	Board decided to issue Notice of Intent to prepare a ZP (NIPZP) for entire MP, other than Gumoo Woojabuddee Section
28 May 2002	GBR Consultative Committee briefed re RAP
7 May 2002	**First formal Consultative Phase (CP1) commenced**
7 August 2002	First formal Consultative Phase closes; 10,150 submissions received
26 Sept 2002	GBR Consultative Committee briefed re RAP
October 2002	*Update 5* released

October 2002	GBR Board noted number of submissions and key issues
Dec 2002	Board approved NIPZP for Gumoo Woojabuddee Section
Feb- March 2003	Final SMF/Exec approval of 20 Issues papers
March 2003	*Update 6* released, broadly summarising issues raised in submissions
4 March 2003	GBR Consultative Committee briefed re RAP
7 May 2003	GBR Board, noting all issues raised in submissions, decided to approve Draft zoning plan (DZP) for release, inviting public comment for 2 June-4 Aug.
2 June 2003	R**elease of DZP = second formal Consultative Phase (CP2)**
4 August 2003	Close of CP2; 21,500 submissions received
Aug – Sept 2003	Analysis of all CP2 submissions, incl digitizing spatial submissions.
Sept 2003	Field consideration/ground truthing of key issues/key locations
Aug – Oct 2003	Discussions with Bureau of Tourism Research and BRS re socio-economic assessment
Oct 2003	Minister briefed re amalgamating 33 sections into one proclamation for entire Marine Park
Nov 2003	Major revisions to Zoning Plan, preparation of legal boundary descriptions, drafting new Regulations
Nov 2003	Finalization of products (new zoning maps) and Regulatory Info package; finalisation of Regulatory Impact Statement Incorp. comments from ORR
12 Nov 2003	Fisheries Minister Macdonald - Media release re. work with fishing industry to consider a structural adjustment package
21 Nov 2003	Queensland Interdepartmental Committee meeting
mid-late Nov 2003	Preparation of 'Joined Govt Socio-economic Assessment'
26 Nov 2003	Great Barrier Reef Marine Park Authority Board approved the Zoning Plan. Board consideration of all submissions received on DZP and approval of final ZP to be submitted to Minister with Regulatory Impact Statement.
29 Nov 2003	LMAC Chairs meeting briefed on revised ZP.
1 Dec 2003	Commonwealth agencies IDC
16 Dec 2003	GBR Consultative Committee briefed re RAP.
3 Dec 2003	The Zoning Plan tabled by the Honourable Dr David Kemp, Minister for Environment and Heritage, in both Houses of Federal Parliament.
January 2004	Government announces policy on *"Marine Protected Areas and Displaced Fishing"*. RAP becomes first implementation of this policy.
24 March 2004	No motion of disallowance was put forward in either house of Federal Parliament, so the Zoning Plan passed through.
12 May 2004	Minister David Kemp announces Government has allocated in the order of $10m for structural adjustment for those affected by RAP. Overall amount is flexible. Package to cover fishing and land-based businesses.
1 July 2004	**GBR 2003 Zoning Plan came into effect.**

APPENDIX A3: SCIENTIFIC EXPERTS AND ADVISORY COMMITTEESS WHO CONTRIBUTED TO THE RAP/REZONING

The following lists provide the names and affiliations of the scientific experts and scientific advisory groups who contributed to the RAP/rezoning.

Reef Experts

Name	Organisation	Expertise
Dr Tony Ayling	Private Consultant; 30 years GBR experience	Corals, Fish and Algae
Dr Terry Done	Australian Institute of Marine Science	Corals
Dr Katharina Fabricius	Australian Institute of Marine Science	Soft Corals
Dr Laurence McCook	Australian Institute of Marine Science	Algae
Mr Lyle Squires	Aquarium business and fisheries consultant in Pacific – previously with QDPI	Fish, Spawning aggregations, Inter-reefal benthic biota
Dr Dave Williams	Australian Institute of Marine Science	Fish

Non-Reef Experts

Name	Organisation	Expertise
Dr Rob Coles	Northern Fisheries Centre, QDPI	Seagrass/Fisheries/habitat
Dr Miles Furnas	Australian Institute of Marine Science	Coastal sediments and nutrients
Dr Chris Jenkins	Ocean Sciences Institute University of Sydney	Sediments/Oceanography
Dr John Hooper	Queensland Museum	Sponges
Dr Patricia Hutchings	Australian Museum	Polychaetes
Mr Warren Lee Long	Northern Fisheries Centre, QDPI	Seagrass/habitat
Dr Roland Pitcher	CSIRO Marine Brisbane	Lobster/Invertebrates
Dr Dave Williams	Australian Institute of Marine Science	Fish

Analytical Working Group (AWG)

Name	Organisation	Expertise
Dr. Adam Lewis (Chair)	GBRMPA	GIS, reserve design, spatial analysis
Dr. Trevor Ward	Sustainable Ocean and Coastal Development Program, University of WA	Reserve design
Dr. Hugh Possingham	Dept of Applied and Molecular Ecology, University of Adelaide	Reserve design
Mr. Andrew Taplin	Environmental Australia	Reserve design
Dr. Glenn De'ath	AIMS & CRC Reef Research Centre	Statistics/modelling
Mr. Francis Pantus	CSIRO, Marine Lab.	Use of data in reserve design
Dr. Ian Ball	Antarctic Division	Developing algorithms for reserve design

Scientific Steering Committee (SSC)

Name	Organisation	Expertise
Dr. Bruce Mapstone (Chair)	CRC Reef Research Centre	Fishing impacts/design issues
Dr. Ian Poiner	CSIRO	Benthos
Dr. Rob Coles	Department of Primary Industries	Seagrasses/epibenthos
Dr. Glenn De'ath	CRC Reef Research Centre	Modelling/statistics
Prof. Helene Marsh	School of Tropical Environment Studies & Geography, James Cook University	Dugong, marine mammals
Dr. Dave Williams	Australian Institute of Marine Science	Reef & pelagic fish
Dr. Terry Done	Australian Institute of Marine Science	Coral reefs
Mr Andrew Page/ Mr Simon Banks	Division of Planning and Research, Queensland Parks and Wildlife Service	Queensland counterpart

Social, Economic & Cultural (SEC) Steering Committee

Name	Organisation	Expertise
Prof. Helene Marsh (Chair)	School of Tropical Environment Studies & Geography, James Cook University	Overlap with Scientific Steering Committee
Mr. Bill Bowtell	N/A	Recreational fishing
Assoc. Prof. Derrin Davis	Graduate Research College, Southern Cross University	Marine resource (ecological) economics
Mr. Bob Grimley	Boating and Fisheries Patrol, Queensland Department of Primary Industries	Day-to-day management
Mr. Alan Hansen	N/A	Commercial fisheries
Dr. Jane Lennon	Commissioner, Australian Heritage Commission	Heritage values
Dr. Gianna Moscardo	Department of Tourism, James Cook University	Tourism and public perceptions/values
Prof. Helen Ross	Centre for Resource and Environmental Studies, Australian National University	Social impact assessment
Mr. Ted Wymarra	Aboriginal Coordinating Council	Indigenous values/use
Ms. Imogen Zethoven	World Wildlife Fund	Conservation values/ non-use values
Mr Andrew Page/ Mr Simon Banks	Division of Planning and Research, Queensland Parks and Wildlife Service	Queensland counterpart

Agencies and organisations who assisted during the RAP/rezoning:

Australian Institute of Marine Science; Australian Land Information Group; Australian Museum, Australian Oceanographic Data Centre; Bureau of Tourism Research, Bureau of Rural Sciences, Cooperative Research Centre for Great Barrier Reef World Heritage Area; CSIRO (Divisions of Marine Research, Oceanography, Wildlife and Ecology); Department of Environment and Heritage (formerly Environment Australia); Environmental Resources Information Network; Geosciences Australia; James Cook University; Museum of Tropical North Queensland; NSW Fisheries; Ocean Sciences Institute (University of Sydney); Productivity Commission, Queensland Fisheries Service (including the Northern Fisheries Centre); Queensland Museum; Queensland Environment Protection Agency; University of Queensland

APPENDIX A4: KEY PLAYERS (e.g., POLITICIANS, SECTORAL LEADERS, LOCAL GOVERNMENT REPRESENTATIVES, LMAC CHAIRS) WHO WERE CLOSELY INVOLVED IN THE RAP/REZONING

The following table shows the names and affiliations of political and sectoral players located along the coast adjacent to the GBRMP who were involved in the RAP/rezoning.

Eight of the names provided below were interviewed as part of my PhD; that comprised four federal politicians, two mayors from Local Government and two LMAC Chairmen.

Location	LMAC Chairs	Federal politicians (electorate)	State politicians (electorate)	Local Govt Area	Local Govt mayors	Sunfish reps	Other (e.g., ENGOs)
Cooktown	Ian McCollum	Warren Entsch (Leichardt)	Stephen Bredhauer (Cook)	Cook Shire	Mayor Bob Sullivan	Vern Veitch (Sunfish North Qld)	Henry Boer (CAFNEC)
Port Douglas	Graham Connett			Douglas Shire	Mayor Mike Berwick		
Cairns	Bob Rossi		Desley Boyle (Cairns) Dr Lesley Clarke (Barron River) Warren Pitts (Mulgrave)	Cairns City Council	Mayor Barry Moyle		
Mission Beach	Peter Heywood	Bob Katter (Kennedy)	Marc Rowell (Hinchinbrook)	Johnston Shire	Mayor James Byrne		
Hinchinbrook	Bill Whiteman			Hinchinbrook Shire	Mayor Keith Phillips		North Queensland Conservation Council
Townsville	Steve McGuire	Peter Lindsay (Herbert) Senator Ian MacDonald	Anita Phillips (Thuringowa)	Thuringowa City	Mayor Les Tyrell		
			Lindy Nelson Carr (Mundingburra)	Townsville City	Mayor Tony Mooney		
			Mike Reynolds (Townsville)				
		De-Anne Kelly (Dawson)	Steve Rogers (Burdekin)	Burdekin Shire	Mayor John Woods		
Bowen	n/a		Jan Jarrett (Whitsunday)	Bowen Shire	Mayor Mike Brunker		
Whitsunday	Tony Fontes			Whitsunday Shire	Mayor Mario Dematini	Noel Whitehead (Sunfish Mackay)	Order of Underwater Coral Heroes (OUCH)

Mackay	Greg Breckell John Formosa		Tim Mulherin *(Mackay)*	Mackay City Council	Mayor Julie Boyd	Noel Whitehead (Sunfish Mackay)	Ian Sutton (Mackay Conservation Group)
			Ted Malone *(Mirani)*	Sarina Shire	Mayor Kevin Morgan		
				Mirani Shire	Mayor Clive Rogers		
		Kirsten Livermore *(Capricornia)*	Hon Vince Lester *(Keppel)*	Broadsound Shire	Mayor Michael McArthur		
				Livingstone Shire	Mayor Bill Ludwig		
Rockhampton	n/a		Jim Pearce *(Fitzroy)*	Rockhampton City Council	Mayor Margaret Strelow	Kim Martin (Capricornia Sunfish)	Capricornia Fisheries Advisory Committee
				Fitzroy Shire	Mayor Don Close		
Gladstone	Dr Michael Walker			Calliope Shire	Mayor George Creed		
		Paul Neville *(Hinkler)*		Miriam Vale Shire	Mayor John Bell	Ray Waghorn (Sunfish Gladstone)	
			Liz Cunningham *(Gladstone)*	Gladstone City Council	Mayor Peter Corones		
Bundaberg	n/a		Hon Junita Cunningham *(Bundaberg)*	Bundaberg City Council	Mayor Key McDuff		
		Warren Truss *(Wide Bay)*	Trevor Strong *(Burnett)*	Burnett Shire	Mayor Ray Duffy		

APPENDIX A5: DIVERSITY OF TASKS WITHIN GBRMPA DURING THE RAP/REZONING

The following list of teams and tasks within GBRMPA was provided in an excerpt from an internal 'thank-you' email sent by Virginia Chadwick to all GBRMPA staff soon after the RAP/rezoning was passed by the Federal Parliament. It is replicated here to show the wide range of groups involved within GBRMPA and the broad range of tasks that were undertaken across the agency to achieve the RAP/rezoning outcome.

'....RAP was the most comprehensive planning exercise ever undertaken by the GBRMPA. Everyone was involved … and for those that were not directly involved, you kept the agency going while others were RAP'ing. However, the following efforts are especially acknowledged for their role in the RAP:

The RAP Task Force; for example:
- o   For their pivotal roles on the Regional Planning Groups
- o   Preparing the RIS and the Explanatory Statement
- o   Their devotion to reading and analysing 21,000 public submissions
- o   All their input into the various other documents (e.g., Zoning Plan, brochures, Updates)
- o   Briefings for the Minister
- o   Answering ministerials and many other RAP letters

The Spatial Data Centre; for example:
- o   The many maps (large and small!)
- o   The GIS overlays which helped us develop the ZP
- o   Post hoc reports
- o   The new highly accurate reef base developed from satellite images
- o   The Schedule 1 (…170 pages of boundary descriptions)

The Fisheries Issues Group; for example:
- o   Working with all QSIA branches, Head Office & EcoFish
- o   Policy advice
- o   Working with QFS and their data to help fine tune zones
- o   Pivotal roles on the regional planning groups

The Communication & Education Group; for example:
- o   All the brochures, the website, Minister's speaking notes
- o   Coordinating the Community Info program
- o   The whole 'Let's Keep It Great' program and the Community Service Announcements
- o   Answering all the public enquiries
- o   Media releases

The Human Dimensions Unit within R&M; for example:
- o   Coordinating the analysis of 21,000 submissions
- o   Developing the RAP Query tool
- o   Coordinating the many contract workers brought in to help

The Legal Services Unit; for example:
- o   Writing the Statutory Plan and getting it through Office of Legal Drafting
- o   Preparing the Regulatory Information package
- o   Policy advice across a range of areas

The Species Conservation Group; for example:
- o Policy advice across research, Indigenous hunting, protected species
- o Pivotal roles on the regional planning groups

The Program Delivery group; for example:
- o Policy advice across a range of areas
- o Key advice on the statutory Plan
- o Pivotal roles on the regional groups
- o Many of the permits staff were involved in submission analyses

The Indigenous Policy and Liaison Unit; for example:
- o Liaison with Indigenous communities along the coast

The Science, Technology, and Information group (in addition to the Spatial Data Group and Human Dimension Unit already mentioned), for example:
- o IT's role in developing the RAP Query tool
- o Info Technology backup
- o Information support across a range of areas

The Tourism and Recreation group; for example:
- o Policy advice across a range of tourism issues
- o Roles on the regional groups

The Parliamentary and Ministerial Liaison Unit; for example:
- o Liaising with the Minister's office
- o Coordinating input from other Commonwealth agencies

The Corporate Services Group; for example:
- o Arranging travel requests
- o Getting the RAP bills paid on time.
- o The Secretariat organised many MPA meetings, RACs and other meetings, with RAP the main agenda item

The Water Quality & Coastal Development group; for example:
- o Some of the group were involved in submission analyses
- o Policy advice across a range of issues

Day-to-Day Management Group; for example:
- o Coordinating policy advice to do with shipping.

The rest of the Executive; for example:
- o Coordinating hundreds of meetings
- o Finalising Ministerial replies and briefings as well as other letters about RAP.

There are undoubtedly many things I have forgotten … the point is that EVERYONE had a role in this, and without all your efforts the RAP could not have been achieved.

My thanks
Virginia...'

APPENDIX A6: COMPILED COMMENTS FROM THE INTERVIEWS ABOUT THE HON. VIRGINIA CHADWICK (CEO/CHAIR OF GBRMPA DURING THE RAP/REZONING)

Leadership traits & personal qualities	Excerpts from the PhD interviews referring specifically to the CEO/Chair's abilities and capabilities (Interviewee code in brackets)
politically astute	'…the fact that the Chair was an ex-politician and really understood the political process, was central to the success of RAP…' (T2) '…Virginia had .. unbelievable parliamentary connections …as well as her consummate skills in diplomacy at all levels including the high political levels. (R6) '…she was politically knowledgeable and understood political processes….' (P1) '…. Her political acumen and an understanding of the political process … and that was so many more times important than technical knowledge... watching the way she operated was ….. a life-changing experience for me, to realise how important (the political) is… and how unimportant in the end …in relativity to the whole thing, is the scientific knowledge..' (T2) '… A remarkable woman, both from a political perspective but also from an environmental management perspective and …. rallying the team, so to speak and supporting …making some hard calls..'. (R7) '…she was a very wily politician and luckily had … so many favours in the cupboard for want of a better word … because for RAP she needed to draw upon every single one of those favours …' (S10) '.. It is very difficult to find that good quality of political leadership which makes Virginia Chadwick stand out to a very unusual occurrence of circumstance..' (P1)
extremely competent	'…she was highly capable in a political, a media and a social forum ….people could see her strength of leadership...' (R2) '... being able to front up at those meetings and .. take your medicine to a certain extent it was an important part of the process and obviously Virginia was front and centre in that process, so she played an important role…' (S4) '…both big picture and detail. … that was one of her strengths. There were times when she needed to read every single word in a particular document because one word out of place would be used by the enemies of the state…' (R2) '… she had strength and courage. .. and she was brave and totally committed …and passionate .. those are the words I would describe Virginia... oh, and stubborn.. frankly, stubborn!' (R7) '… Virginia remains one of the cleverest people I've ever come across. She was extraordinary.... she was clever… and her EQ was as good as her IQ … and she was cunning..' (S10) '… Virginia was able to break down walls … an amazing ability to engage on a personal level with the Queensland bureaucrats … for example, Virginia had Leo Keliher eating out of her hand .. the next minute they were having a red wine and a cigarette in the corner together.. … Virginia manufactured relationships that lasted for a long time …. ' (T1) '… she was a very capable, very intelligent lady… you didn't have to tell her more than once…' (P3)

(Table continued on next page)

Leadership traits & personal qualities	Excerpts from the PhD interviews referring specifically to the CEO/Chair's abilities and capabilities (Interviewee code in brackets)
Understand the community	'…as an ex-politician, she understood the importance of community was part of securing political support..' (A2) '… she went to great lengths to ensure that all the information was out there …and people had access to it'. (P4) '… securing community support …absolutely essential and she was highly capable..' (R2) '…Virginia put herself right out there in front … and she actually won people over … people who came to fight with her, actually ended up having a beer with her … she knew how to engage with the community in such a way …. to genuinely listen and to do something about whatever she could do ….' (T1) '…Securing community support.. was one of the main benefits of having somebody with her political background in the position…' (P1) '….. she understood what politicians needed in terms of a level of community support to get something over the line and there was confidence that she understood which lines could not be crossed…' (R2) '…she was adamant that securing community support was one of the big drivers. That's why we had to get people behind us…' (R4)
decisive/ responsive	'… Virginia grew to have a vision and passion for the Reef. I don't think she started that way… but it certainly grew in her…' (S6) '….she didn't necessarily have a vision, but she knew a good vision. She was very good at building on other people's visions ... and once she owned a vision, she really owned it…' (A2) '... I'm going to give her a '3++' for visioning in the sense of her being able to look forward and see what was needed to be done to get to the next step. … .. and she could really think on her feet!...' (R2) '… she was a master at connecting people and building … the right team … she didn't want know how you did it, just as long as you did it…' (R4) '… if it didn't get past Virginia, it didn't go anywhere ... And of course, once she got hold of it, she was able to convince those above her…' (R10)
an awesome advocate for RAP	'…Virginia was an awesome advocate for RAP - I don't think RAP would have succeeded without Virginia …she was very highly regarded in the government…' (P5) ' ..the (RAP) had a chance of being successful because of the leadership and political skill that Virginia Chadwick had brought to the position of GBRMPA Chair…' (P1) '…her role was crucial during the RAP process itself. And in terms of the approval of parliamentary approval, her role was just so critical…' (P1) '… overwhelmingly the most important person was the Chair of GBRMPA because once she got on board, she was leading from the front. She had the whole organisation behind her in a way that was absolutely remarkable…' (T2) '… RAP would never have happened if it hadn't been for Virginia. There's no way there was anyone else without that political cred could have got it over the line.' (S10) " It was building that trust ….and I guess that starts at the top.. that started very much with Virginia and the executive…' (R7) '…She was very, very strategic and knew where the weaknesses were in rolling it (the RAP) out…' (T1)

(Table continued on next page)

Leadership traits & personal qualities	Excerpts from the PhD interviews referring specifically to the CEO/Chair's abilities and capabilities (Interviewee code in brackets)
an all-round leader	'…Virginia was kind of the pivot for everything…. things that absolutely stand out as her major traits: securing political support; securing community support (she was a master at that); conflict resolution; installing the right team, delivering results …she was outstanding..'. (S6) '..because of her range of skills and interests combined with her past which meant that she knew a lot of people and had a lot of influence in a lot of places to get people together …' (R2) '… Virginia's role as Chair was really about community support, locking in the political actors, trust building and conflict resolution. That was her focus .. and her strength was to … focus on the things that she was really good at, leaving the rest for us who had a lesser ability or experience… this didn't necessarily mean she didn't display those traits in other areas..'. (R8) '..Virginia had …the patience and the wisdom to eventually bring everybody to the table and …. somehow wrestle this thing….you know there's a saying when a committee designs a horse, it turns into a camel …. this was such a complex camel, such a complicated beast, that it's amazing that it survived .. and it is functional …' (S1).

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APPENDIX A7: KEY LESSONS LEARNED ABOUT MARINE ZONING

The table below is adapted from a similar table published in Day et al. (2019, pp.20-28) which drew upon the experience with zoning in the GBR over 40 years. The 38 lessons in the left-hand column are reproduced as they appear in Day et al. (2019) whereas the notes in the middle column have been summarised. Table S5, Supplementary Information in Day et al. (2019) provides specific experience from the GBR against each of these generic lessons.

Legend: Before = before zoning actually commences; During = during the actual zoning process; Implement = after zoning made into law to ensure effective implementation
XX = Lesson highly relevant to this phase; X = lesson of some relevance to this phase; -- = not applicable.
* = lesson may, or may not, be applicable

Generic zoning lessons learned	Notes and clarification [see Day et al., 2019, Table 6) for details]	Before	During	Implement-
1. **Zoning should not be considered the only tool for marine management** - zoning should be used in conjunction with other management tools (spatial and temporal).	Marine zoning can separate and impose conditions on competing and incompatible uses or regulate uses to protect sensitive, ecologically valuable or recovering areas. Zoning needs to be legally robust and not easily circumvented. Do not rely on zoning alone but instead to use zoning as the underlying framework in combination with other consistent spatial and temporal management tools.	XX	XX	XX
2. **Legal framework** - a sound legal framework to back-up any zoning, while not essential, will provide many benefits and enable more effective zoning.	The *Act* provides a sound legal framework for planning and implementing GBR zoning. Many other management layers in the GBR are implemented by regulations and are therefore more easily modified. This approach provides *'the best of both worlds'* (i.e., strong legislative foundation for the underlying zoning, but the additional management layers are more flexible, and more readily amended for adaptive management).	X	XX	XX
3. **Scientific understanding** - a comprehensive scientific understanding of an area to be zoned is not an essential pre-requisite before developing a zoning plan.	Waiting for 'perfect' science before commencing a zoning program is not only unnecessary but can potentially lead to bigger problems; in other words, start using the best available knowledge (see *Lesson 17*), but be prepared to adapt if new information becomes available.	XX	XX	X
4. Some form of **bioregionalization**, however, should be a prerequisite prior to developing a zoning plan.	Utilise basic ecological info (e.g., bathymetry) and apply rudimentary mapping principles (e.g., latitudinal and longitudinal differences) to develop a basic regionalisation representing the broad scale patterns of biodiversity across the MPA. In the GBR, the 70 mapped bioregions have subsequently been shown to increase protection for the full range of biodiversity in the GBR	XX	XX	-
5. **Representative approach** - zoning should aim to protect one or more representative examples of all known habitats within your MPA.	Having developed a broad scale regionalisation, then the application of basic planning principles (e.g., Fernandes et al, 2005) can help develop a systematic and representative draft network which can then be released for public comment.	X	XX	X

Generic zoning lessons learned	Notes and clarification [see Day et al.(2019, Table 6) for details]	Before	During	Implement
6. IUCN advocates protecting **at least 30% of marine waters in highly protected areas**, but not every MPA should aim to protect this percentage from the time of initial designation	A percentage recommendation for marine protection continues to be widely debated (e.g., de Santo, 2013; Agardy et al., 2016). In the GBR, the best scientific advice was the expectation was that around 25-30% of the GBRMP should be in highly protected areas (GBRMPA 2002). Instead of aspiring for an overall total percentage, the initial aim for any MPA should be for a politically acceptable minimum level of protection informed by best science (i.e., a representative approach) and then adaptively manage that over time as more information becomes available.	X	XX	X
7. Spectrum of zones - the aim in any zoning plan should be to ensure a spectrum of zones types.	The emphasis should be on providing a spectrum of zones with differing objectives and identifying activities consistent with those objectives. Experience would suggest any new zoning program should not contemplate too many zone types – rather, use other spatial tools to ensure flexibility in management (see *Lesson 1*). Supplementary Information Table T1 lists 13 zoning programs that have drawn upon the GBR zoning approach; with 4-5 zones being the average number of zones across these 13 zoning plans.	XX	XX	X
8. Role of political engagement - zoning cannot occur in a 'political vacuum'; zoning is primarily a political process that needs to consider the interests of all stakeholders and be in keeping with the political aspirations of the government(s).	It is important to engage key community and political players from the start of any planning process. While some decision-makers would prefer all planning decisions to be consensus-based or achieve a 'win-win' for those concerned, neither are realistic when dealing with issues of such magnitude and complexity. It is therefore essential to obtain political endorsement early in the planning process and to explain to politicians that compromises are likely. Be mindful that stakeholders (e.g., fishers) will also be lobbying politicians, so you need to be able to show how you intend to engage with them (and all other stakeholders and rights-holders) to be able to appropriately consider their concerns. e.g., a 'Leaders Guide' was prepared to help politicians and other key players.	XX	XX	XX
9. Effective zoning includes **high-levels of political buy-in** enhanced by ongoing public participation.	The high levels of political buy-in, building upon the comprehensive public participation, were among the fundamental reasons behind the success of the 2003 GBR zoning (e.g., Fernandes et al., 2005; Day, 2017a).	XX	XX	XX
10. **Public engagement** - all zoning processes should include genuine and effective public engagement which generally precludes a relatively quick or inexpensive zoning process.	The successful development, political adoption and practical implementation of any zoning plan will be determined by the extent to which local communities understand the need, purpose and process of the rezoning and reflects their aspirations and interests. Effective and on-going public engagement are therefore fundamental. Successful engagement is dependent on the willingness of community members to engage on matters that are important to them but also on the commitment of managers to also get it right.	XX	XX	XX

(Table continued on next page)

Generic zoning lessons learned	Notes and clarification [see Day et al.(2019, Table 6) for details]	Before	During	Implement
11. **Adjacent areas** - zoning needs to consider and wherever possible complement, adjacent coastal or marine areas.	Zoning without regard for the adjacent marine and coastal areas is "likely a folly" (Agardy, 2010). Many issues facing MPAs cannot be effectively addressed by managing the marine realm alone and hence are not well managed by marine zoning, e.g., water quality (most issues arise on land); coastal developments like ports (most are outside the jurisdictional control of an MPA); and climate change (management including zoning may help build resilience but climate change is a global issue).	XX	XX	X
12. **Ecological connectivity** is an important concept when determining zoning.	Given the high levels of connectivity within marine systems, all available knowledge about aspects of connectivity should be considered when planning (McCook et al., 2009; Balbar & Metaxas (2019). For example, an effective 'source' reef for fished species is clearly better zoned as a no-take zone given it is likely to replenish other reefs; conversely an identified 'sink' reef may be fished if it appears that it is being replenished from adjacent source areas.	X	XX	XX
13. Zoning decisions should **consider all the values** (ecological, social, cultural, and economic) within, and surrounding, an MPA.	Zoning can provide a key foundation for MPA management, but more effective ecosystem-based management (Arkema et al., 2006) will be achieved if consideration is also given to the wider context, both inside and outside an MPA, and within both the terrestrial and marine realms.	X	XX	XX
14. **Complementary zoning across adjoining jurisdictions** can provide many advantages, by enhancing public understanding as to what is allowed, or not allowed.	Complementary legislation refers to laws that complement or supplement each other, applying matching or 'mirrored' provisions to enhance public understanding. Where there are adjoining jurisdictions (e.g., State, provincial and/or federal), the benefits of a complementary approach are numerous (e.g., increased public understanding; improved management of species which cross over jurisdictional boundaries; enhanced compliance). Complementary management is also essential where governments cannot agree where a boundary occurs.	*	* XX	* XX
15. **Zone by objective, not activity** - zones should *not* be based around individual activities; rather the key determinant should be activities that are compatible with the zone objectives.	In some parts of the world, zoning is based solely around allowing, or prohibiting, specific activities in specific areas. However, in many MPAs, numerous existing or potential marine activities need to be managed. Many of these activities are not antagonistic; if so, those can occur within the same zone. If zoning is used to manage existing activities, then it is preferable that zoning be by objective rather than by each activity. E.g., a 'no-trawling' zone may indicate clearly one activity is prohibited (i.e., trawling is banned), but it is not clear as to what other activities may be allowed or not allowed. To assist public understanding, the allowable activities in each zone should be summarized into a simple activity/zoning matrix.	XX	XX	X

(Table continued on next page)

Generic zoning lessons learned	Notes and clarification [see Day et al.(2019, Table 6) for details]	Before	During	Implement
16. **Traditional and local knowledge** - utilise the special knowledge that many MPA users have, combined with that of professional researchers.	Those who are often on the water (e.g., commercial & recreational fishers, tourist operators) have invaluable knowledge about the local marine environment which can complement the knowledge of managers, researchers and traditional Owners – so draw upon all these types of knowledge and use it to augment the best available scientific data. Additionally, such users are likely to have more ownership of the zoning outcomes if they have opportunities to be involved throughout the process and see evidence that their input has been considered.	X	XX	XX
17. **Decision support tools** - analytical tools may prove helpful but are not an essential requirement to undertake a comprehensive zoning program.	Decision-support systems (DSS) or analytical tools (such as Marxan, MarZone or SeaSketch), are often promoted as a prerequisite for effective marine spatial planning. Many planners hope that a DSS will generate 'the answer' providing a quick and reliable solution to their planning problem. All DSS tools have limitations and cannot compensate for missing or incomplete data or a lack of political feasibility. For these reasons, DSS will seldom, if ever, produce the final pragmatic solution for any planning task (Lewis et al., 2007).	X	XX	-
18. **Placement of zones and zone boundaries** – consideration of where zone boundaries are placed should consider ease of public understanding and consequent compliance[60].	Zone boundaries (as well as MPA boundaries) should be readily available and recognisable on the water. Without this, public understanding and compliance with zoning may be difficult (Davis et al., 2004). Marking zone boundaries uses fixed markers on the land or floating marker buoys, means significant costs to install and maintain such infrastructure. Also issues with interpretation of the boundary (e.g., marker buoys move depending on tidal flows and depth). Traditionally, inshore MPA boundaries were referenced to an obvious natural feature or by using a distance from a feature like the shoreline but may be confounded by varying tide levels. Relying on submerged features (e.g., depth contours, reefs, etc) may be even harder to identify. (*see also Lesson 22 below about coordinate-based boundaries).*	X	XX	X
19. Avoid spatial zoning arrangements with **sudden transitions** between different zones or levels of protection.	In a multiple use zoned MPA, avoid sudden transitions from highly protected areas to zones of relatively less protection; the concept of 'buffering' (i.e., having a gradation of zone types) should be applied wherever possible. This principle theoretically strengthens the ecological integrity of the highly protected areas, including through reduced enforcement and compliance risk.	-	XX	XX
20. Discourage **vertical zoning** in the water column, for both ecological and compliance reasons.	Some MPAs have applied vertical zoning, allocating the water column to a different zone from the seafloor (e.g., allowing pelagic fishing but prohibiting benthic fishing). Given the uncertainty in the way benthic and pelagic systems and species interact, researchers are only just beginning to understand how surface or mid-water fisheries may in fact be ecologically connected to benthic communities below. Furthermore, enforcing vertical zoning is extremely difficult if not legally impossible. The 3D nature of the marine environment can still be recognised by designating a single zone that clearly stipulates what can and cannot occur throughout the water column.	X	XX	XX

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[60] A comprehensive compliance program involves a much wider range of activities than just enforcement; it also includes activities such as targeted education, surveillance, field patrols, intelligence, audit, investigations, formal directions/orders, penalties and sanctions.

Generic zoning lessons learned	Notes and clarification [see Day et al.(2019, Table 6) for details]	Before	During	Implement
21. Zoning around **ambulatory coastal features** (e.g., sand spits or shallow bays) needs to consider their transient nature.	Shorelines may be ambulatory (i.e., erode and/or accrete) so management boundaries may be difficult to understand or enforce if they move or are difficult to define. Any zoning adjacent to ambulatory coastal features needs to consider the transient nature of such features.	* X	* XX	* XX
22. Coordinate-based zone boundaries	In deep water, open-ocean conditions or for large MPAs, the placement of marker buoys for zone or MPA boundaries is extremely difficult, if not impossible, and the cost is prohibitive. For these reasons, MPA managers usually delineate such offshore boundaries using global positioning system (GPS) coordinates. Coordinate-based boundaries are relatively easy to locate and enforce in offshore areas using electronic devices e.g., a GPS device or plotter.	-	X	XX
23. Benefits of zoning - zoning can lead to substantial ecological and economic benefits provided it is appropriately developed and then implemented	*Lessons 4* and *6* discussed ensuring representative examples of all mapped bioregions in no-take zones increased protection for the full range of biodiversity in the GBR. Significant ecological outcomes have occurred (some relatively quickly) following declaration of the Zoning Plan (e.g., Russ et al., 2008). *Lesson 36* also outlines the importance of monitoring these outcomes.	X	XX	XX
24. Zoning has been shown to have **spill-over benefits** for fisheries, even if the protection of biodiversity is the main objective.	The spill-over benefits of the no-take zones in the GBR has now been demonstrated (e.g., Williamson et al., 2004; Harrison et al., 2012). Nevertheless, effective fisheries management also requires other fisheries management tools in addition to zoning (see Table 5).	X	XX	XX
25. Zoning cannot encompass the full life cycle of many **migratory species,** but the benefits of zoning is increasingly recognised.	Research is increasingly recognising the appropriateness of zoning for migratory species (e.g., Schofield et al., 2013; Sibert et al., 2012; Stokes et al., 2014). It is difficult to quantify these benefits, but the fact that some migratory species temporarily have high site fidelity at important stages of their life cycle is an indication that highly protected areas can mitigate risks for some migratory species (Tobin et al., 2014)	X	XX	XX
26. **Climate change** - given its widespread global impacts, climate change should be explicitly considered in any zoning.	Climate change is rapidly emerging amongst the biggest threats facing MPAs, so it needs to be addressed as a key aspect of marine management. Highly protected zones are likely to be more resilient and therefore better able to cope with the impacts of climate change or other pressures in the longer term.	X	XX	XX

(Table continued on next page)

Generic zoning lessons learned	Notes and clarification [see Day et al.(2019, Table 6) for details]	Before	During	Implemen +
27. Highly protected zones are still subject to impacts, including climate, but are likely to remain more ecologically resilient.	The evidence from the back-to-back bleaching in the GBR in 2016-17 showed that reefs in all types of zones bleached, irrespective of the underlying level of protection (Hughes et al., 2017). What remains unclear, is whether the more highly protected areas may be more resilient and able to recover more quickly (or more readily) given their level of ecological coherence. Climate change therefore needs to be explicitly considered in any zoning or rezoning.	X	XX	XX
28. Unique zone identifier – having a unique identifier for every zone has advantages.	Providing every individual zone in the MPA with its own unique identifier enables users to find out more information if required, linking each zone to additional information provide elsewhere (e.g., on zoning maps).	--	XX	XX
29. Zoning information - need to ensure that information about the locations of all zones and what are the appropriate activities for each zone is widely and freely available.	To be effective, all aspects of the zoning (such as zone locations, allowable provisions, prohibited activities, etc) need to be available for all users. A zoning plan is only as good as the stakeholder, community, and wider public support that it enjoys. In the GBR, zoning maps are made freely available in numerous centres and shops along the GBR coast. However, not every aspect of spatial management is shown in the zoning maps. The internet is also an important source of information; the unique zone identifier (see *Lesson 30*) helps to provide specific information for specific locations.	X	XX	XX
30. New and emerging technologies - a zoning plan should consider all known uses but also have provisions to assess new technologies or new activities.	Technology is always changing. The GBR Zoning Plan has a special 'catch-all' permit provision ("*any other purpose consistent with the objective of the zone…*"). This provision provides for new technologies or activities that were not known when the Zoning Plan was approved. If assessed to be consistent with the relevant zone objective, an activity may still be assessed and may be granted a permit. This provides an important 'safety net' enabling previously unknown activities to be considered for a permit.	*	X	XX
31. Permits – Permits (tied to specific zones or locations) allow a level of management not possible by zoning alone.	Having a zoning plan does not necessarily equate to effective management, and many other management tools in the managers 'toolkit' (e.g., permits) can more effectively address the issues impacting marine conservation (see Table S5 in Supplementary Information).	--	XX	XX
32. A permit is not guaranteed: A Zoning Plan may indicate an activity can occur if granted a permit, but that does not automatically mean a permit will or should be granted for that activity.	For example - Activities such as aquaculture or harvest fishing that may or may not have an impact so <u>may</u> be permitted to occur in a Habitat Protection Zone but only after undergoing a comprehensive permit assessment process. The assessment determines whether the specific proposal (such as the aquaculture method or proposed location of the harvest fishing) is compatible with the zone objective and meets all the necessary permit criteria. Once the necessary requirements have been satisfactorily addressed, a permit may be issued with conditions and remain valid for a specified period after which it will expire.	--	XX	XX

(Table continued on next page)

Generic zoning lessons learned	Notes and clarification [see Day et al.(2019, Table 6) for details]	Before	During	Implement
33. Adequate resourcing particularly for compliance activities, is essential to ensure the effectiveness of zoning.	Ongoing and adequate resourcing is an essential requirement to ensure a zoning plan is effective e.g., a well-resourced and ongoing compliance program, including enforcement (see Footnote 56) is essential, as is an effective communication and education campaign to ensure ongoing awareness. Ongoing management is required, not just for the conservation benefits for the ecosystem, but equally the flow-on social and economic benefits for adjacent communities and industries— including all the industries that rely on the MPA for their livelihoods.	X	XX	XX
34. No rotational opening of zones - no-take zones declared for biodiversity protection should not be periodically opened to allow fishing (i.e., no rotational zoning).	Highly protected zones which prohibit all fishing and collecting need to be in place for the long-term given their role to protect all species and habitats, not just fished species. The benefits (both within the zone but also as spill-over to adjacent areas) become greater the longer those areas are left closed to extractive activities (e.g., Russ et al., 2008; Harrison et al., 2012). If an area that has been highly protected is subsequently opened to fishing, it can quickly become targeted and rapidly depleted.	-	XX	XX
35. Comprehensive monitoring and evaluation system - Any zoning should be monitored and periodically reviewed and adapted given that the context and the pressures are likely to change.	Monitoring is a fundamental management tool to document environmental impacts, both natural and anthropogenic, but also to assess the effectiveness of management actions including zoning. Is zoning achieving its objectives (or not) and is an important pre-requisite for adaptive management. Managers should use monitoring to report back to local communities, stakeholders and to the decision-makers. Key monitoring questions include what an adequate level of monitoring is but also who is best suited to undertake such monitoring. There may be a need to compare the zone with a control site); and recognise the issue of 'shifting baselines' if the monitoring is not effectively recorded. It is critically important that the monitoring and the public communication of the results are built into the post-zoning implementation. This is especially important for securing political support for ongoing management and future amendments.	*	X	XX
36. Documenting the reasons behind all the zoning decisions - both thematically and by location.	A report outlining the basis for zoning decisions (both thematically and by location) is invaluable to explain to different stakeholder groups why a particular area/reef was zoned the way it was. Such a compilation (e.g., GBRMPA, 2005) is helpful during implementation but will also undoubtedly be useful in any subsequent zoning review.	*	* X	XX
37. Reviewing existing zoning - comprehensive zoning should be periodically reviewed, updated and/or adapted given the likely numerous changes occurring in and around the MPA.	Zoning is certainly an important management tool for effective ecosystem-based management. However, to remain effective, zoning must be periodically reviewed, especially considering the enormous changes occurring in most MPAs, including rapidly changing patterns of use, technological changes, social-economic changes, political changes, and most importantly, recognising marine ecosystems are dynamic natural systems, subject to a myriad of environmental (including climatic) changes.	*	* XX	* XX

Generic zoning lessons learned	Notes and clarification [see Day et al.(2019, Table 6) for details]	Before	During	Implemen t
38. Setting a **specific or set timeframe** within which a Zoning Plan should legally be reviewed is unnecessary; rather, be willing to review and adapt zoning when circumstances have changed.	Any successful management regime must be adaptable and be able to incorporate new information as it becomes available or as circumstances change. Irrespective of whether a change in marine management results from new data, 'in-the-field' experience, or as a result of external circumstances, all management arrangements must be periodically reviewed and updated. Some legislation stipulates a set timeframe when a review of marine management is required; in contrast, *the Act* determines a minimum timeframe for which zoning must remain in force; this is intended to give certainty to users.	--	X	XX

APPENDIX A8: KEY LESSONS LEARNED ABOUT PUBLIC ENGAGEMENT

The table below is adapted from a table published in Day (2017a, pp.4-8) which drew upon the lessons about public engagement learnt in the RAP/rezoning. The 25 key lessons in the left-hand column are reproduced as they appear in Day (2017) whereas the explanation in the right-hand column has been amended. Where (**x) is shown, the 'x' refers to the relevant method for engagement in Day (2017a, **Supplementary Table T2)**, where more information about this method is available.

A.   Lessons to be considered at the *commencement* of a planning program

Key lessons learnt	Explanation (using the RAP/rezoning or other GBRMPA planning as the example)
1. Ensure all stakeholders know the reason(s) why the planning process is happening; why they should be involved and how they can get involved.	Some stakeholders had *'a problem understanding there was a problem'* ... they could not understand why a new zoning plan was needed. Stakeholders needed to be informed that the GBR was 'under pressure' (see Lessons 4 and 5) and the level of biodiversity protection was insufficient; only then were many willing to accept RAP as part of the solution.
2. Assume everyone does not have the same knowledge/ information base; keep the messages simple (as far as possible)	Information sharing should be multi-directional. Technical Information sheets (**14) were made available. Needed to remind stakeholders to focus on the problem (protecting biodiversity) rather than what the consequences might mean (e.g., reduced fishing areas?). See also Bush et al. 2001; McKinley 1998.
3. Ensure anyone who is affected or interested understands the planning process, when they should get involved and any constraints on the process	A clear timeframe and planning framework need to be established at the start of the process; however, some flexibility is needed to deal with unforeseen circumstances (see Lesson 20) which may lead to an expanded timetable. Also need to be honest about which planning aspects stakeholders will be able to influence e.g., what is open for input and what is not (e.g., some legal aspects were not-negotiable). Maguire et al. (2012) maintain there are times during the process when all stakeholders should be involved and other times when only targeted representatives should be involved. See also Bryson et al. (2012), Nabatchi & Amsler (2014).
4. Ensure your stakeholders understand the key issues and the key terms that will be used during planning (may need non-technical language and/or graphics to explain complex issues).	Many stakeholders initially had little understanding, or were misinformed, about the key issues/pressures. Many had not heard of 'biodiversity' or did not understand its importance for the GBR's future. Needed to communicate in layman's terms to the majority of stakeholders but also in technical terms to the experts, so communication messages were appropriately tailored for different stakeholder groups (see *'Crossing the Blue Highway'* (**16); Gilliland and Laffoley, 2008; Weik & Walter, 2009).
5. Clarify the clear objective of the planning (e.g., *it is not about managing fishing but it's about protecting biodiversity*) – and don't promise what you may not be able to deliver!	Many outspoken critics maintained that increasing no-take zones would not benefit fisheries and would have adverse impacts on the distribution of fishing effort. They needed to be continually reminded that RAP was not about fisheries management but was about protecting the full range of biodiversity. GBRMPA, however, still believed the rezoning would have positive benefits for fish stocks despite the fact this was not the prime objective (this turned out to be true). See also Gilliland & Laffoley (2008) and Pomeroy & Douvere (2008).

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Key lessons learnt	Explanation (using the RAP/rezoning or other GBRMPA planning as the example)
6. The media can be a great/influential ally – or a fierce and critical opponent. A trained media spokesperson in your team who knows the topic and how to present well is an advantage	Work closely with all forms of media so they get to know you and how you work. Expect that some media will be critical or opposed to what you are doing – and be prepared to counter those views with clear and concise messages. Having specialised skills in media can be a real advantage; Sayce et al. (2013) suggest hiring professional public engagement specialists if that expertise is unavailable in-house. For RAP, a senior Director coordinated public participation aspects throughout the planning process e.g., directing the key campaigns (**8).
7. Most planning processes require political approval at some stage. Start early; don't wait until the end of the planning process to get political buy-in. Note also the timelines favoured by politicians are often incompatible with comprehensive planning processes.	The level to which political masters are aware of the issues, the implications of your recommendations and the full range of public views, will help them make the best possible decisions; a 'Leader's Guide' (**11) therefore helped politicians and other key players. Contacting these people prior to CP1 was important, and whenever possible, senior GBRMPA officers undertook personal briefings. These ensured politicians had the correct information, had materials to give to their constituents, and had a GBRMPA contact if required. Remember politicians are usually more interested in what the wider community thinks than just those who send submissions. They are also interested in which of their constituents you have engaged, so keep a running list of all meetings/ engagement events and the numbers present.

A.   Lessons applying *throughout* a planning program

8. Public engagement (both formal and informal) needs to happen throughout the entire planning program, not just during the formal/statutory times	Engaging throughout the planning program invariably means better outcomes. Take on locally informed perspectives from as wide a viewpoint as practicable; in RAP this was achieved by ongoing interaction with the 12 Local Marine Advisory Committees (**12) along the GBR coast, all of whom provided excellent opportunities for information exchange to and from the planners. Periodic *Update* brochures (**15) kept the public informed of progress outside the formal engagement periods.
9. Be prepared to refute contrary claims and misinformation – address it as soon as is possible, as leaving such claims exacerbates the problem.	A fact sheet titled '*Correcting the Misinformation*' (**22) proved useful to publicly refute wrong or misleading claims. Misinformation can arise in many ways, whether it is due to a misunderstanding or deliberate mischievous behaviour – but leaving it unaddressed in the community exacerbates the problem. The running list of all meetings was useful when constituents claimed there was no opportunity to get involved – it showed the opportunities they ignored! See Lewandowsky et al. 2012; Ecker et al. 2014
10. As far as possible, avoid public meetings; recognise the 'noisy minority' usually does not represent the silent majority (see also 11 below).	Previous planning programs showed that public meetings were often not conducive to an effective exchange of all differing views. The 'noisy minority' rarely equates to all those with an interest in the future of your MPA. One place to avoid such meetings is any venue where alcohol may be available. GBRMPA was required to attend some public meeting when they were arranged by others; however, we learnt how to turn those to our advantage by providing the fact sheet '*Correcting the Misinformation*' and ensuring sufficient staff were present to answer questions one-on one before, during and after the meeting.

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Key lessons learnt	Explanation (using the RAP/rezoning or other GBRMPA planning as the example)
11. Don't ignore those stakeholders who choose to remain silent; consider ways to understand and collate their views.	The silent majority can often be 'drowned-out' by the vocal minority who are highly motivated to voice their concerns. The Community Information Sessions (**23) ensured that all interested parties had an opportunity to be heard and ask questions. Many MPA supporters (the 'silent majority') do not voice their views or write a submission and may not be motivated to act if they believe everything is okay. There is a need to monitor the wider community attitudes and awareness, especially to inform the decision-makers/politicians. See also Stephenson & Lawson (2013).
12. Recognise you may be dealing with issues that may impact someone's livelihood; this is a critical requirement – a good understanding of relevant industries is reassuring for those who think their livelihoods might be affected	Many stakeholders felt RAP would have adverse implications for their financial and operating future, leading to some discussions being very emotive and personal. Whenever issues affecting a stakeholder's livelihood are discussed, it is critical that a young/naïve/inexperienced officer does not represent the agency. GBRMPA used officers who really knew the issues e.g., an ex-fisheries manager understood the concerns of all types of fishers and knew how to talk with them; an ex-tourism employee knew what was important for tourist operators; etc. A minimum of two officers attended all meetings even if only with a small audience (mainly for corroboration/back-up during any discussions but also from a workplace safety perspective).
13. Reiterate to all stakeholders that, in terms of the submissions, it is <u>not</u> a numbers game	During RAP, stakeholders needed to be reminded that 1-2 well-argued submissions were more convincing than 10-20 proforma submissions that said exactly the same thing; it was not a numbers game but more about the quality of any arguments submitted. The analysis must ensure the substance of submissions is considered rather than the number of times a comment is made; each submission must be considered on its merits. However, groups were encouraged to submit joint submissions (while clarifying how many people that one submission represented); many groups complied and submitted well-argued joint submissions.
14. Expect there will be conflicts sometime during your planning process.	There is no simple way of creating a conflict-free consultative mechanism for large complex MPAs. While many decision-makers would like to have consensus-based decision-making, *"consensus is not an achievable goal for stakeholder processes dealing with issues of this magnitude"* (Helms 2002 in Day et al. 2004:258). There were many conflicting views about RAP and its outcomes, so no single solution would totally satisfy all users and stakeholders.
15. Recognise that scientific knowledge is, in many areas 'provisional, uncertain and incomplete' (Backstrand 2003)	A lack of scientific certainty is not a valid reason to not proceed; use the best available science. During the RAP, the Scientific Steering Committee's advice was that none of their recommendations (i.e., the biophysical operational principles, see **4) were for 'ideal' or 'desired' amounts of protection. They were the best possible estimates based on the available literature, expert knowledge, and their knowledge of the GBR system at that time; however, they acknowledged their recommendations might need reviewing when new information becomes available. See also Bradshaw & Borchers, 2000; Oreskes, 2004; Fleming & Jones, 2012.

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Key lessons learnt	Explanation (using the RAP/rezoning or other GBRMPA planning as the example)
16. Utilise traditional/ local knowledge, formal scientific knowledge, and expert knowledge	It was important to recognise and utilise all forms of local knowledge as well as expert opinion. Fishers and tourist operators, who are regularly on the water, often know as much (or more?) about the local environment than many researchers – so draw upon their knowledge and use it to augment the best available scientific data. Be wary if information differs widely but recognise that some sectors and cultures view and value the marine environment in differing ways.
17. Provide feedback, and show the public that their comments do make a difference ... also be able to show this to decision-makers	Ensure any consultation is not seen as 'token'; i.e., all comments and submissions must be considered, and planners should be able to demonstrate where comments have made a difference – and if not, why not. Manage expectations to maintain confidence and build trust. However, do not fuel unrealistic expectations or promise what you cannot deliver.
18. There is rarely a 'win-win' in complex planning tasks; compromises are often the only possible outcome	Ensure your political masters are aware there are likely to be 'winners and losers'. Political 'trade-offs' near the end of a planning process are a reality (and may actually be essential to achieve an outcome). Recognise it is unlikely you will keep everyone happy - compromises are often the outcome. See also Rees et al. 2010; Christensen 2004.
19. No successful public engagement campaign can be conducted solely from within your office	It is essential to get out into the community and to engage with the wider public (not just the users) - where they work, where they recreate and where they feel comfortable. The Community Info Sessions (** 23 and Lesson 21 below) and LMACs (**12) all provided neutral/non-threatening venues for user/public/agency interactions. Also use media (**18-20), 'champions (**9) and displays (**17) to raise the planning profile in the community.
20. 'Expect the unexpected' – and ensure there is sufficient flexibility in your planning process to cope	There were many unexpected aspects during RAP, including the unprecedented number of submissions, some implications of unexpected political events (i.e., appointment of a new Minister), or the unanticipated political influence of the small but powerful charter fishing sector. Such unforeseen events required additional efforts and/or led to the initial timelines being extended.

C.   Lessons applied *as/when required* in a planning program

21. A two-way flow of knowledge is essential, so create a conducive environment for effective engagement (e.g., community information sessions)	The Community Information Sessions (**23) in numerous local centres were particularly successful allowing information exchange and promoting understanding of the RAP program and its objectives. Advertising about forthcoming Community Info. Sessions in local media ahead of time was important (**19-20), as was the choice of suitable venues/times in each location. We learned during CP1 that even more local communities should have been visited so this was addressed in CP2.
22. Think carefully what you ask in any submission form - open questions are very hard to code/quantify	The submission form used for CP1 (**7) included many open questions which produced long rambling answers; these proved hard to code as were the large maps that were also distributed. CP2 was far more effective as a simple two-page A3 size submission form that contained specific questions. Not everyone used the CP2 submission form but scanning and coding were much easier for those who did.

Key lessons learnt	Explanation (using the RAP/rezoning or other GBRMPA planning as the example)
23. It is easier to ask specific questions about a map with areas/blocks pre-marked and numbered, than have to code individually submitted maps	During CP1, large blank maps (**10) were provided free to the public; however, many marked the map in differing ways showing their areas of interest. Some 5800 submissions contained maps indicating places that people wanted as no-take zones (or not) or proposed another zone type. This spatial information was allocated to mapping units by an overlay (and standard rules for interpretation), allowing spatial data to be entered into the submissions database. Detailed maps were digitised to preserve specific boundaries for future reference.
24. Assuming you do engage effectively, be prepared for more submissions than you expected	Submissions were received in a number of formats: letters, reports, proformas, and petitions (**21) as well as the GBRMPA submission form (**7). Lessons were learned during the process (e.g., during CP1 we started photocopying all submissions but quickly realised this was a waste of time/paper, whereas electronically scanning all submissions was the preferred approach).
25. Recognise many stakeholders are wary of 'black-box' models they do not understand; nor is it possible to get all the necessary planning variables into a model.	Decision-support tools (DST) like *Marxan* or *Seasketch*, may assist planners but they rarely produce the final planning outcome. While such tools may generate 'a solution', it is inevitably refined if/when socio-economic values and political compromises are introduced (often the most fundamental determinants for a socially acceptable outcome). Stortini et al. (2015) propose a DST to help evaluate different boundary options. However, do not expect all the necessary social, economic, and political information can be realistically used in such analytical tools.

APPENDIX A8