Co-learning in Marine Protected Area Management

by

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Submitted in fulfilment of the degree of Doctor of Philosophy

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STATEMENT OF ORIGINALITY

The work presented in this dissertation, to the best of my knowledge, is the original work of the author and no material published or written by any person except as acknowledged in the text. It has not been submitted previously, either in whole or in part, for a degree at the University of the Sunshine Coast or any other university.

Contributions to jointly published works and this dissertation

Publications listed (page v) are based on the data collected by myself for this work. As senior author, I prepared the initial draft and interpretation of the data. My advisors and co-authors provided review comments and additional insights to the data. Others acknowledged as co-authors provided initial discussion that guided development of the research and paper development.

Contributions by others to this work are covered in the acknowledgements.

Mohammad Abdul Latif Siddique

23 June 2014
ABSTRACT

Natural resource management learning depends not only on effective participation of stakeholders, but also factors such as availability of quality knowledge, the processes and methods of sharing knowledge, and facilitation to create a co-learning environment. Using the case of the Moreton Bay Marine Park (MBMP), south east Queensland, Australia, this study explored how management and stakeholders interact in Marine Park Area (MPA) management planning, what meaning they give to their actions, and what issues concern them. Based on a qualitative thematic analysis of the zoning plan and in-depth semi-structured interviews with 23 stakeholders, it was evident that little co-learning practice occurred in the management and planning process for the MBMP. The plan and onsite management had little success in incorporating the diverse knowledge of local stakeholders because of poor information sharing and communication mechanisms. In addition, many other factors, such as lack of monitoring, mistrust among stakeholders, political interference and a lack of legislative requirement for comprehensive consultation significantly influenced the overall learning environment. Like many other MPAs, MBMP planning and management also suffers from data scarcity. Collaborative and participative approaches, which engender co-learning, could play a vital role in overcoming the issue of inadequate data. Active contribution could be stimulated through encouraging submissions from stakeholders or by involving them as a reference group or an expert panel. A strong monitoring and evaluation program, which involves the community/industry, would also ensure that stakeholders learn simultaneously from good outcomes and mistakes. Most importantly, stakeholders need to reflect on their lessons regarding how to go about a rezoning process and how they could engender co-learning throughout the process in any such future endeavour.

Key words: Co-learning, social learning, marine protected area, marine park management, natural resource management, knowledge and information.
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<tr>
<th>CC</th>
<th>Climate Change</th>
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<td>CB</td>
<td>Consumptive Beneficiaries (e.g., fishermen)</td>
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<tr>
<td>CoP</td>
<td>Communities of Practice</td>
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<td>CPZ</td>
<td>Conservation Park Zone</td>
</tr>
<tr>
<td>CSIRO</td>
<td>Commonwealth Scientific and Industrial Research Organisation</td>
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<td>DAFF</td>
<td>Department of Agriculture, Fisheries and Forestry</td>
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<td>DERM</td>
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<tr>
<td>DNPRS R</td>
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<td><em>Environment Protection and Biodiversity Conservation Act 1999</em></td>
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<td>FGD</td>
<td>Focus Group Discussion</td>
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<td>GBRMPA RAP</td>
<td>Great Barrier Reef Marine Protected Area Representative Area Program</td>
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<td>Global Positioning System</td>
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<td>Habitat Protection Zone</td>
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<tr>
<td>IAD</td>
<td>Institutional Analysis and Development</td>
</tr>
<tr>
<td>ICOM</td>
<td>Integrated Coastal and Ocean Management</td>
</tr>
<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
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<tr>
<td>LGB</td>
<td>Local Government Beneficiaries (e.g., local council)</td>
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<td>MBAA</td>
<td>Moreton Bay Access Alliances</td>
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<td>NNRMT</td>
<td>National Natural Resource Management Taskforce</td>
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<td>National Oceanic and Atmospheric Administration</td>
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<td>NRC</td>
<td>National Research Council</td>
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<td>Natural Resource Management</td>
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<td>PRA</td>
<td>Participatory Rural Appraisal</td>
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<td>SEK</td>
<td>Scientific Ecological Knowledge</td>
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<tr>
<td>SGB</td>
<td>State Government Beneficiaries (e.g., state government department)</td>
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<td>SNA</td>
<td>Social Network Analysis</td>
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<tr>
<td>SWOT</td>
<td>Strength Weakness Opportunity and Threat</td>
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<tr>
<td>TEK</td>
<td>Traditional Ecological Knowledge</td>
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<td>WCPA</td>
<td>World Commission on Protected Areas</td>
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Chapter 1

INTRODUCTION: LEARNING PROCESSES AND BARRIERS IN MARINE PROTECTED AREA MANAGEMENT
Chapter 1

Studying learning process and barriers in marine park area management

1.1 Chapter overview

1.2 Background
1.3 Knowledge utilisation and diffusion
1.4 Research problem

1.5 Aims and objectives
1.6 Significance and innovations
1.7 Expected outcomes

1.8 Conceptual framework
1.9 Dissertation structure

Figure 1.1 Structure of the Chapter 1
CHAPTER 1
INTRODUCTION: LEARNING PROCESSES AND BARRIERS IN MARINE PROTECTED AREA MANAGEMENT

1.1 Chapter overview

This chapter introduces the dissertation topic, which addresses the learning process and barriers among managers and other stakeholders for improving management effectiveness in Marine Protected Area (MPA hereinafter) management systems. The dissertation begins by establishing the disciplinary context within environmental management with a particular focus on natural resource and marine protected area management. Within this discipline is consensus of the need for adaptive management, which can occur effectively only through communication of information and knowledge among stakeholders. To explore this further, the research considers the central factors in developing a co-learning framework that fosters shared learning among MPA stakeholders for mutual benefit and sustainable use of resources. This research applies social learning theory to assess the role of participation in information sharing and co-learning. The extent to which co-learning is applied in decision-making is investigated by examining the implementation, review and revision of a MPA Plan using the case study of the Moreton Bay Marine Park (MBMP) in south-east Queensland, Australia. The chapter concludes with a conceptual model for the study and an outline of the dissertation.

1.2 Formative background

The driving force for this research has been my professional and academic experiences in the field of natural resource management (NRM) in developing and developed countries, although experiences in developing countries are predominant. It reflects an ongoing attempt to understand the world through the trans-disciplinary lens in which my career is located. This journey of learning is influenced by academic studies in fisheries and aquaculture (Bangladesh), marine and coastal management (Canada), expertise as a government extension officer in fisheries and aquaculture management (Department of Fisheries, Bangladesh), and as a research and extension officer with an international research organisation (WorldFish Center). I have had the opportunity to work within an enforcement authority as well as playing a facilitating role (e.g. while working in a non-government organisation) in the field of fisheries and aquaculture management. During
this professional journey, I have experienced the benefits of stakeholder participation in the process of sustainable natural resource management (NRM), rather than involving stakeholders only in the management implementation stage, despite the necessity of enforcement of regulations to underpin sustainable practice. As an enforcement officer in the Department of Fisheries, the learning for me has been that noncompliance can be reduced through participatory legislation formulation and integration of stakeholder experiential knowledge. Finally, this research is framed by the professional influence of working on the marine sanctuaries programme for sustainable fisheries management for three years as a Marine Fisheries Officer, and experiencing the importance of stakeholder knowledge integration through mutual learning mechanisms. In this context, co-learning processes in MPA management were explored and interpreted to identify the existing and potential role of local and experiential learning in key fisheries and conservation actions in the case study area of MBMP. This work could be described as crossing multiple disciplines, including anthropology, sociology, biology and ecology and applies disciplinary elements to the field of fisheries management and conservation. This research is trans-disciplinary because it attempts to understand the human dimension in relation to the impacts of stakeholder knowledge integration in NRM, specifically in MPA rezoning and management.

1.3 The context of the research

NRM is not only concerned with ecosystems but also with ecoplexes – the management of ecosystems for human purposes (NNRMT 1999). In Australia, at a national level, the management of natural resources (i.e. the components of ecosystems that are directly used by humans) has been documented as having the three long-term goals of achieving:

- “healthy ecosystems and catchments in which the integrity of soils, water, flora and fauna is maintained or enhanced;
- innovative, competitive and self-sustaining industries that make use of natural resources, within their capability, to generate wealth for social and economic well-being; and
- proactive communities that are committed to the ecologically sustainable management of natural resources in their region” (NNRMT 1999: 9).

As two of these goals directly relate to people, the communities in which they live, and the economic and social systems that nurture them, NRM involves understanding, maintaining and, where necessary, improving the interactions that people have with the biotic and abiotic components of ecosystems (Oliver & Whelan 2003). While there is often detailed knowledge of specific research subjects and sites, and knowledge of broad scale
processes, the challenge lies in integrating available knowledge across the range of scales needed for effective NRM towards achievement of goals at landscape, regional and specific interest scales. Both practitioners and users of science are facing these challenges and the difficulties inherent in integrating the complexities of managing both natural and developed ecosystems (NRMMC 2004).

Likewise, the marine environment is subject to a wide range of human activities and potential threats that cause alterations to the status of its structure and functioning. Key issues for marine and coastal environmental authorities are the management of environmental pressures associated with a large and expanding tourist industry, commercial and recreational fishing, urban growth, increased energy demand, mineral extraction, coastal development, shipping and the downstream effects of land use. Global decline of marine and coastal resources and its impacts on stakeholders’ livelihood and amenity is a driver for changing management systems worldwide (Álvarez-Romero et al. 2013; Caveen et al. 2013; Chuenpagdee et al. 2013; Day & Dobbs 2013; De Santo 2013; Fox et al. 2012; Pomeroy et al. 2005). Ecosystem-based management approaches emerged with MPAs as the main tool (Angulo-Valdés & Hatcher 2010; Ban et al. 2011) with an emphasis often on conserving marine resources (Caveen et al. 2013; Chuenpagdee et al. 2013). MPAs have been popularly accepted by NRM agencies and conservation groups as one way of protecting marine and coastal natural resources (Lopes et al. 2013a; Lopes et al. 2013b; Lopes & Videira 2013). However, social factors (e.g., beneficiaries and their livelihood issues), and involving specific stakeholders in MPA development and management are acknowledged as the primary determinants of the success of MPAs in terms of maintaining ecosystem services (Fox et al. 2012; Mascia 2003; NOAA 2004; Voyer et al. 2012).

According to the International Union for Conservation of Nature (IUCN), an MPA is an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, natural and associated cultural resources, and managed through legal or other effective means (Dudley 2008). This definition equally emphasises protection of biological diversity and cultural resources creating an opportunity to look at the degree of balance between biodiversity and human dimensions. MPAs can help nations attain the three main objectives of living resource conservation as defined in the World Conservation Strategy (1994): (1) the maintenance of essential ecological processes and life support systems; (2) the preservation of genetic diversity; and (3) the sustainable utilisation of species and ecosystems (Nursey-Bray & Phillip 2009). Two major categories, totally protected areas and multiple use areas, are usually considered when establishing MPAs, and areas are zoned according to varying levels of protection (and use). Levels of protection are
conventionally determined according to the IUCN Categories I–VI, ranging from strict protection to sustainable use of natural resources (e.g., managed resource protected area) (Nursey-Bray & Phillip 2009).

As a subset of NRM, MPAs are typical of multiple use NRM challenges in terms of multiple stakeholders with differing expectations, views and contested uses, and complex problems with often un-identifiable cause and effect. On the other hand, MPAs differ from terrestrial NRM because of less visibility of the resource and its status, perception of a common property resource, as well as difficulties in defining boundaries and physical and logistical issues with compliance (Aanesen et al. 2012; Bacher et al. 2014; Banks & Skilleter 2010; Martins et al. 2014; Schofield et al. 2013; Warner & Pomeroy 2012; Wood et al. 2013). These synergies and contrasts underpin the need to think across disciplinary boundaries. A key factor NRM and MPAs have in common is the acceptance that adaptive management is required (Jacobson et al. 2014; MEAM 2010; Pahl-Wostl 2007; Sherman 2014; Tompkins & Adger 2004). However, MPAs are human impositions on nature and society (Oracion et al. 2005). Effectiveness of MPAs is affected by both social and ecological factors (Maldonado & Moreno-Sanchez 2014), which are dynamic in nature.

This requires understanding and application of best available social and biophysical science (Katsanevakis et al. 2011). Adaptive management requires continuous sharing of information and knowledge, as complex social-ecological systems cannot be predicted and controlled (Pahl-Wostl et al. 2007). Hence, MPA management needs to be investigated from different disciplinary perspectives to aid understanding of how knowledge from different stakeholders (e.g., scientists and users) can shape adaptive planning and on-site management to ensure long-term sustainable use.

1.4 Integrating stakeholder knowledge into MPA management

The NRM literature has recognised two contrasting approaches to natural resource protection and management. The ‘top-down’ dominant model is widely used in area-based resource protection, where scientific investigation has led to the process of identifying and designating specific areas for protection (Brody 1998). The ‘bottom-up’ approach, in contrast, advocates the importance of social values and cultural perspectives because conserving resources is not only a bioecological process but also a socio-cultural one (Fiske 1992). This model is an approach to planning that typically combines scientific knowledge with traditional knowledge of the users to understand and accommodate how they rely on the resources (NOAA 2004). For this reason, a ‘bottom-up’ approach to planning, design,
and implementation of MPAs offers the opportunity to develop plans with stakeholders, for stakeholders and in the public interest.

Multi-resource users in NRM have multiple beliefs, experience and interests, which often create conflicts (deVos & vanTatenhove 2011; Jentoft et al. 2011; Muro & Jeffrey 2012). A shifting of management strategy from ‘top-down’ to ‘bottom-up’ is suggested to reduce such conflicts, as this approach can link group learning, such as social learning, with collaborative management (Armitage et al. 2008; Jones et al. 2011; Saarman & Carr 2013). Group learning is a social process to engage with, learn with, and create local knowledge. It requires facilitation (Plant & Ryan 2013) and free flow of information. There remains a distinction between the general provision of information to the public, mainly from government and expert professionals (weak participation), and intensive dialogue with stakeholders by involving them directly, leading to consensus building, conflict resolution and implementation of policy (Coffey 2005; McCay & Jones 2011). This distinction is amplified and reinforced by how knowledge transfer and diffusion occurs among different government and non-government institutions responsible for management as well as among individual stakeholders. Knowledge sharing can be influenced by relationships among all stakeholders including management; for example, through trust, transparency and commitment. Whether actors have positive expectations of others, share sensitive information, are willing to take risks, or demonstrate reciprocity (deVos & vanTatenhove 2011), are all relevant to achieve effective and sustainable resource management.

Managers and policymakers need information on the strengths and weaknesses of management actions and on the threats and stresses (Hockings 2003). There will never be sufficient funding to monitor and evaluate, with scientific rigour, the change in status of all values in a MPA in response to management action. Neither is it possible to always separate impacts of management from other natural and human causes. However, stakeholder experiential knowledge represents a record of management outcomes that is likely to be useful to reduce the acknowledged knowledge gap and limitations in rigorous monitoring and evaluation. As information concerning these aspects may be of an essentially different kind from that provided by science, resource management decisions cannot be based wholly on the logical positivist approach of the modern scientific ethic (Holmes et al. 1992). Considering, stakeholders possess a variety of knowledge and information, they might contribute to the types and breadth of information required for resource management planning. This requires effective facilitation and development of a knowledge sharing platform and supportive governance environment.
Literature in the field of NRM and MPAs also shows that the sharing of learning is not occurring effectively (Allen et al. 2011; Bouwen & Taillieu 2004; Curry & Cunningham 2000; Fazey et al. 2005; Muro & Jeffrey 2008). Knowledge sharing mechanisms are required to improve access to the valuable experiential knowledge held by non-government and scientific stakeholders. Over the past 30 years, there has been an increasing trend towards using adaptive and participatory decision-making arrangements in MPAs (Ban et al. 2011; Ban et al. 2012; Day & Dobbs 2013). This management approach combines readily with ecosystem-based management principles by facilitating social learning, building trust, and enhancing the legitimacy of rules and regulations. It has not only produced decisions responsive to community interests and values, but also has helped resolve user conflicts, and educate the public about the environment (NOAA 2004). Despite acknowledging social issues and incorporating community planning and management approaches (Andrade & Jairo 2002; Ban et al. 2011), most MPA agencies are still learning how to design and conduct an effective participatory process, to gain an understanding of the implications of increased stakeholder involvement and how to improve the process.

Having stakeholder participation embedded in a policy framework enhances effectiveness and legitimacy, particularly if participants feel the implementation process was fair, open and positive dialogue and debate among stakeholders occurred, and their input was valued and used (NOAA 2004; Sutinen & Kuperan 1999). Stakeholder participation enhances compliance because stakeholders are more knowledgeable about, committed to, and supportive of regulations if they have a say in the process (Carey et al. 2007; Clifton 2013; Coers et al. 2012; NOAA 2004; Saarman & Carr 2013; Smith 2012).

An empowered stakeholder group is able to address both the need for economic development and the conservation of natural resources (Pomeroy 1995) through a commitment to stewardship. When stakeholders are more involved in management, resource conflicts may diminish, access rights distributed more effectively and equitably, management initiatives better implemented, and resources better managed (Pomeroy 1995). These outcomes are possible without power sharing, although balanced power arrangements have been advocated in many co-management systems (Nursey-Bray & Phillip 2009). In the context of complex marine resource use, MPAs require stakeholder participation to ensure benefits for resource dependent stakeholders. Therefore, it is critical to understand how participatory decision-making processes can be improved through mutual or shared learning.

Dissemination of knowledge is as important as its production, and recognised in the commerce and agricultural extension fields (Jakku & Thorburn 2010; Kreunen 2002;
Knowledge utilisation in the MPA management system is generally poor, mainly because of lack of evidence-based information and the lack of multidirectional knowledge flow between managers and stakeholders (Hockings et al. 2000; Pullin et al. 2004). For example, “around 60% of conservation management decisions rely on experience-based information, and many practitioners report having insufficient evidence to assess their management decisions” (Cook et al. 2010: 181). Enhancing stakeholder knowledge generation and application, providing opportunities to share learning from reflection, and strengthening their ability to meet concerns and deal with changes throughout the process, may foster participation. Exchange of information between stakeholders (e.g., researcher and community, government and community, within and between community groups) can empower stakeholders to become involved in and positively contribute to the MPA planning process and can increase the credibility of the process itself (Abecasis et al. 2013b).

Effectiveness and success of an MPA depends on how the planning, establishment and management process follows a logical sequence based on knowledge and information (Abecasis et al. 2013b). Learning is an integral part of knowledge management in the MPA management system. It can be described as the acquisition of knowledge or a skill through study, experience, or instruction (Serrat 2008). MPA management organisations might not adopt internal systems to increase internal communications, promote cross-functional teams, and create a learning community of practice, but will need to do so to become successful learning organisations. Therefore, there is a need for the organisations to recognize that people operate and communicate through learning that includes the social processes of collaborating, sharing knowledge, and building on each other’s ideas. Managers need to recognise that knowledge resides in people and that knowledge creation occurs through the process of social interaction (Serrat 2008). High-performance learning organisations (i) adopt a strategic approach to dissemination; (ii) know their target audiences; (iii) formulate generic, viable dissemination strategies that can be amended to suit different purposes; (iv) hit the target; and (v) monitor and evaluate their accomplishments (Serrat 2010). Hence, there seems value in applying such a stakeholder-focused management strategy, which generates and maintains continuous flow of knowledge and information to improve MPA management.

The availability of appropriate and readily usable information or knowledge to managers and stakeholders should improve management plans. Despite less attention being given to the utilisation of evaluation information to improve conservation management outcomes (Jacobson et al. 2011), information is always required as part of the learning process.
Information utilisation in protected area management has focused on knowledge readily available to managers (see Fazey et al. 2005), which is usually gathered from expert information providers (Jacobson et al. 2011) rather than stakeholder knowledge and experience. Therefore, it might useful to explore the extent to which management plans, for example, are making full or systematic use of the full range of stakeholder knowledge and disciplinary information (Christie 2011) available to support decision-making (e.g., Pullin et al. 2004), and to foster acceptance and compliance by stakeholders.

Often, framing the problem is the problem in sustainable NRM. This is true for MPAs where problems are entangled and interconnected with many inseparable issues. MPAs are considered as a key management strategy to achieve conservation of marine biodiversity and sustainable delivery of ecosystem services, which are increasingly under pressure worldwide (IUCN-WCPA 2008). In the case of sustainable MPA management, co-management has been proposed as a way to promote access to, and exchange of, material and non-material resources, such as money, technology, scientific knowledge, knowledge from local experience, as well as increased management legitimacy (Sandstrom & Rova 2010). At the heart of co-management and stewardship is co-learning, where every intervention, including exploitative use, represents a learning opportunity that could be shared to improve understanding and inform management. This would involve acquiring multiple lines of evidence for the state, pressures and responses of valued resources to conservation management, and involve scientific study, stakeholder experience and traditional ecological knowledge regarding the biophysical and social dimensions of the MPA. Scientists and managers do not hold all the information needed and available for effective management. Other stakeholders also carry out roles and work within managed systems, developing practical knowledge relevant to management. Exchange or sharing of information can reduce the knowledge gap to inform planning and management and might foster collaboration between managers and other stakeholders.

Integrating knowledge (scientific or otherwise) into management is a complex process involving facilitation, translation, and communication, which relies on stakeholder partnerships and the translation of knowledge into accessible and relevant media, for communication between stakeholders at the appropriate times (Orbach & Karrer 2010). This is acknowledged by the vision in IV/5 and VII/5 of the Nagoya Oceans Statement built on the tenth meeting in the conference of Convention on Biological Diversity (Nagoya Oceans Statement 2010). This stresses the need to apply the best available science, including the technological knowledge of local and indigenous communities. However, processes for accessing stakeholder knowledge, sharing and integrating knowledge towards co-learning remains problematic. The decision-making processes often remain
compartmentalised, with governments or agencies frequently implementing policies in isolation from other government agencies (DERM 2010: 51) and stakeholders. The co-management literature offers some solutions for accessing stakeholder knowledge, but co-management requires power sharing (Armitage et al. 2008; Campbell et al. 2013; Cundill & Fabricius 2009; Jones & Burgess 2005; Nursey-Bray & Phillip 2009; Sandstrom & Rova 2010; Trimble et al. 2014), which is not achievable practically in many government systems built on traditional bureaucratic practices. Therefore, there is an emerging demand for alternative ways of accessing stakeholder knowledge in which complicated power-sharing can be avoided. As a result, systems for sharing or co-learning between stakeholders are suggested.

1.5 Case study background

Australia has great experience with MPAs having managed the Great Barrier Reef Marine Park (GBRMP) since 1975. Much has been written about coral reef ecosystems and livelihood aspects of the stakeholders as well on Australian MPAs (Day & Dobbs 2013; Jacobson et al. 2014; McPhee 2011; Voyer et al. 2013), but the influence co-learning has on stakeholder knowledge integration is relatively unexplored. This research uses Moreton Bay Marine Park (MBMP), established in 1997, as a case study to look at co-learning. I have chosen this case because of timeliness and background familiarity to investigate the MPAs management issue that I am interested in exploring. There is also a demand in the stakeholders to review the rezoning process, as learning from the past, to prepare themselves for next review in 2018.

The MBMP is one of the most biologically diverse coastal and marine regions in south east Queensland (DERM 2008), supporting significant commercial and recreational fisheries. However, management remains contested, in no small part due to uncertainty and disagreement over sustainable levels of take and zoning designed to balance conservation, recreation and commercial use of the area (DERM 2011). In the early 1990s, Moreton Bay was recognised as an outstanding natural and cultural heritage resource for more than 1.5 million people in south-east Queensland (DoE 1993). At that time, the Queensland Government committed to ensuring that development and use of the Bay is ecologically sustainable (Robson 1993) given the increasing pressure from rapidly growing populations in its catchment (DoE 1993; Holmes et al. 1992; Robson 1993). A 1991 draft Moreton Bay Strategic Plan proposed new legislation to establish a commission and give legal force to the Strategic Plan. It recommended mechanisms to address issues such as co-ordinated decision-making, the need for environmental impact assessment, and community involvement in decision-making (DoE 1993). The draft Strategic Plan also proposed a
marine park over Moreton Bay to allow a holistic approach to decision making on all uses of the Bay and give legislative backing to ensure that activities undertaken in the Bay conform to the Moreton Bay Strategic Plan (Robson 1993). The goal of the Moreton Bay Strategic Plan was “to provide for ecologically sustainable use of Moreton Bay and to protect its natural, recreational, cultural heritage and amenity values” (DoE 1993, p 5). It was also recognised that public awareness and involvement are required in the formulation of policy and management strategies for Moreton Bay to achieve the goal (Poiner 1993).

An estimated 82% of Queensland’s regional ecosystems are represented to some extent in national parks, whereas multiple use marine parks have been declared within 9 of the 13 marine bioregions covering about 72% of its coastal waters (DERM 2010). In this context, in 1997, Moreton Bay was declared a marine park under Queensland legislation, Marine Parks Act 1982. The first Marine Parks (Moreton Bay) Zoning Plan commenced on 1 December 1997. Government increased strictly protected zones in Moreton Bay Marine Park from 0.5% to 16% after the review of the zoning plan in 2009 (DERM 2010).

1.6 Aims and objectives of the research

This research aims to address the evidence for co-learning between stakeholders in MPAs. It attempts to examine knowledge/learning being used in MPA planning and management including the factors that foster or hinder such learning sharing between stakeholders. Moreover, it aims to develop an effective co-learning framework in the context of MPA management.

Considering the importance of information and knowledge sharing including the gaps in co-learning research in MPA management, the above discussion leads to the following research questions.

1. What evidence exists for co-learning being embedded in planning for MPA management?-RQ1
2. What knowledge/learning is being used in planning and on-site management actions for MPA?-RQ2
3. How is information/learning shared, updated with experience through implementation, and shared updated information?-RQ3
4. What are the barriers to co-learning?-RQ4
5. How can these barriers help understanding for stakeholder knowledge integration in MPA planning and management?-RQ5
1.7 Significance and innovation of the research

This research is significant in two ways. From a theoretical perspective, it shows how co-learning is integral to effective participation and inclusion in decision-making. This research seeks to understand the factors that are critical to the co-learning process as well as to identify the barriers that impede shared learning continuation between stakeholders. It tests this conceptual framework with application to a case study.

From a MPA practice perspective, the research identifies the strengths and weaknesses of the MBMP zoning plan, relevant institutional groups and their knowledge base and approaches for updating their knowledge and applying it to management. Identifying knowledge and learning, shared in the MBMP planning and management process, including the factors influencing such knowledge sharing, might help develop a co-learning framework by which the MBMP or other marine parks could be examined later. This improved understanding from the research would contribute to increasing the capacity to better respond to future coastal environment challenges. It might also create a new platform for considering actors’ (managers and stakeholders) past mistakes and opportunities for learning and informing future decisions.

Protected areas are established to conserve special natural and cultural values, so understanding these values and their significance at global, national or local scale is vital for both management planning and evaluation (Hockings et al. 2000). MPA management needs a knowledgeable and concerned public for its long-term maintenance so that it, with industries and governments, can stop and reverse threatening processes to biodiversity and conservation (Agardy et al. 2011; DERM 2010). Effective MPA management usually includes strategic partnerships and engagement with stakeholders who influence the site’s values, both positively and negatively, and who may depend on the site’s resources in some way (Hockings et al. 2000). For the sake of management improvement, it is essential to know how secure these values are, what threats they face and about external influences, including stakeholders with a particular emphasis on local communities. While scientific data and understanding form a vital component of the information, other aspects such as traditional ecological knowledge (TEK) and stakeholder/community experience effective translation of data to user-friendly information is also required for effective management. Therefore, an interface as a bridging pathway between managers and stakeholders is required to establish an effective MPA management system. Studying co-learning barriers and factors influencing information and knowledge sharing among stakeholders might help understand such an interface.
Environmental studies, as a trans-disciplinary stream, contribute to environmental management of natural resources, such as marine park management. Considering the dynamic nature of Marine Parks, the literature stresses practising adaptive management in which stakeholder learning and knowledge can make a significant contribution. This research provides a better understanding of how stakeholder knowledge has been integrated in the MBMP planning and management. It outlines the impacts of different initiatives for communication and information sharing by government and non-government stakeholders in the study area. The research identifies strengths and weaknesses of the MBMP rezoning plan and the factors influencing stakeholder engagement in shared or co-learning that might offer new avenues of thinking in MPAs management.

1.8 Dissertation structure

The thesis development process derives initially from observation and reflection on experiences with fisheries and aquaculture communities (Section 1.2). MPA authorities, stakeholders and existing management instruments are considered as three major elements influencing co-learning (Figure 1.2).

![Figure 1.2. Conceptual approach for the study of Co-learning in Marine Protected Area (MPA) management.](image-url)
The MBMP management practices are mainly directive (e.g., top-down) or enforcement based, with which stakeholders unhappily comply or ignore, as it is not a community-based management, co-management or managed by a traditional owner or indigenous group. This existing management system in the case study area helped conceptualise the framework for the research and helped review the relevant literature (see Chapter 2). Therefore, the concept, gaps in the literature and the aims and objectives lead to develop a qualitative methodology for data collection and analysis to address the research questions (see Chapter 3). The conceptual framework also helped guide selection of primary and secondary data sources for the study, choose methods of analysis and the interpretation. It also helped set aims of the analysis to enhance understanding about co-learning gaps, barriers and opportunities in both management instruments and stakeholder’s opinions.

The dissertation is divided into seven chapters (Figure 1.3). The first three chapters discuss the context for the research, the research questions, methodology and learning used in NRM, towards developing a co-learning framework in MPA management. Chapter 4 presents a critical analysis of the management instruments related to the MBMP. The field research (in-depth semi-structured interviews) results are reported in Chapters 5 and 6. Chapter 7 provides discussion and conclusions about the similarities and contrasts from analysis of documents and field research. This informs the development of a co-learning framework. It also reviews the research problem, methodology, research questions and results to make conclusions and recommendations towards reducing the learning gaps among management and stakeholders of the MBMP.
Chapter 1
Studying MPA management and co-learning impacts:
Introduction
- Background
- Research problem
- Research questions
- Objectives

Chapter 2
Learning processes in MPA management and barriers of co-learning:
literature review
- Adaptive learning
- Social learning
- Organisational learning
- Policy learning

Chapter 3
Learning the way of stakeholders’ learning process and barriers:
methodology
- Case study area
- In-depth semi-structured interviews representatives

Chapter 4
Anatomy of the existing MPA instruments:
document analysis
- SWOT analysis of MBMP 2008
- Comparative analysis of the MBMP 2008 and MBMP 1997

Chapter 6
Results: Information sharing outcomes from interview data analysis
- Types of information shared
- Information sharing mechanism
- Factors influencing information sharing between stakeholders

Chapter 5
Results: Learning outcomes from interview data analysis
- Knowledge/learning sharing
- Communication mechanism
- Factors influencing

Chapter 7
Discussion and Conclusions
- Co-learning framework and social learning
- Barriers of co-learning
- Overcoming strategy

Figure 1.3 Dissertation structure
Chapter 2

LITERATURE REVIEW: CO-LEARNING IN THE COASTAL ZONE AND MARINE PROTECTED AREA MANAGEMENT
Chapter 2 Co-learning in the coastal zone and marine protected area management

2.1 Chapter overview
2.2 Introduction

2.3 Co-learning
2.4 Relevant learning practices for co-learning

2.5 Relevant learning theories
2.6 Learning frameworks used in the literature

2.7 Developing co-learning framework for MPA management

*Figure 2.1 Structure of the Chapter 2*
CHAPTER 2
LITERATURE REVIEW: CO-LEARNING IN COASTAL ZONE AND MARINE PROTECTED AREA MANAGEMENT

2.1 Chapter overview

This chapter discusses the potential contributing forms of learning to co-learning: adaptive learning, social learning, organisational learning and policy learning. It also discusses the role of co-learning in participatory planning, monitoring and evaluation, and anticipated action learning. It reviews literature on learning in natural resource management (NRM), integrated coastal and ocean management and marine protected areas (MPAs) to identify links between these concepts towards developing a co-learning framework applicable to MPAs and coastal zone management. It also discusses the shared learning process and barriers in NRM and MPA management systems. The chapter aims to find the gaps in the literature related to learning approaches that might be relevant in addressing the research questions. Following a critical analysis of the various learning frameworks from the literature, a framework for co-learning is proposed for sustainable MPA management.

2.2 Introduction

Despite advances in our understanding on ocean and coastal ecosystem over the past century, much remains a mystery about the linkages between species, habitats, and oceanographic factors (MEAM 2010). Unlike NRM in a terrestrial context, there is a gap in MPA literature regarding the provision of comprehensive evidence of the ecological, social and economic linkages between MPAs and external areas (Belfiore et al. 2004; Ferrol-Schulte et al. 2013; Jones 2013). Considering the dynamic nature of MPAs, as a sub set of NRM in marine and coastal areas, sound science is necessary for commons governance, but rarely this is sufficient (Dietz et al. 2003), and creating a platform for integrating stakeholder experience and learning with scientific evidence might address the knowledge gap in science. A number of learning theories and concepts have been proposed to explain what motivates human behaviour for shared or mutual learning (see Appendix 1), although most have come from the formal education discipline. Over the past two decades, increasing emphasis has been devoted to processes of decision making in NRM, whereas processes of social learning have largely been neglected (Pahl-Wostl & Hare
Although the literature covers a wide variety of learning theories, this review focuses on six major group learning theories or group learning-related themes that are common to all:

- the importance and process of social learning,
- the need for adaptive learning to enhance adaptive capacity and management,
- the importance of organisational learning in creating a supportive learning environment,
- the necessity of learning through regular policy review (i.e., ‘policy learning’),
- the relevance of anticipated action learning when seeking resilience when uncertainty is high, and
- the role of participatory planning and implementation to develop and promote a co-learning environment for sustainable management.

Reviewing literature on these group-learning concepts is one way to deepen understanding about their impacts on stakeholder knowledge integration in MPA management, and how different types of learning might be combined to better balance human needs and conservation priorities. Management, irrespective of the types of institution (e.g., government or non-government), is inherently a learning process involving continuous review and adjustment of actions (Angulo-Valdés & Hatcher 2010). The literature on MPA or NRM were the primary focus for this study, but other disciplinary fields were also considered (e.g., literature from the business discipline because of its long term attention to organisational learning). Adaptive management is an iterative process of decision making, which implies learning from past successes and failures along with deliberate experimentation and monitoring (Allen et al. 2001; Ban et al. 2011; Jacobson et al. 2014; Lee 1999; Pahl-Wostl 2007).

2.3 Co-learning

Learning is an exploratory information processing and knowledge generation mechanism, where actors experiment with innovation until they meet constraints and new boundaries (Pahl-Wostl 2009). In other ways, it is an active, constructive process, which requires new information, ideas or skills and a purposeful way of synthesizing newly generated knowledge (Smith & MacGregor 1992). Learning can change a person’s understanding about their place in the world (Fazey et al. 2005). Similarly, learning in community is usually voluntary, and an expression of the desire to engage with, learn with, and create local knowledge. Members of a community share their learning about a change in the individual but primarily in relation to the community (Stein 2002). Learning in community can also produce a shared sense of belonging to a group that embraces differences and can produce improved understand of their interests better. This group learning is usually
more effective than gaining insights from outsiders (e.g., external experts). By participating in a learning community, stakeholders will not necessarily always agree on specific issues, but they may move toward a common vision of their mutual future through challenging and questioning themselves (Stein & Imel 2002). This can contribute to the creation of a co-learning environment, which may extend beyond the organisation (Ban et al. 2011). Learning is recognised as a valuable process for achieving sustainability in NRM and can make a contribution to decision making processes relevant to addressing the global challenges faced by the sector (Thorburn et al. 2011). Despite much reference to the value of collaborative partnerships in the literature, the connection between collaboration and learning remains relatively unexplored (Imel & Zengler 2002).

Learning can also be considered to be a change in a person's understanding of their place in the world and how they perceive it (Fazey et al. 2005; Newig et al. 2010; Pahl-Wostl 2009). This dissertation uses the notion of co-learning to refer to a process of social learning with adaptive learning at its heart; where stakeholders (e.g., both government and non-government) simultaneously acknowledge and adapt to the other's learning, knowledge and behaviour so as to produce desirable management outcomes.

Stakeholders may learn something more about their own world and its connection to the institutions to which they are connected (Wagner 1997). In such a learning environment, the community of interest provides supportive structures for individual inquiry, and acts to mediate knowledge through sharing of experiences and developing of norms so that knowledge grows within the community as well as for each individual (Jaworski 2003).

Co-learning can facilitate a re-framing of beliefs, assumptions and expectations regarding a problem (i.e., more congruent technological frames), which allows the parties involved to arrive at an increasingly shared understanding of the problem (Thorburn et al. 2011). Stakeholders' tacit knowledge can also be translated through practising co-learning as it can interact person to person whilst engaging the whole (Anthony et al. 2009). However, the complexity within co-learning derives from its concurrent nature, as one adapts to the behaviour of others (Shoham & Tennenholtz 1993) while learning from each other. This requires free flow of information.

Protected areas are established to conserve special values, so understanding these values and their significance at global, national and local scales is vital for both management planning and evaluation (Hockings et al. 2000). To conserve values, managers and policymakers need updated information on the strengths and weaknesses of their management practices so that multiple users can realise their potential within the sustainable management framework (Hockings 2003).
Despite learning experience being an internalised process of incorporating new information within existing knowledge (Jacobson et al. 2011), the sharing of knowledge is rarely evident in the MPA management literature. Moreover, collective action, behaviour and attitude change, and sound relationships among stakeholders, are a likely prerequisite for achieving socially optimal use of resources (Synapse Research and Consulting and CapitalAg Consulting 2001). Stakeholder participation in shared or co-learning activities is linked to the capacity to change in three broadly defined ways (Kilpatrick 2003) by:

- delivering new knowledge and skills (e.g., refining existing knowledge as adaptive learning),
- providing interaction with ‘experts’ (e.g., managers as facilitators), and
- providing opportunities for interaction with peers (e.g., social learning).

In group learning situations, some groups work together successfully to solve problems, while others do not. However, group work can induce many beneficial outcomes in comparison to traditional forms of instruction (Chiu 2000). The relationship between learning and community is a central theme in the history of adult education (Hugo 2002). In NRM, multiple actors engage around issues of water and soil management, nature preservation, land use, farming practices, introduction of new technologies in life sciences and related problem domains (Reed et al. 2013). Interdependent involvement of stakeholders, the development of a shared problem definition, the coordination of actions at different levels and the orientation towards a shared common vision and action strategy are core themes in NRM learning. Stakeholders’ learning occurs through co-constructing a social learning process by sharing problem perspectives and working with different kinds of knowledge and competencies (Lee & Smagorinsky 2000; Reed et al. 2013). Therefore, co-learning is not a standalone practice; rather, it is an embedded learning process combining different forms of social and institutional learning and their participatory implementation.

2.4 Practices for co-learning

2.4.1 Social learning

In the context of learning, many of the leading concepts and theories have emerged from the field of education; mostly in child education and adult learning (see Appendix 1). Much of the literature is focused on immediate outcomes, such as the achievement of a policy-decision, and does not consider processes that may sustain learning in the long-term (Schusler et al. 2003). As this dissertation considers social learning as a core mechanism for understanding co-learning, particular attention has been given to
examining definitions, concepts and theories of social learning to identify a working definition in the NRM field.

From a review of definitions (Table 2.1), social learning is commonly identified as a core component of co-learning: a process of iterative reflection that occurs when experiences, ideas and environments are shared with others (Keen et al. 2005). It is also considered as a process by which society democratically adapts its core institutions to cope with social and ecological change in ways that will optimize the collective wellbeing of current and future generations (Woodhill 2004).

<table>
<thead>
<tr>
<th>Key definitions</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collective action and reflection, amongst individuals and groups, work to improve management, interrelationships between social and ecological systems.</td>
<td>Keen et al. (2005) (in Cundill &amp; Fabricius 2009: 3205)</td>
</tr>
<tr>
<td>Individuals interaction and observation of others in a group, engage one another, sharing Bandura (1963); Schusler et al. diverse perspectives and experiences, develop a common framework of understanding, basis for joint action.</td>
<td>(2003: 311)</td>
</tr>
<tr>
<td>Groups or social systems, operate in new, unexpected, uncertain and unpredictable circumstances.</td>
<td>Wildemeersch (2007: 102)</td>
</tr>
<tr>
<td>Intentional process of collective self-reflection, interaction and dialogue among diverse participants (stakeholders).</td>
<td>Fernandez-Gimenez et al. (2008: 4)</td>
</tr>
<tr>
<td>Developing new relational capacities, both between social agents, learning how to collaborate and understand others' roles and capacities differently, and also between social-ecological systems.</td>
<td>Pahl-Wostl et al. (2008: 24)</td>
</tr>
<tr>
<td>Concerted action in complex and uncertain situations.</td>
<td>Ison and Watson (2007: 21)</td>
</tr>
<tr>
<td>Active social participation, dynamic interaction between people and the environment, construction of meaning and identity.</td>
<td>Cundill and Fabricius (2009: 320)</td>
</tr>
<tr>
<td>Learning of individuals by copying from others, rather than through having experiences oneself.</td>
<td>Newig et al. (2010: 24)</td>
</tr>
<tr>
<td>Change in understanding, beyond the individual, situated within wider social units, social</td>
<td>Reed et al. (2010)</td>
</tr>
</tbody>
</table>

The three main components of social learning process are observation, copying and experiencing (Bandura 1963, 1977; Ison & Watson 2007; Keen et al. 2005; Pahl-Wostl et al. 2008; Schusler et al. 2003). The social learning literature shows both synergy and contrast, especially in relation to copying, experiencing and participation, but in the NRM context some others are added. Learning by copying from others might be common in the education sector, but experiencing might be much more relevant in NRM.

Based on the reviewed literature, social learning can be defined as mutual learning by individuals and/or groups in society for collective or joint action that spills over beyond these individuals and groups to manage ecosystem (Figure 2.2). It occurs when individuals and groups observe, interact, engage and share their experiences and interpretations of phenomena with others: it involves self (and group) reflection to
develop relational capacities resulting in a common framework of understanding. This common framework might be difficult to measure or ensure in multiple resource users cases in MPA management. Either a participatory mechanism (Schusler et al. 2003) or effective use of social media/networks might contribute to interaction or sharing, which help stakeholders to be ready for common understanding (Reed et al. 2010). Therefore, the flow of accessible updated information, considered a missing link in the social learning process in MPA management, might serve as fuel to promote social learning. It is the collective action, either by individuals, groups or institutions that is required to achieve the goal of improved management and resilience in NRM (Woodhill 2004). This stimulus for collective action might come through social learning, as it moves participants towards a common framework for a particular ecological and societal environment.

Social theories of learning define learning as active social participation in the practices of a community and their dynamic interaction with the environment (Lave & Wenger 1991; Muro & Jeffrey 2008; Wenger 1998). Accordingly, it is a process by which participants involved in collaborative NRM can learn together about an NRM issue of importance to them (Tan 2008), but with little need to have consensus over the meaning or theoretical basis of social learning (Reed et al. 2010). A central hypothesis for the concept of social learning is that social involvement and the management of content are strongly interdependent (Lorenzoni et al. 2000). This occurs when people share their experiences, ideas and environments with others (Keen et al. 2005). The sharing processes also help build trust, establish social networks and create self-reflection to make collective decisions (Pahl-Wostl 2002). In decision-making processes, social learning among all stakeholders offers the potential for significantly increasing the sustainability of management (McFadden et al. 2009) through promoting adaptive learning.
2.4.2 Adaptive learning

Adaptive learning, based on the arguments in the literature (Davidson-Hunt & Berkes 2003; Smith et al. 2009; Smith & Smith 2006; Tschakert & Dietrich 2010), may be defined as a type of learning that embraces other forms of learning that is required to live with changes in society and the broader ecosystem. The processes of such learning are information-intensive and require active, ongoing participation by “those most likely to be affected by the policies being implemented” (Lee 1999: 7). The contextual learning framework which includes adaptive learning (see Section 2.5) may be embedded within the institutional structures of coastal management organisations (Smith & Smith 2006).

Accordingly, adaptive learning for coastal management includes social learning, sustainability learning, organisational learning and a bias towards reviewing and changing policy and management practice (Smith et al. 2009). The rationale for adaptive learning in management systems rests on three key elements: (1) rapid knowledge acquisition, (2) effective information flow, and (3) processes for creating shared understandings (McLain & Lee 1996). However, adaptive learning as learning to live with change and uncertainty, and combining different types of knowledge, are key principles for building adaptive capacity in social-ecological-economic systems (Davidson-Hunt & Berkes 2003; Tschakert & Dietrich 2010). Thus, it relies on effective communication and trust. Adaptive learning in organisations is also a situated process within a physical setting, deserving greater attention from scholars and managers (Tyre & Hippel 1997). Change and implementation of integrated, adaptive, and sustainable resources management systems cannot be brought about by top-down implementation; rather, it requires a process and change (Pahl-Wostl 2007) through the practice of social learning even in the organisation or institution level.

2.4.3 Organisational learning

The more a ‘management organisation’ transforms to a ‘learning organisation’, the better it can create a supportive environment to promote exchange of learning. That is,

A learning organisation is an organisation skilled at creating, acquiring, and transferring knowledge, and at modifying its behaviour to reflect new knowledge and insights (Garvin 1993: 80).

Organisational learning is a cycle that begins with a stimulus and proceeds with a process of internal selection, articulation and codification, followed by the replication and enactment of new routines across the organisation (Berkhout et al. 2006). Learning organisations engage everyone in the exploration, exploitation, and transfer of knowledge, increasing the collective learning throughout the organisation to make it adaptive and
transformational (James 2003). Social learning among individuals, groups and organisations is a key factor in the creation of such organisational knowledge (Tyre & Hippel 1997). To become a learning organisation, changes of organisational ‘routines’ maybe required, such as on-going activities, rules, strategies, technologies, procedures, conventions, cultures and beliefs (Berkhout et al. 2006). To be more specific, the core learning elements for building an organisation that can ‘learn’ are based on five converging components: system thinking, personal mastery, mental models, building shared vision and team learning (Senge 2006). In MPAs, organisational learning could play a role in clarifying stakeholders’ perceptions about scientific and other findings (Garces et al. 2013), which might require an environment for debate and dialogue between the members of the organisation. Creating such an effective learning environment in the organisations related to MPA management might require national policy and institutional reforms (Arceo et al. 2013). The MPA literature, which addresses organisational learning, emphasises the importance of policy reform, institutional strengthening and social preparation (Arceo et al. 2013; Garces et al. 2013; Leisher et al. 2012; Micheli & Niccolini 2013) in the development of a learning organisation. A learning organisation might increase its representativeness and acceptability of its decisions to other organisations. All these attributes focus on social and collaborative learning in the literature on adaptive management of MPA (Bown et al. 2013). The literature also demonstrates that the organisation might require appropriate strategies and policies, as essential component of stimulating, attaining and practising organisational learning.

2.4.4 Policy learning/reviewing

Learning that informs policy or ‘policy learning’ is an analysis of influence and effectiveness of policy in different contexts to see how it is structured, operationalised and controls management (Howlett 2011), and how it links to decision-making processes. Organisations involved in MPA planning and management, such as government departments and conservation NGOs, have an important role in enabling and reinforcing community initiatives, and ensuring that community efforts are consistent with existing legal and policy frameworks, including the fulfilment of biodiversity conservation objectives/obligations (Jones et al. 2011). In addition, decision makers need to recognize that policy instruments must create an institutional environment for stakeholder participation, and these instruments require regular review and fine tuning (Bressers & Rosenbaum 2000). Policy learning differs from traditional policy reviewing, as it should not only assess the degree to which existing policies contribute to achieve objectives, but also the degree to which they stimulate or facilitate learning processes (Bressers & Rosenbaum 2000; Katrin & Jan 2009). It requires highly trained personnel in the organisation:
personnel who are far-sighted, with skills in collecting and processing evidenced-based information and the ability to assess alternatives (Howlett 2011; Howlett & Joshi-Koop 2011). Therefore, effective policy learning depends on the level of resources in human, financial, network and knowledge in the organisation (Howlett & Joshi-Koop 2011).

The concepts of complex and reciprocal learning can inform understanding of policy learning. At the institutional level, social interactions about new norms might produce significant changes to actor identities/interests. This is termed as ‘complex learning’ when it occurs within a policy community and as ‘reciprocal learning’ when it occurs across two or more communities, such as input from external sources (Gabler 2010). In complex and reciprocal learning, “actors seek a reasoned consensus and are open to preference change driven by problem-solving and persuasion” (Gabler 2010: 85). In the case of MPA management, both of these learning practices may have considerable impacts on stakeholders’ learning that might require strengthening in organisational learning along with policy reforms. Changes from traditional policy review to learning (e.g., complex and reciprocal) might require to be facilitated by openness and access to information, inclusiveness, frequency and equity or non-hierarchical relations that eventually enrich policy learning, as actor interests might be transformed through deliberation and learning. However, substantial changes may not occur, such as when there is ‘simple learning’ (e.g., within a community) and ‘conflictual learning’ (e.g., across communities) (Figure 2.3). Rather, in simple and conflictual learning, actor positions remain mostly fixed; these are not open to persuasion by a better argument (Figure 2.3). Simple learning may lead to weak policy integration. Complex learning has deeper socialization and weak to medium policy integration, while reciprocal learning leads to strong policy integration (Gabler 2010). Reciprocal learning also promotes the idea that adaptive capacity and management are essential to foster learning to improve policy.
The literature suggests that policy integration advances when learning moves from simple to complex processes, going through adaptive management and governance. These processes might also help leave room for accommodating any unseen situation arising in future or uncertainties, such as precautionary approach for climate change impacts.

2.4.5 Anticipated action learning

A crucial factor for seeing futures or dealing with uncertainties is not only to forecast but also to create confidence in individuals of the system’s ability for adaptation to new challenges of sustainability (Inayatullah 2006). Uncertainties may include climatic as well as daily life and livelihood stressors, as well as larger-level economic, environmental, and policy disturbances and risks (Tschakert & Dietrich 2010). Decision making in fisheries management, pollution control, coastal zone management, and flood control is characterised by uncertainty as to the outcome of decisions (Tompkins & Adger 2004). As a collaborative precautionary approach, anticipatory action learning/research works within
the epistemological framework of participation (Inayatullah 2006). This learning differs from futures research by expert forecasters, because it is more attuned to participatory learning processes, particularly those involved in a questioning process based on the 'knowing' categories of participants (i.e., their worldviews) (Inayatullah 2006). Similarly, in the process of foresight, the outcomes are negotiated by those who participate, resulting in futures that are constantly revisited through envisioning, experimenting, and reflection (Tschakert & Dietrich 2010: 11). The successive series of collective decisions and action in NRM indicates how the manner in which problems have been framed shapes the space for future learning (Maarleveld & Dangbégnon 1999). Demand is creating now to think and act both individually and collectively about anticipated effects and consequences of related future uncertainties. Therefore, anticipated action learning might require participatory planning and implementation mechanisms for MPAs management.

2.4.6 Participatory planning and implementation in Marine Protected Area management

People have things at stake during MPAs established, considering that they may lose or gain (Chuenpagdee et al. 2013). Managing various commercial and recreational activities in MPAs thus require participatory planning and implementation (Banks & Skilleter 2010). The idea for the participatory planning and implementation component of co-learning were built on the growing body of literature on the benefits of incorporating Local stakeholder knowledge and economic concerns with decision-making processes (Berkes 2002; Davidson-Hunt 2006; Davidson-Hunt & Berkes 2003; Teixeira et al. 2013; Zurba et al. 2012). Participatory approaches have become an inseparable component in NRM that reflects the need for new modes of governance and knowledge generation to deal with increasing uncertainty and complexity (Pahl-Wostl 2009). Inviting the incorporation of local knowledge in the early stages of the planning process for MPAs may well be an effective way to foster participation, and empower stakeholders in the governance of marine resources (Scholz et al. 2004). Co-management research shows that fishermen and fishing communities are often equipped with a high level of local and experiential knowledge regarding fish populations and marine ecology that can contribute to data generation during planning and processes (Bown et al. 2013; Campbell et al. 2013; Jones & Burgess 2005; Scholz et al. 2004; Zurba et al. 2012). However, social conditions, constructive personal behaviour, and social learning can be the essential elements that contribute to participant interactions for sharing their information and knowledge in the planning process (Dalton 2005; Hildebrand 1997; Hoelting et al. 2013; Muro & Jeffrey 2012). Information that is freely exchanged among all participants enhances knowledge
about the natural and social characteristics of MPAs (Dalton 2005). Active involvement by participants throughout the planning process can also contribute to the interests and knowledge of stakeholders being integrated into planning decisions (Figure 2.4). In a participatory planning and implementation system, participants might view a process in which they understand how decisions are reached and all have an equal opportunity to participate. A process in which participants interact with one another in positive ways helps reduce conflict between stakeholders and builds strong working relationships (Dalton 2005).

<table>
<thead>
<tr>
<th>Participatory process feature</th>
<th>Possible impact on process</th>
<th>Potential process output</th>
<th>Desired outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active participant involvement</td>
<td>Local knowledge and interests incorporated into discussions</td>
<td>Improved knowledge of natural and social characteristics of marine environment</td>
<td></td>
</tr>
<tr>
<td>Decisions based on complete information</td>
<td>Improved knowledge of natural and social characteristics of marine environment</td>
<td>Participants trust each other and decision makers</td>
<td>MPA achieves Objectives, such as:</td>
</tr>
<tr>
<td>Fair decision making</td>
<td>Participants trust each other and decision makers</td>
<td>Sustainable participation</td>
<td>Increased fish abundance, improved community support and protection of biodiversity</td>
</tr>
<tr>
<td>Efficient administration</td>
<td>Sustained participation</td>
<td>Enhanced working relationships</td>
<td></td>
</tr>
<tr>
<td>Positive participant interactions</td>
<td>Improved decisions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 2.4 Relationship between participatory processes and management of marine protected areas (adapted from Dalton 2005: 1398).*

To manage human activities in the ocean effectively, and MPAs in particular, engaging stakeholders in dialogue that crosses disciplinary boundaries is necessary (Dalton 2005). A participatory planning and implementation process facilitates decision-making that allows the dynamic response of the system to external forces and provides scope to adapt to the unanticipated and the uncertain (Abecasis et al. 2013a; Agardy et al. 2003; Batista et al. 2011; Christie 2011; Chuenpagdee et al. 2013; Day & Dobbs 2013; McFadden et al. 2009; Micheli & Niccolini 2013).

### 2.5 Relevant learning theories

This dissertation addresses stakeholder learning with managers and uses ‘social learning’ as a core learning theory for understanding co-learning in the MPA management (see Section 2.6). Social learning theory posits that people learn from one another, via observation, imitation, and modelling (Bandura 1973; Bandura 1977, 1986). The thesis also considers ‘community of practice’, ‘situated learning’ and ‘experiential learning’ theories (Figure 2.5) as components of the broader theoretical framework (Chapter 3).
The three major characteristics of Communities of Practice are community, domain and practice. Situated learning theory posits that learning is unintentional and characterised by issues of authenticity of activity, context, and culture (Lave & Wenger 1990). Social interaction and collaboration are essential components of situated learning, where learners become involved in a ‘community of practice’ that embodies acquired beliefs and behaviours. Accordingly, learning is the process whereby knowledge is created through the transformation of experience (Kolb 1984). These four learning theories are related by each having three of the four major characteristics (inside the circles in Figure 2.5) frequently identified in learning theory (see Appendix 1).
2.6 Learning frameworks used in the literature

The aim of this section is to critically analyse the learning frameworks used in the literature to obtain an insight for developing a co-learning framework for MPA management (Section 2.8). There are similarities between learning and NRM frameworks (Table 2.2).

Table 2.2 Learning frameworks related to natural resources management.

<table>
<thead>
<tr>
<th>Framework and reference</th>
<th>Key features</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional Analysis and Development (IAD) (Andersson 2009: 346)</td>
<td>Particularly useful for analysing the conditions that help explain variations in the governance performance of collective goods and services at sub-national scales of society. As such, the framework can help practitioners and scholars in their search for solutions associated with collaborative learning.</td>
<td>[Diagram]</td>
</tr>
<tr>
<td>Sectorally and vertically integrated decision-making process (Tompkins &amp; Adger 2004: 10)</td>
<td>Involves identifying and engaging key stakeholders; defining their interests and objectives for the resource; managing conflicts; engaging them in a process of information dissemination and dialog to explore their preferences for managing the area; collecting and analysing economic, social, and ecological data to understand the impacts of different future scenarios on important criteria; analysing data; resolving existing conflicts; and finding areas of agreement between stakeholders.</td>
<td>[Diagram]</td>
</tr>
</tbody>
</table>
| Anticipatory learning (Tschakert & Dietrich 2010: 11) | Five elements:  
- lessons learned from the past (memory);  
- monitoring and analysis of trends to anticipate future events;  
- deliberate surprises, perturbations, and discontinuities that distinguish anticipated change from known (and potentially also cyclical) change;  
- measures of anticipatory capacity; and  
- design of decision-support tools for adaptation planning.  
This enables poor and vulnerable communities to transform their current conditions into more desirable and resilient futures. The process highlights their rights and skills to reduce harm and avoid undesirable thresholds by providing space for their framings and imaginations. | [Diagram] |
<table>
<thead>
<tr>
<th>Framework and reference</th>
<th>Key features</th>
<th>Diagram</th>
</tr>
</thead>
</table>
| Anticipatory action learning (AAL) (Inayatullah 2006: 657) | Anticipatory action learning/research is collaborative, and works within the epistemological framework of participation. It differs from futures research by:  
• being less driven by expert forecasts and being more attuned to participatory learning processes, particularly questioning;  
• the category of ‘future’ is not a *priori* given, but emerges through the questioning process, it is based on the knowing categories of participants, and  
• while critical, it does not accede to any particular tradition of critical theory (e.g., ontological or Indic) but rather draws from the actors’ own epistemological categories. | ![Diagram of Traditional research, Present, Action learning, Future, Anticipatory action learning, Action learning/research] |
| Double-loop learning (Fazey et al. 2005: 4) | Feedback from the real world can induce change in mental models. Change in the mental model leads to new goals and decision rules, not just new decisions. | ![Diagram of Double-loop learning] |
| Triple-loop learning applied to governance regimes (Pahl-Wostl 2009: 361) | It is assumed that interactions in formal policy cycles are restricted mainly to single-loop learning. Informal learning processes are required to support double-loop or even triple-loop learning. | ![Diagram of Triple-loop learning] |
| Sequence of learning cycles in the concept of triple-loop learning (Pahl-Wostl 2009: 359) | Single-loop learning refers to an incremental improvement of action strategies without questioning the underlying assumptions. Double-loop learning refers to a revisiting of assumptions (e.g. about cause–effect relationships) within a value-normative framework. In triple-loop learning one starts to reconsider underlying values and beliefs, world views, if assumptions within a world view do not hold anymore. | ![Diagram of Sequence of learning cycles] |
| Multiple loop learning (Armitage et al. 2008: 89) | This type of multiple loop learning directs attention to the norms and protocols upon which single- and double-loop learning are predicated or governed. There are important interconnections among collaborative processes that are interactive and participatory, the process of social learning, | ![Diagram of Multiple loop learning] |
and their products, which may facilitate further collaboration. These outcomes are especially important as it is congruency (or incongruency) between intentions and actions that prompt changing routines, altering underlying values, and/or developing innovative governance norms and protocols.

Social learning in resources management (Pahl-Wostl et al. 2007: 30)
In the centre are multiparty processes that are influenced by the context in which they are embedded and that produce outcomes that may lead to changes in the context, and thus to a cyclic and iterative long-term process of change.

Organisational learning cycle (Berkhout et al. 2006: 140)
Organisational learning can be seen as a cycle that begins with a stimulus leading to the generation of variation through experimentation and search. It proceeds with a process of internal selection, articulation and codification, followed by the replication and enactment of new routines across the organisation, finally returning to the beginning of a new cycle of innovation by virtue of a new stimulus.

Contextual learning (Smith & Smith 2006: 104)
It allows the conceptualisation of learning in terms of structural and process connectivity (i.e., how data and information relate to the situation in question and how that information is assimilated and exchanged). Hence, the contextual learning framework can be used to formulate objectives based on desired learning outcomes.

Adaptive learning process (Reed et al. 2006: 414)
It integrates bottom–up and top–down approaches into a framework that combines best practice, from the different methods, into a single framework to guide any local sustainability assessment. It uses systems theory that is interdisciplinary, using both qualitative and quantitative methods. It also draws on social learning to develop a process that stimulates change of individuals and systems through an ongoing process of learning and negotiation.

The Institutional Analysis and Development (IAD) framework stresses people’s participation in the entire cycle from planning to evaluation, considering collaborative
learning as one of the core components of the adaptive decision cycle (Andersson 2009). Similarly, in the sectorally and vertically integrated decision-making process framework, stakeholders are involved in the whole process of decision-making, including data collection and information dissemination (Tompkins & Adger 2004). Both the anticipatory learning and anticipatory action learning frameworks stress stakeholder prior learning, skills and rights for future management rather than forecasting and future research (Inayatullah 2006). In the double-loop learning framework, in one loop, a decision is made, acted on, and the results used to inform better decision-making (Fazey et al. 2005). Feedback from the actions in the first loop can also induce change in the mental model, which is represented in the second loop. Triple loop learning results in changes in governance norms and protocols in the context of collaborative learning and environmental and resource management (Armitage et al. 2008). The triple loop learning framework has also been applied in the context of adaptive governance, with an assumption that interactions in formal policy cycles are mainly restricted to single-loop learning where informal learning processes are required to support double-loop and triple-loop learning.

In the social learning framework (Pahl-Wostl 2007), the overall process aims to improve both technical qualities, such as the improvement of the state of the environment, and relational qualities, such as an increase in the capacity of a stakeholder group to manage a problem and/or institutional change. This framework stresses framing and reframing of the problem domain, which determines the overall learning process. Frames may be derived from culture, social roles, and scientific disciplines. The contextual learning framework (Smith & Smith 2006) is a comprehensive learning framework for institutional learning in coastal zone management, which provides a mechanism to institutionalise continuous improvement for coastal sustainability. By integrating approaches from different paradigms, the adaptive learning framework (Reed et al. 2006) process offers a holistic approach for measuring a learning progress towards sustainable development. It emphasizes the importance of participatory approaches and setting the context for sustainability assessment at local scales, but stresses the role of expert-led methods in indicator evaluation and its dissemination.

The frameworks in the literature reveal that adaptive learning is dynamic and cyclical, rather than linear, where feedback or sharing is vital. It is also evident that multi-loop learning is much better than single loop to address stakeholder participation and overall sustainability, as it deals not only with seeking solution response to impacts but also with the reasons or factors behind this and therefore includes anticipated action learning for the future. However, creating and maintaining a dynamic sharing loop may be the necessary cycle of building and maintaining a co-learning framework in MPA.
2.7 Interrelationships of ‘group learning’ concepts and its application in MPA management

Learning is an active, constructive process requiring new information, ideas or skills and purposeful synthesis (Smith & MacGregor 1992). Learning in NRM is essentially the reflection of stakeholders’ experiential learning where organisation play in promoting communicative process (Muro & Jeffrey 2012) necessary for applying such stakeholders learning. The scholars of experiential learning theory provide six propositions, such as learning is best conceived as a process, learning is relearning, it requires the resolution of conflicts, it is a holistic process of adaptation to the world, it results from synergetic transition between the person and environment and is the process of knowledge creation (Kolb & Kolb 2005). Group-learning, a central theme in the history of adult learning (Hugo 2002), is a social process and an expression of the desire to engage with, learn with, and create local knowledge (Stein 2002).

The learning concepts discussed in this chapter are interrelated, as all of them share the common thread of ‘group learning’. This dissertation uses the notion of co-learning as a target learning for the stakeholder groups (e.g., government and non-government) in MPAs management. Individual group or different stakeholder groups might achieve co-learning through the vehicles of social learning or adaptive learning or in a combination of both (Figure 2.6).
Although individual or groups of stakeholders represent different organisations in MPAs (e.g., government or non-government, direct users or conservation or aesthetic stakeholders), they may act differently and as dual entities. For these characteristics, ‘group learning’ interrelationships are considered separately both within and across group and organisation levels. For example, beneficiaries in an MPA (i.e., consumptive, non-consumptive, academic and government) might be united in their opinions for a particular position during re-zoning if they have learnt together or have similar learning about the probable impacts of re-zoning. Both social and adaptive learning might be involved to reach such co-learning and consensus, although social learning seems to be more effective for non-government beneficiaries, as it can include a large number of people and does not always require public participation. Social learning requires the continuous free-flow of information, whereas, adaptive learning proceeds through a trial-error type ‘learning by doing’ mechanism, which might be more relevant to government beneficiaries due to better institutional capacities. However, government beneficiaries can benefit from social learning towards co-learning beyond the traditional hierarchy level. At the organisation level, co-learning seems to be embedded with organisational and policy learning along with social and adaptive learning. Organisational learning might not only embrace social learning by using social media or networks for co-learning, but also create a co-learning
environment through practising policy and adaptive learning. All these learning practices in an organisation may help practising adaptive management despite a lack of preparedness for dealing with future uncertainties. While all uncertainties may not be able to be anticipated, anticipated action learning might be useful in organisational decision-making process for managing a MPA where fostering stewardship is part of the tools being applied. Co-learning practices within a group or between groups of stakeholders will require knowledge flow to inform stakeholder-focused management actions. However, management actions might require stakeholder participation in every stage of implementing, monitoring, evaluating and replanning, which may ultimately reinforce co-learning.

2.8 Developing a co-learning framework for MPA management

The learning frameworks in the context of adaptive co-management in the literature mainly focus on: (1) definitions of learning; (2) learning goals, objectives and expectations; (3) mechanisms by which learning takes place; (4) probable actors who are involved in the process of learning; (5) importance and process of feedback, and (6) the merits and demerits of learning in different field of NRM. Despite the variations in the field of application, most of the learning frameworks address context, process and outcomes, and stress the necessity for feedback. These might require a comprehensive and transparent monitoring programme as well. Stakeholders’ participation in cooperation and collaboration is also emphasised to achieve learning goals. The collaborative learning approach has turned out to be difficult to implement at broader scales, as the creation of collaborative learning systems is plagued by several motivational dilemmas of stakeholders (Andersson 2009), as not all the stakeholders have similar interest and passion for participation. Examining 18 collaborative or community-based ecological assessment or monitoring projects, Fernandez-Gimenez et al. (2008) found that collaborative monitoring can lead to shared ecological understanding among diverse participants, build trust internally and credibility externally, foster social learning and community-building, and advance adaptive management. Despite substantial works on adaptive co-management, with a focus on the synergies between existing monitoring frameworks, collaborative monitoring approaches and social learning, relatively less attention has been given to methodological approaches that might facilitate learning as part of the monitoring process (Cundill & Fabricius 2009). Perhaps the most important lesson from stakeholders’ participation in collaborative management is the development of a common understanding of a problem through the development of working framework with key stakeholders.
Such a framework for common understanding might be developed through co-production of knowledge and learning from stakeholders' experiences, considering the existing management situation and uncertainties or anticipated future changes.

Considering the learning issues discussed in this chapter, the research intended to develop a co-learning framework based on the findings from the MBMP case study (see Chapter 7). A co-learning framework would be a mechanism for embracing other learning practices (Table 2.3), such as adaptive learning, social learning, organisational learning, policy learning, and anticipated action learning, with a stronger participatory planning implementation system (Figure 2.7).

### Table 2.3 Characteristics of co-learning components and its implementation derived from literature

<table>
<thead>
<tr>
<th>Co-learning components and criteria in literature</th>
<th>Alignment with the MBMP management case study results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Components</strong></td>
<td><strong>Key characteristics</strong></td>
</tr>
<tr>
<td>Adaptive learning</td>
<td>Ongoing participation of affected stakeholders</td>
</tr>
<tr>
<td></td>
<td>Continual reviewing and changing practices based on</td>
</tr>
<tr>
<td></td>
<td>observation and reflection</td>
</tr>
<tr>
<td></td>
<td>Multi-way information flow</td>
</tr>
<tr>
<td></td>
<td>Combination of different types (biological and social; experimental and local) of knowledge</td>
</tr>
<tr>
<td>The case study results have been analysed through the lenses of these learning characteristics and participatory implementation strategy to understand the actual learning practices in the MBMP rezoning process and onsite day-to-day management (see Chapters 4-6).</td>
<td></td>
</tr>
<tr>
<td>Social learning</td>
<td>Collective action and reflection in management</td>
</tr>
<tr>
<td></td>
<td>Interaction and sharing experiences for joint action</td>
</tr>
<tr>
<td></td>
<td>Rigorous dialogue among diverse stakeholders</td>
</tr>
<tr>
<td></td>
<td>Collaborate, understand and respect other's role</td>
</tr>
<tr>
<td></td>
<td>Learning by imitating or copying from others</td>
</tr>
<tr>
<td></td>
<td>Integration of scientific and local knowledge</td>
</tr>
<tr>
<td></td>
<td>Change in understanding beyond individual</td>
</tr>
<tr>
<td></td>
<td>Social interaction among stakeholders and beyond</td>
</tr>
<tr>
<td></td>
<td>Social interaction among stakeholders</td>
</tr>
<tr>
<td></td>
<td>Stakeholders' easy access to necessary information</td>
</tr>
<tr>
<td></td>
<td>Informal sessions for sharing ideas and concerns</td>
</tr>
<tr>
<td>Organisational learning (Organisation denotes users organisation, government organisation and NGOs)</td>
<td>Knowledge creation and dissemination within group</td>
</tr>
<tr>
<td></td>
<td>Knowledge creation and dissemination beyond group</td>
</tr>
<tr>
<td></td>
<td>Knowledge creation, dissemination and preservation within the Department</td>
</tr>
<tr>
<td></td>
<td>Knowledge creation, dissemination and preservation beyond the Department</td>
</tr>
<tr>
<td></td>
<td>Interactions among diverse stakeholders</td>
</tr>
<tr>
<td></td>
<td>Participatory decision making within organisation</td>
</tr>
<tr>
<td>Policy learning</td>
<td>Practice of social learning in policy process</td>
</tr>
<tr>
<td></td>
<td>Consistency of community information and effort with policy framework and management plan</td>
</tr>
<tr>
<td></td>
<td>Rigorous dialogue among communities in policy development</td>
</tr>
<tr>
<td></td>
<td>Use of local knowledge through planning process, starting early</td>
</tr>
<tr>
<td></td>
<td>Influence of policy to create supportive learning environment</td>
</tr>
<tr>
<td></td>
<td>Policy development by political biased versus stakeholder focused</td>
</tr>
<tr>
<td></td>
<td>Continual improvement through monitoring and evaluation</td>
</tr>
<tr>
<td>Anticipated action learning</td>
<td>Addressing future uncertainties (e.g., climate change)</td>
</tr>
<tr>
<td></td>
<td>Adaptation plan to face new challenge or uncertainty</td>
</tr>
<tr>
<td></td>
<td>Stewardship programmes for next generation learners</td>
</tr>
<tr>
<td>Participatory planning and</td>
<td>Shared problem identification</td>
</tr>
<tr>
<td></td>
<td>Integration of scientific and local knowledge</td>
</tr>
</tbody>
</table>
|                                                  | University of the Sunshine Coast 39
Co-learning for MPA management improvement might require using learning through stewardship, partnerships and community engagement in biodiversity conservation and NRM decision-making. The framework might also require using both formal and informal processes for creating sustainable options for the future and makes explicit links between co-learning, planning and action for sustainability through continuous knowledge and learning sharing loop, which could serve the role of bonding different learning practices. A key element of informed participation is that stakeholders have access to different knowledge and learning, and are sufficiently equipped to understand and resolve complex issues (Alem & McLean 2005; Walker 2002). Similarly, stakeholder learning is essential as science alone cannot provide all the answers, and has to be combined with a structured process of shared learning (Allen et al. 2001).

Figure 2.7  Co-learning framework for MPA management improvement.
The co-learning framework is also useful for defining the ecosystem services in NRM and managing existing maintenance of what stakeholders value in the systems (Cork et al. 2001; Hagmann et al. 2002) and might have a similar contribution in MPA management. Therefore, the proposed framework is an initiative to understand the existing learning practices in the case study area including the learning barriers. The another purpose is to examine the knowledge and learning sharing process to develop iterative and dynamic feedback or sharing loop.

Reflection from experience and the literature reviewed throughout this chapter suggests that NRM systems, such as MPAs, already have different forms of information and learning that are diffuse and disconnected (‘A’ in Figure 2.7). These learning practices are interdependent or interrelated in nature (Table 2.3), considering that these might be inadequate and disjointed in the case study area. It would be worthwhile to examine the level and extent of these learning practices to understand the gap in co-learning practices. The proposed framework also assumes that the MBMP management system might require an integrated continuous process of sharing-updating/experiencing-sharing mechanism (‘B’ in Figure 2.7), through which disjointed learning would become a formal integrated and interconnected process (‘C’ in Figure 2.7). Therefore, the existing routine management activities, with stakeholder responses, might be able to create a resilient system by going through the process of integrated and structured learning. This is because existing information and knowledge sharing among stakeholders would support shared understanding, which ultimately leads to improved participation (Alem & McLean 2005). This structured form of learning is denoted as co-learning, which may help improve management outcomes through improving compliance and satisfaction, based on a trustful relationship between managers and users. The framework might create the premise of free flow of information and shared learning through testing in the field, as many stakeholders may have reservations, with some justification, that their information might be used incorrectly, or against them.
Chapter 3

**Methodology: A Way of Exploring Co-learning Process and Barriers**
Chapter 3
Way of exploring co-learning processes and barriers

3.1 Chapter overview

3.2 Evolution of research context/problem
3.3 Theoretical framework linked to the research questions

3.4 Study area
3.5 Data collection and analysis

5.6 Ethics
5.7 Conclusions

Figure 3.1 Structure of the Chapter 3
CHAPTER 3

METHODOLOGY: A WAY OF EXPLORING CO-LEARNING PROCESSES AND BARRIERS

3.1 Chapter overview

This chapter describes the methodological approach taken to conduct this research. It presents the methodological development of the dissertation and includes the systematic processes and mechanisms for exploring the research questions. The methodology recognises the epistemology, relevant learning theories for the study and methods to achieve the overall goals of the research. Initially, the evolution of research in the context of learning between managers and stakeholders in MPAs is discussed (Figure 3.1). This is followed by the theoretical framework associated with the research questions, data collection, and finally the analytical framework linked to a summary of the learning theories relevant to this research. The research methods used in this study have been selected to collect data that will help answer the research questions and meet the objectives of the research.

3.2 Evolution of research context/ problem

In this research evidence that co-learning is currently used in decision-making processes was investigated by trying to understand and analyse the way in which an organisation formulates, implements and evaluates MPA Management Plans. The aim was to contribute to the literature on social learning practices of different stakeholder organisations (e.g., government and non-government) within a specific MPA. Sources of information used by management and their decision-making framework and information arising from their decisions were investigated through: (1) analysis of management plans, and (2) interviews with the key stakeholders.

This research aims to address the evidence for social learning among stakeholders and management outcomes in MPAs. It attempts to identify the factors that foster or hinder social learning between stakeholders. Moreover, it aims to develop an effective co-learning framework in the context of a MPA management. Stakeholder experiences with resource dynamics, sustainable use and associated needs, accessing information and knowledge to aid in their understanding and collective involvement in social learning processes are the core components of the study. Understanding different perspectives, such as those of technical personnel (e.g. managers, biophysical scientists, policy makers) and other stakeholders are the main interest. Finally, how experiences, attitudes and life
circumstances of these diverse stakeholders can contribute to fostering a shared learning environment for mutual benefit of resource utilisation and management is addressed.

3.3 Methodology

The methodology links the methods for data generation and analysis and the theoretical perspective or assumptions that frame how this research intends to answer the questions. This exploratory research seeks to find out how management and stakeholders interact in the setting of MPA management and what issues concern them? This research aims to identify the role of stakeholder participation in addressing issues of community learning through applying social learning theory (see Chapter 2). The goal is to understand how learning is established in management and whether shared learning exists among and between the management sector and stakeholders.

Epistemologically, this is a study of constructivism (Table 3.1), as it explores how stakeholders in the MPA construct their reality in the context of management, based on perceptions, truths, explanation, beliefs, experiences, worldviews and finally learning (Patton 2002). The research deals with subjects or participants and is rooted in the constructivist paradigm as it stresses the importance of exploring how different stakeholders in a social settings construct their beliefs and practices (Guba & Lincoln 2005).

Table 3.1 Research paradigms, methods and tools
(adapted from Cohen & Manion 1994; Creswell 2003; Crotty 1998; Lindlof & Taylor 2002; Maykut & Morehouse 1994; Mertens 2005)

<table>
<thead>
<tr>
<th>Paradigm</th>
<th>View of reality-Ontology</th>
<th>Evidence for knowledge about reality-epistemology</th>
<th>Relationship between researcher and research</th>
<th>Compatible methods</th>
<th>Data generation tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positivist-objectivist</td>
<td>Independent of the knower; singular; and objective</td>
<td>Observation of empirical phenomena; reducing the whole into variables; experiments; cause and effect generalised</td>
<td>Objectivity is possible; researcher can stand outside; values can be suspended for the purpose of research.</td>
<td>Quantitative</td>
<td>Experiments Quasi-experiments Tests Scales</td>
</tr>
<tr>
<td>(traditional scientific)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-positivist/</td>
<td>Physical and social worlds exist independently of human</td>
<td>Created through search for causal explanations; causes are multiple interactive and evolving; social actors' perspectives are subjective but relevant</td>
<td>Absolute objectivity and value free inquiry unobtainable but reduction in bias is obtainable and desirable.</td>
<td>Quantitative methods tend to be predominant although qualitative methods can be used.</td>
<td></td>
</tr>
<tr>
<td>critical realist</td>
<td>consciousness; beliefs about reality are multiple; partial, approximate.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constructivist</td>
<td>Realities are socially constructed, plural, contextual</td>
<td>Meaningful realities emerge through interaction between researcher and researched are interdependent</td>
<td>Researcher and researched are interdependent</td>
<td>Qualitative methods predominate although</td>
<td></td>
</tr>
</tbody>
</table>

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Constructivism, as a paradigm or worldview, posits that learning is an active, constructive process\(^1\). In this process, a learner is an information constructor who actively constructs or creates his own subjective representations of objective reality. Constructivist approaches to research have the intention of understanding "the world of human experience" (Cohen & Manion 1994: 36), suggesting that "reality is socially constructed" (Mertens 2005: 12). The constructivist researcher tends to rely upon the "participants' views of the situation being studied" (Creswell 2003: 8) and recognises the influence on the research of their own background and experiences. Constructivists do not generally begin with a theory (as with post-positivists or reductionists); rather, they "generate or inductively develop a theory or pattern of meanings" (Creswell 2003: 9) throughout the research process. The constructivist researcher is most likely to rely on qualitative data collection methods and analysis or a combination of both qualitative and quantitative methods (mixed methods). Quantitative data may be utilised in a way that supports or expands upon qualitative data and effectively deepens the description and analysis. This dissertation was guided by a theoretical framework (Figure 3.2) based on the hypothesis that knowledge is co-generated through social learning processes.

\(^1\) Learning-Theories.com: http://www.learning-theories.com/constructivism.html
Chapter 3 Methodology: a way of exploring co-learning processes and barriers

Figure 3.2 Methodological tree

Under the umbrella of a constructivist paradigm, this research explored stakeholders’ knowledge and learning for MPA management through their experiences, observation, reflection and personal interpretation. The exploration started with a conceptual model (see Chapter 1, section 1.8), based on the arguments in the literature and researcher’s personal experiences in NRM, particularly fisheries and aquaculture management about impacts of co-learning on MPA management. The model was then compared with the learning scenarios in the case study area, particularly with the findings from document analysis and interview data analysis to support the thesis statement about co-learning in MPA management.

The theoretical framework for this study is located in the social learning literature associated with the theories of communities of practice, situated learning and experiential learning (see Chapter 2 and Appendix 1). A community of practice has the characteristics of a joint enterprise and mutual engagement among people who engage in a process of collective learning in a shared domain of human endeavour (Wenger 1998). Social learning theories acknowledge the role of modelling, observational learning, subjectivity, intentionality, and a plurality of socio-cultural contexts productive of multiple identities and
literacy. Learning is viewed as a social process with implications for identity-building occurring over an individual’s experiences in lifespan in formal and informal situations.

3.4 Study area

This study draws on two different approaches to collect and interpret data from a particular case study, used as a vehicle to understand the co-learning context of marine protected area management. The case study area is the Moreton Bay Marine Park (MBMP). The MBMP is one of Queensland's iconic coastlines covering 3400km² and stretches 125km southward from Caloundra to the Gold Coast and extends three nautical miles offshore (DERM 2011). It takes in most of the Bay's tidal waters, including many river estuaries and extends seaward to the limit of Queensland waters. The MBMP was declared in 1993 to protect the Bay's unique values and high biodiversity while still allowing for people to use and enjoy it (DERM 2011). The marine park protects a range of marine and coastal environments (including rocky shores, internationally significant wetlands, coral reefs, mangroves, seagrass meadows and sandy beaches) through zoning, designated areas, regulations and permits. Guided by the zoning plan, the MBMP strives to maintain a balance between protecting the marine wildlife and habitat and allowing access, and ensuring correct use, by the public (DERM 2011). The Department of Environment and Resource Management (DERM), which is now called DNPRSR (Department of National Parks, Recreation, Sports and Racing), manages the marine park as a multiple-use marine protected area (MPA). The multiple-use approach recognises that people use and value marine park resources in many different ways. Unlike a national park on land, where everything is protected to the greatest possible extent, the marine park allows for a range of recreational and commercial activities (DERM 2011). Management of Moreton Bay and the marine park is focused on retaining a diverse, resilient and productive ecological system that can be enjoyed in the present and future. History, legal framework and governance of MBMP are discussed further in Chapter 4.

3.5 Data collection and analysis

3.5.1 Defining the types of data required

The selection of methods was based on the concept of science as a continuous cycle of action and reflection of learning in a social setting with people and real issues in the context of MPA management. Analysis of the success or failure of the intervention of any management instrument could contribute to a more credible assessment of co-learning in natural resource management. This thinking led to the development of a multi-method approach combining a variety of qualitative inquiry techniques, including document review.
and semi-structured interviews with key stakeholders (Table 3.2). These considerations led to the selection of the following data collection methods:

- a review of literature relevant to the topic (Chapter 2);
- case study related document analysis (Chapter 4);
- semi-structured interviews with key stakeholder representatives (Chapters 5 and 6);
- a discussion of data and comparison of results with published material (Chapter 7).

<table>
<thead>
<tr>
<th>Intend to know</th>
<th>Data collection methods</th>
<th>Analysing tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of co-learning framework</td>
<td>Literature review</td>
<td>NVivo 10</td>
</tr>
<tr>
<td>Links, knowledge flow, learning flow</td>
<td>Zoning plan and interview</td>
<td>Document analysis (SWOT) &amp; NVivo 10</td>
</tr>
<tr>
<td>Possible ways of removing barriers</td>
<td>Interview</td>
<td>Thematic analysis with NVivo 10</td>
</tr>
</tbody>
</table>

The document analysis process included both primary and secondary documentation (zoning plans, Acts and Regulations, related reports, local media). Interviews were conducted with key informants comprising direct resource user groups (e.g., commercial fishermen, recreational fishermen, fish tackle and tourism operators), conservation groups, MBMP management staff, government policy makers (local and state) and academic researchers.

3.5.2 Sampling and data collection

A literature review was undertaken of material relevant to the topic and identified through the application of the above-mentioned approaches. This included journals, books, government and international organisation’s reports and published theses using internet search tools and library databases. A search of grey literature, zoning plans, annual reports, Acts and Regulations and published documents from the DNPRSR was also conducted for document analysis (see Chapter 4).

Qualitative research was conducted to develop a deeper or broader concept on the learning and knowledge sharing issues relating to the MBMP. A range of stakeholders (Table 3.3) with intimate knowledge and involvement in the management of the MBMP was selected for semi-structured interviews. Statistical representativeness was not the aim of this study. This means interviewees were selected because they are likely to generate data for the study. To ensure that this sample was credible, and covers the main groups interested, maximum variation was sought within the study limits. This involved selecting key stakeholder based on variables that are likely to have an influence on stakeholder views of the topic of this dissertation. While the aim is not to generalise

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2 NVivo 10: Qualitative data analysis software, which assists data organisation, analysis and visualisation (http://www.qsrinternational.com/products_nvivo.aspx).
statistically, it is useful to think in terms of minimising sample bias. This simply means that the selected stakeholders may not be representative of the general population. But the aim is to include a range so that the research does not have obvious limitations.

A combination of purposive and snow-ball sampling (Patton 2002) was followed to identify key informants from the relevant agencies and organisations (Table 3.3). Initial interviewees were chosen based on their level of involvement in resource use and management in the MBMP areas. These participants were asked to recommend other individuals significantly involved in similar aspects of MBMP management. In this manner, a representative cross section of stakeholders directly involved in the park’s management was generated.

<table>
<thead>
<tr>
<th>No. of interviewees</th>
<th>Representative organisation</th>
<th>Code for using in analysis</th>
<th>Length of interview (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Commercial fishing industry</td>
<td>Consumptive Beneficiaries (CB)</td>
<td>93</td>
</tr>
<tr>
<td>1</td>
<td>Tackle industries</td>
<td>Consumptive Beneficiaries (CB)</td>
<td>52</td>
</tr>
<tr>
<td>1</td>
<td>Moreton Bay Access Alliance</td>
<td>Consumptive Beneficiaries (CB)</td>
<td>39</td>
</tr>
<tr>
<td>1</td>
<td>Recreational fishing industry</td>
<td>Consumptive Beneficiaries (CB)</td>
<td>75</td>
</tr>
<tr>
<td>1</td>
<td>Game fishing</td>
<td>Consumptive Beneficiaries (CB)</td>
<td>49</td>
</tr>
<tr>
<td>1</td>
<td>Conservation group</td>
<td>Non Consumptive Beneficiaries (NCB)</td>
<td>67</td>
</tr>
<tr>
<td>1</td>
<td>Conservation group</td>
<td>Non Consumptive Beneficiaries (NCB)</td>
<td>41</td>
</tr>
<tr>
<td>1</td>
<td>Conservation group</td>
<td>Non Consumptive Beneficiaries (NCB)</td>
<td>56</td>
</tr>
<tr>
<td>1</td>
<td>University (Ex DNPRSR staff)</td>
<td>Academic</td>
<td>53</td>
</tr>
<tr>
<td>1</td>
<td>Griffith University</td>
<td>Academic</td>
<td>47</td>
</tr>
<tr>
<td>1</td>
<td>University of Queensland (Social)</td>
<td>Academic</td>
<td>56</td>
</tr>
<tr>
<td>1</td>
<td>University of Queensland (Social)</td>
<td>Academic</td>
<td>84</td>
</tr>
<tr>
<td>1</td>
<td>CSIRO</td>
<td>Academic</td>
<td>73</td>
</tr>
<tr>
<td>1</td>
<td>Moreton Bay Regional Council</td>
<td>Local Government Beneficiaries (LGB)</td>
<td>51</td>
</tr>
<tr>
<td>1</td>
<td>Gold Coast City Council</td>
<td>Local Government Beneficiaries (LGB)</td>
<td>61</td>
</tr>
<tr>
<td>1</td>
<td>DNPRSR (Field management level)</td>
<td>State Government Beneficiaries (SGB)</td>
<td>65</td>
</tr>
<tr>
<td>1</td>
<td>DNPRSR (Ranger level)</td>
<td>State Government Beneficiaries (SGB)</td>
<td>52</td>
</tr>
<tr>
<td>1</td>
<td>DNPRSR (Field management level)</td>
<td>State Government Beneficiaries (SGB)</td>
<td>70</td>
</tr>
<tr>
<td>1</td>
<td>DNPRSR (Executive level)</td>
<td>State Government Beneficiaries (SGB)</td>
<td>54</td>
</tr>
<tr>
<td>1</td>
<td>DNPRSR (Executive level)</td>
<td>State Government Beneficiaries (SGB)</td>
<td>40</td>
</tr>
<tr>
<td>1</td>
<td>DAFF</td>
<td>State Government Beneficiaries (SGB)</td>
<td>86</td>
</tr>
<tr>
<td>1</td>
<td>Cabinet employee (NRM)</td>
<td>State Government Beneficiaries (SGB)</td>
<td>56</td>
</tr>
<tr>
<td>1</td>
<td>Political advisor to a Minister</td>
<td>State Government Beneficiaries (SGB)</td>
<td>53</td>
</tr>
</tbody>
</table>

Total=23 1529

The interview questions (nine in all) (Appendix 2) were designed to elicit the views of stakeholders on the learning experiences and knowledge sharing between park managers and the community before and during the MBMP ZP 2008 development and implementation. The questions were pilot tested with people outside of the participant pool.

Interviews were conducted in a mutually agreeable location, mostly in the participant’s working place or a convenient location decided by the interviewees. All interviews were audio-recorded upon the consent given by the interviewees and the interviewer took additional notes. All interviewees were asked the same questions in a conversational
manner, rather than a question-answer session. Supplementary probing questions were asked to elicit meaning and greater detail for a particular question or if the interviewer felt that a particular point or issue raised by the interviewee was relevant and reasonable for further exploration. Interviews lasted between 40 and 93 minutes. Interviews were conducted in the Sunshine Coast, Moreton Bay, Brisbane City and Gold Coast Council areas of southeast Queensland, Australia between 29 May and 07 September 2012.

3.5.3 Data processing and analysis

After completion of the data collection, the data were collated and managed in a database system with software, “NVivo10”, for analysis. This involved a journey of searching co-learning evidence in the case study area in three ways: assessing learning opportunity from management instruments; assessing information from key stakeholders; and exchange of information and learning from the key stakeholders (Table 3.4).

<table>
<thead>
<tr>
<th>Objective</th>
<th>Methods</th>
<th>Brief description of process and analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessing learning evidence from management plan</td>
<td>Information uses in the plans through document analysis</td>
<td>Analysis of plan and management instruments for searching evidence of integration of stakeholders’ knowledge to understand what form of knowledge (what parts of experiential knowledge) was used in the plan and how.</td>
</tr>
<tr>
<td>Assessing learning evidence from stakeholders’ information exchanges</td>
<td>In-depth interview to the learning process since rezoning plan (2008) launched</td>
<td>What information were stakeholders providing since plan launched? What was being used by the management? What were stakeholders receiving? What were stakeholders using?</td>
</tr>
</tbody>
</table>

The research questions are suited more to an inductive approach, as they are largely ‘what’ and ‘how’ questions. Together the approaches and the questions were used to collect data in an attempt to explain co-learning patterns associated with social learning between stakeholders to scope the five main research questions, that sought to examine:

RQ1. What evidence exists for co-learning being embedded in planning for MPA management?

RQ2. What knowledge/learning is being used in planning and on-site management actions for MPA?

RQ3. How is information/learning shared, updated with experience through implementation, and shared updated information?

RQ4. What are the barriers to co-learning?

RQ5. How can these barriers help understanding for stakeholder knowledge integration in MPA planning and management?
Principle elements for an effective co-management system, such as sharing responsibility, balancing power, cooperation, participation, discussion, education and sharing of information, communication, consensus, flexibility and the use of TEK and SEK (Iwasaki-Goodman 2005), were also considered during plan analysis. The difference or gap between the information provided by the stakeholders during plan preparation and its reflection in the final rezoning plan (2008) were identified through interview responses.

Document analysis was undertaken using: (1) a comparative analysis of the Marine Parks (Moreton Bay) Zoning Plan 2008 (MBMP ZP 2008) and the Marine Parks (Moreton Bay) Zoning Plan 1997 (MPMB ZP 1997) and public interpretative information; (2) a strengths, weaknesses, opportunities, and threats (SWOT) analysis of the MBMP ZP 2008; and (3) word analysis, as part of the summative content analysis (Hsieh & Shannon 2005) of the MBMP ZP 2008 with the help of NVivo 10. For comparison, each section of the MBMP ZP 2008 and the MBMP ZP 1997 was carefully read to identify the learning reflection and changes that occurred in the latest plan. The changes were then summarised in a tabular format with discussion. The MBMP ZP 2008 was separately analysed to identify strengths, weaknesses, opportunities and threats through coding the whole plan under these four themes, which was also presented in tabular format as results (Chapter 4). Finally, key words were analysed, according to the summative content analysis of the MBMP ZP 2008 with the NVivo 10 tool to identify their connection and usage in the plan, which gave a critical overview of the plan showing the gaps in the context of co-learning. Summative content analysis starts with identifying and quantifying certain words in text for understanding the meaning of usage where the keywords are derived from interest of researchers or review of literature (Hsieh & Shannon 2005).

Interviews were transcribed to text form and analysed using NVivo 10. The data were labelled and categorised in cross-sectional code and retrieval methods (Spencer et al. 2003), which is a data-driven thematic analysis (Ritchie & Lewis 2003) through searching a whole data set. Cross sectional codes helped obtain a systematic overview of the scope of the data to aid searching themes across the whole data set, rather than within selected parts of the data. This involved initially searching the whole data set for the 100 most frequently used words by all the interviewees (Figure 3.3). This search was for the words having at least five letters (Appendix 3) excluding a number of non-thematic words (Figure 3.4). The size of the rectangle in Figure 3.3 shows the relative quantity of the 100 most frequently used words (Appendix 4). This gave an overview of the data set to revisit the particular texts under the broad themes. Similar types of themes were consolidated in one group for in-depth reading to label according to the specific observations. A new label was created for every new observation or insight. Care was taken to use labels relevant
to the data and not to import information based on knowledge, theories and ideas already known. The coded data were stored according to the emergent themes for further analysis to identify the relationships and connections between different themes. Two-way framework matrices were prepared for every theme, having the theme in the column and interviewees in the rows to identify the connections and contrasts of opinions of the stakeholders for the particular observation. These matrices helped to understand how stakeholders spoke differently on similar issues or observations. These findings were compared and later integrated with secondary data in the results chapters (Chapters 4, 5 and 6).

![Figure 3.3 Schematic view of the 100 most frequently used words list in the interview data set (exclusively from the interviewee's texts, excluding interviewer's text).](image)

![Figure 3.4 Stop words list during searching the most 100 frequently used words in the interview data set.](image)
3.5.4 Triangulation

The original model of triangulation assumes a single reality and ignores the symbolic interactionist foundation of much qualitative work that proposes that different methods (or researchers or participants) will necessarily view or construe the object of the research in different ways (Bazeley 2002). Triangulation is not a tool of validity, rather it overcomes personal biases from single methodologies (Denzin 1989). For triangulation, the dissertation was based on similar studies using different methods (e.g., document analysis and stakeholder interviews) to achieve the same purpose, with a view to providing support evidence for the conclusions drawn. Alternative methods may also “tap different domains of knowing” (Mathison 1988: 14) or encourage or allow expression of different facets of knowledge or experience. For example, people responding to interviews or open-ended questions often raised quite different issues to those provided for in a structured submission essentially for the same purpose. Interviews generate different information, reflecting public versus private views (Morgan 1993) and a preparedness to deal with more sensitive issues in interviews (Kaplowitz 2000). While the use of parallel methods may not, therefore, provide corroborative evidence, they can add depth and breadth to a study and perhaps even hold the key to understanding the processes occurring (Jick 1979; Mark et al. 1997). This study used the level of consistency of the findings from the policy documents and the interview data as a triangulation tool. Both the policy documents and the interview data showed similar evidence regarding co-learning practices in the MBMP rezoning and management (see Chapters 4, 5 and 6).

3.5.5 Limitations

In spite of initiatives to reduce errors in research design and sampling and some limitations in this research method, it provided a very useful dataset for elucidating co-learning patterns of the MBMP. The limitations of this study were:

- focusing on only one case study rather than comparative to others due to time constraints and complexity of in-depth data on learning which was often not overt; not all the representatives participating in the MBMP rezoning process agreed to participate in this research (The sample may not be representative of the full range of users. For example, there was a focus on fisheries-related stakeholders. Local Aboriginal stakeholders were not included, as this would have required considerable time establishing rapport and the small community was also participating in other research thus stretching their capacity);
- not all the participating organisations shared their complete information with the researcher;
Chapter 3 Methodology: a way of exploring co-learning processes and barriers

• limited data about social learning because learning organisations are a relatively new phenomenon in MPA management, this required meticulous data-searching and interpretation; and
• methods of inquiry were limited to document analysis and stakeholder interviews rather than other methods, such as survey, as quantification was not the aim of the study. However the interviews provided in-depth perceptions of participants.

3.5.6 Ethics (conflict of interest, consent, and confidentiality)

As this research involved directly gathering human data, low risk ethics approval was given by the Human Research Ethics Committee of the University of the Sunshine Coast (HREC: S/12/421).

Conflict of interest
As the researcher did not have any prior relationship with the interviewees in the case study area, the chance of conflict of interests arising was minimal.

Consent
The interviewees were informed about the aim of the study and the questions they were asked and gave clear consent to participate in the research.

Confidentiality
Reporting in this dissertation demonstrates due respect to the privacy of the people who assisted with the research and all participants were assured that they could withdraw from the study at any time without having to give a reason.

3.6 Conclusions

The purpose of methodological development was to create a framework for the document analysis and face-to-face semi-structured interviews, which illuminated the relationships between the processes followed for developing the MBMP ZP 2008 and its on-site implementation. The document analysis provided a useful means of tracking stakeholders’ learning scenarios in the MBMP management, decision making and communication with the stakeholders groups and also with the groups and wider constituencies (e.g., the local government, the local community, the academic and policy making community). The silence and gaps in the MBMP ZP 2008 indicated power relations underlying resource deployment and domination of formal, biophysical and positivist knowledge (see Chapter 4). On the other hand, interview data analysis considered comparing and contrasting interview transcripts cross-referenced to the different groups to draw out the repeated themes (see Chapters 5 and 6).
Chapter 4

Results (Document Analysis): Policy Learning for Moreton Bay Marine Park Management
Chapter 4

Policy learning for Moreton Bay Marine Park area management

4.1 Chapter overview
4.2 Introduction
4.3 History of MBMP zoning plan

4.4 Comparative analysis of the 2009 and 1997 plans

4.5 SWOT analysis of the 2009 plan

4.6 Recommendations
4.7 Conclusions

Figure 4.1 Structure of the Chapter 4
CHAPTER 4
RESULTS (DOCUMENT ANALYSIS): POLICY LEARNING FOR MORETON BAY MARINE PARK MANAGEMENT

4.1 Chapter overview

This chapter presents the results related to the issue of local knowledge integration through stakeholder participation in Moreton Bay Marine Park (MBMP) planning and management during the preparation of the MBMP ZP 2008 and afterwards. This chapter analyses the Marine Parks (Moreton Bay) Zoning Plan 2008, the primary statutory tool for park management, to identify learning reflections that may have emerged from the experience of implementing the previous plan (1997) and gaps in the existing plan. It also discusses the strengths, weaknesses, opportunities and threats of the new zoning plan in terms of both ecosystem management and stakeholder learning. Policy learning is often confused with the practice of policy review (see Chapter 2) but policy review is only one aspect of policy learning. This analysis recognises that policy learning is a combination of learning from policy content, process, organisation, effects and context (Runhaar et al. 2006). The chapter progresses as a journey to consider: changes in the objectives of the plan; how the planning processes evolved over time (2007-2008); what other legislative instruments are involved; unintended consequences; and how the plan was affected by political, economic and cultural context. For this purpose, a document analysis was undertaken using: (1) a comparative analysis of the Marine Parks (Moreton Bay) Zoning Plan 2008 (MBMP ZP 2008) and the Marine Parks (Moreton Bay) Zoning Plan 1997 (MPMB ZP 1997) and available public interpretative information; (2) a strengths, weaknesses, opportunities, and threats (SWOT) analysis of the MBMP ZP 2008; and (3) keyword analysis, as part of summative content analysis (Hsieh & Shannon 2005) (Chapter 3 Section 3.5.3) of the MBMP ZP 2008.

4.2 Introduction

Moreton Bay Marine Park (MBMP), which stretches 125km from Caloundra to the Gold Coast Seaway in southeast Queensland, Australia, is a body of water unlike any other in Queensland. It is adjacent to 2.5 million residents who love it and use it intensively. Moreton Bay is home to 750 species of fish, 120 species of coral, an abundance of dolphins and migratory whales, and the world’s largest population of dugong (Queensland University of the Sunshine Coast 59
Government 2008). The park includes a large number of traditional and non-traditional users that create demand for protecting not only the area’s environmental qualities, but also lifestyle values that derive from these. To balance protection and use so that current and future generations can enjoy what the bay has to offer, the government introduced the MBMP ZP 2008, which took effect on 1 March 2009 (Queensland Government 2008). Of significance was the increase in protected areas to 16%, from the previous 0.5% in the MPMB ZP 1997 (Queensland Government 2008). The MBMP ZP 2008 establishes zones for the marine park (Part 3), sets aside designated areas (Part 4), sets out matters for entry or use permission (Part 2), in addition to:

a. requirements for accreditation of traditional use of marine resources agreement (s.69); and
b. requirements for accreditation of educational or research institutions (s.86).

Having a multipurpose usage intent, marine protected areas (MPAs) are often managed through establishing zones allowing or permitting different uses (Grantham et al. 2013). A zoning plan made under a statute is thus the primary tool for management and enforcement. The outcome of such planning often results in consumptive stakeholders considering that they are losing their rights, and conservation groups consider it provides inadequate protection of the ecosystem. The MBMP ZP 2008 evoked such polarised views (van de Geer et al. 2013; personal communication and media reports). The purpose of this chapter is to critically review the MBMP ZP 2008 in search of learning and progress made since the MPMB ZP 1997, and identify the areas still requiring attention for the effectiveness of the zoning provisions.

4.3 History of the MBMP zoning

4.3.1 Zoning plan development

In 1993, after a long community campaign by local conservationists, scientists, tourism groups and educators, the MBMP was declared under the Marine Parks Act 1982 (DNPRSR 2013). The first MBMP zoning plan (MPMB ZP 1997) commenced on 1 December 1997 (s.2), with the purpose of conserving the marine environment while providing for its wise use, enjoyment and appreciation into the future (DNPRSR 2013).

The MPMB ZP 1997 had five types of zones that offered various levels of protection:

- protection zones — ‘no-take’ zones (less than one per cent of the marine parks was set aside as protection zones);
- buffer zones — same as protection zones but allowed for trolling for pelagic fish species;
• conservation zones — recreational activities were permitted but commercial trawling was prohibited;
• habitat zones — allowed activities except disruptive ones (e.g., shipping); and
• general use zones — allowed for most activities but some, such as commercial operations, required a permit.

In 2008, the *MPMB ZP 1997* was reviewed under the *Marine Parks Act 2004* and the *MBMP ZP 2008* followed, coming into effect on 1 March 2009.

4.3.2 Reviewing the draft zoning plan (MBMP ZP 2008)

The *MPMB ZP 1997* was due to expire on 1 September 2008 and required revision with the aim of conserving the unique values of the MBMP and providing for its sustainable use (Queensland Government 1997; 116p). It was intended that the zoning plan would be based on the latest available scientific information considering all relevant social and economic data.

An expert advisory panel was convened in 2007 (Figure 4.2) to provide input and guidance, and ensure the scientific rigour of the review process. This panel was chaired by Professor Paul Greenfield AO, Senior Deputy Vice-Chancellor, University of Queensland and included 12 other people from academic and research institutions. A stakeholder reference group with representatives from a wide range of community and industry groups was also convened. Although the stakeholder reference group created an opportunity for incorporating local knowledge into the revision process (Carey et al. 2007), no stakeholders other than academics were included in the expert panel, which was considered science-based knowledge team.
Chapter 4 Policy learning for Moreton Bay Marine Park area management

Figure 4.2 Schematic diagram of evolution of the MBMP ZP 2008

Considering the data-poor systems in NRM, such as the marine park, stakeholder involvement in all stages can add value to decision making processes (Carey et al. 2007; Queensland Government 2004). A draft zoning plan was released for formal public consultation in 2007. Over 8000 submissions were received in response (Queensland Government 2009). The public benefit test report of the then Environmental Protection Agency (EPA) states that approximately 6000 of these submissions supported the draft zoning plan, with around 4500 of these calling for greater protection than the 15 per cent proposed in the plan (Queensland Government 2009). For the purpose of this thesis, it would have been useful to identify how many of the submissions were generic from specific groups, and also what the other 2000 submissions said about the plan, but neither that metadata or submissions received are publicly accessible.

4.4 Comparison of the MBMP ZP 2008 and the MPMB ZP 1997

4.4.1 Objectives/purpose

There is no overall objective in the MBMP ZP 2008, but in the MPMB ZP 1997 the purpose was:
... to provide for the ecologically sustainable use of the MBMP and to protect its natural, recreational, cultural heritage and amenity values (s.4).

Apart from this, each zone has specific objects that clarify the purpose of the zone. In the MPMB ZP 1997, these objects were in the zoning plan document, but in the MBMP ZP 2008, the objects refer to the Regulation (Marine Parks Regulation 2006). This was done to provide consistent zoning among all Queensland marine parks. However, as a zoning plan is the primary tool for users, to require uses to consult different documents for complete understanding of the plan introduces unnecessary complexity.

4.4.2 Application

The MBMP ZP 2008 applies to the MBMP with its boundary described in the Marine Parks (Declaration) Regulation 2006, Schedule 1 (the marine park), zone objectives described in Marine Parks Regulation 2006, and zone boundaries delineated in the Plan itself. The MBMP ZP 2008 also states that other statutory instruments about protecting the environment within the marine park, such as local government laws or regulations under the Fisheries Act 1994, also apply. Regarding the extent of any inconsistency between the MBMP ZP 2008 and local laws or regulations, it identifies that the instrument that provides the most stringent protection of the marine park prevails, which is not very transparent for marine park users.

4.4.3 Zone types and standards

There are four different zones in the MBMP ZP 2008 (Figure 4.3): general use zone, habitat protection zone, conservation park zone and marine national park zone. Five zones were identified in the MPMB ZP 1997. The zones are listed in ascending order of the level of protection given to them under the plan.
No explanation is given of why the MBMP ZP 2008 excluded the buffer zone, which remains in the adopted model of the Great Barrier Reef Marine Park Zoning Plan. The protection zones are fused into the marine national park zone in MBMP ZP 2008. The priority given to protection is evident when dealing with overlap.

The area of the overlap is taken to be part of the zone with the highest level of protection under this plan (s.11).

4.4.4 Permitted usage in the zones

a. General Use Zone

Both the MPMB ZP 1997 and the MBMP ZP 2008 allow non-fishing and most fishing activities without permission in the general use zone (GUZ) area; however, the MBMP ZP 2008 (s.14) includes more fishing categories than the MPMB ZP 1997 (Table 4.1). The MBMP ZP 2008 also allows traditional owners to use marine resources without permission, providing a special opportunity for them, as they had to obtain permission under the MPMB ZP 1997. On the other hand, non-fishing activities were categorised as recreational, educational and cultural or spiritual in the MBMP ZP 1997 (s.12, 16, 20 and 30), but presumably come under 'low impact activity not involving fishing or collecting' in the MBMP ZP 2008 (s.14 (a)).
Table 4.1 Permitted uses inside the zones of the MBMP area

<table>
<thead>
<tr>
<th>Zone</th>
<th>Without permission (s.14)</th>
<th>With permission (s.18)</th>
<th>Without permission (s.16)</th>
<th>With permission (s.17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General use zone</td>
<td>- Low impact activity not involving fishing or collecting</td>
<td>- A harvest fishery, other than accredited harvest fishery</td>
<td>- A recreational, educational, cultural or spiritual activity that does not involving fishing;</td>
<td>- Only traditional inhabitant of Moreton Bay could do traditional fishing, hunting or gathering;</td>
</tr>
<tr>
<td>(GUZ)</td>
<td>- Certain fishing or collecting activities, such as bait gathering, crabbing, accredited harvest fishery, limited spearfishing, line fishing, netting, trawling and trolling</td>
<td>- A traditional use of marine resources;</td>
<td>- Fishing, other than trawling, recreational bait gathering, limited collecting;</td>
<td>- Navigating a boat, a personal water craft, a hovercraft other than for a commercial purpose, a boat, ferry or water taxi service (other than a service involving a hovercraft) for transfer passengers or transfer vehicles;</td>
</tr>
<tr>
<td></td>
<td>- Carrying out a traditional use of marine resources.</td>
<td>- Limited collecting, crabbing, line fishing, spearfishing and trolling;</td>
<td>- Carrying out non-manipulative research;</td>
<td>- Carrying out speed trials for motorised boats;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Tourism programme;</td>
<td>- Navigating a boat, a personal water craft, a hovercraft other than for a commercial purpose, a boat, ferry or water taxi service (other than a service involving a hovercraft) for transfer passengers or transfer vehicles;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Media activity;</td>
<td>- Carrying out manipulative research;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Limited research and educational programmes;</td>
<td>- Tourism;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Navigating vessel, other than a ship or managed vessel.</td>
<td>- Minor and major works.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Habitat zone</td>
<td>Without permission (s.17):</td>
<td>With permission (s.18):</td>
<td>Without permission (s.16):</td>
<td></td>
</tr>
<tr>
<td>(HPZ)</td>
<td>- A low impact activity not involving fishing;</td>
<td>- A harvest fishery, other than accredited harvest fishery</td>
<td>- A recreational, educational, cultural or spiritual activity that does not involving fishing;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fishing activities, such as bait gathering, crabbing, an accredited harvest fishery,</td>
<td>- A traditional use of marine resources;</td>
<td>- Fishing, other than trawling, recreational bait gathering, limited collecting;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>collectting, spearfishing, line fishing, netting and trawling;</td>
<td>- Limited collecting, crabbing, line fishing, spearfishing and trolling;</td>
<td>- Carrying out non-manipulative research;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Traditional use of marine resources;</td>
<td>- Traditional use of marine resources;</td>
<td>- Navigating a boat, a personal water craft, a hovercraft other than for a commercial purpose, a boat, ferry or water taxi service (other than a service involving a hovercraft) for transfer passengers or transfer vehicles;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Limited media activity, limited impact research, and limited educational program;</td>
<td>- Media activity;</td>
<td>- Carrying out manipulative research;</td>
<td>- Carrying out speed trials for motorised boats;</td>
</tr>
<tr>
<td></td>
<td>- Operating an aircraft at more than 500 ft;</td>
<td>- Limited research and educational programmes;</td>
<td>- Tourism;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Navigating a vessel, other than a ship or managed vessel.</td>
<td>- Navigating a vessel charter operation;</td>
<td>- Minor and major works.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Major works;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Navigating a ship or managed vessel.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservation zone</td>
<td>Without permission (s.18):</td>
<td>Without permission (s.20):</td>
<td>Without permission (s.21):</td>
<td></td>
</tr>
<tr>
<td>(CPZ)</td>
<td>- A low impact activity not involving fishing;</td>
<td>- A recreational, educational, cultural or spiritual activity that does not involving fishing;</td>
<td>- Only traditional inhabitant of Moreton Bay could do traditional fishing, hunting or gathering;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fishing activities, such as bait gathering, bait netting;</td>
<td>- Fishing, other than trawling, recreational bait gathering, limited collecting;</td>
<td>- Operating an oyster ground;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- For an accredited harvest fishery that is the aquarium fish fishery or the beachworm fishery— fishing or collecting under the fishery’s accreditation;</td>
<td>- Carrying out non-manipulative research;</td>
<td>- Mariculture;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Limited collecting, crabbing, line fishing, spearfishing and trolling;</td>
<td>- Manipulative research;</td>
<td>- Tourism;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Traditional use of marine resources;</td>
<td>- Collecting for a commercial purpose under an authority for an aquarium fish fishery under the</td>
<td>- Minor and major works.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Media activity;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Limited research and educational programmes;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Navigating vessel, other than a ship or managed vessel.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### The MBMP ZP 2008 vs The MBMP ZP 1997

<table>
<thead>
<tr>
<th>Activity</th>
<th>MBMP ZP 2008</th>
<th>MBMP ZP 1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Fish feeding;</td>
<td>- Tourism programme;</td>
<td>- Fish feeding;</td>
</tr>
<tr>
<td>- Media activity, other than limited media activity;</td>
<td>- Media activity, other than limited media activity;</td>
<td>- Organising, promoting or carrying out a commercial fishing competition;</td>
</tr>
<tr>
<td>- Research, other than a limited impact research;</td>
<td>- Research, other than a limited impact research;</td>
<td>- Manipulative research;</td>
</tr>
<tr>
<td>- Educational programme, other than a limited educational programme;</td>
<td>- Educational programme, other than a limited educational programme;</td>
<td>- Tourism;</td>
</tr>
<tr>
<td>- Major works;</td>
<td>- Major works;</td>
<td>- Navigating a submersible boat;</td>
</tr>
<tr>
<td>- Navigating a ship or managed vessel.</td>
<td>- Navigating a ship or managed vessel.</td>
<td>- Discharging waste;</td>
</tr>
<tr>
<td><strong>Marine national park zone (MNP)</strong></td>
<td><strong>Without permission</strong> (s. 23):</td>
<td><strong>Without permission</strong> (s. 26):</td>
</tr>
<tr>
<td></td>
<td>- A low impact activity not involving fishing;</td>
<td>- A recreational, educational, cultural or spiritual activity not involving fishing;</td>
</tr>
<tr>
<td></td>
<td>- Limited media activity;</td>
<td>- Photography, filming or sound;</td>
</tr>
<tr>
<td></td>
<td>- Limited research;</td>
<td>- Trolling for pelagic fish;</td>
</tr>
<tr>
<td></td>
<td>- Navigating a vessel, other than a ship or managed vessel.</td>
<td>- Non-manipulative research;</td>
</tr>
<tr>
<td></td>
<td><strong>With permission:</strong></td>
<td>- Navigating a boat, other than a submersible boat;</td>
</tr>
<tr>
<td></td>
<td>- Traditional use of marine resources;</td>
<td>- Mooring or anchoring a vessel or aircraft;</td>
</tr>
<tr>
<td></td>
<td>- Conducting a tourism program;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Media activity, other than a limited media activity;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Research, other than limited impact research;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Limited educational program;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Vessel charter operation;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Anchoring a vessel in a particular area</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Navigating a ship or managed vessel;</td>
<td></td>
</tr>
<tr>
<td><strong>Designated areas</strong></td>
<td>The following areas of the marine park (each a designated area) are set aside for special management—</td>
<td>The following designated areas within the zones of the marine park are set aside for special management—</td>
</tr>
<tr>
<td>- grey nurse shark areas;</td>
<td>- commercial bait worm gathering areas;</td>
<td>- ocean beach areas;</td>
</tr>
<tr>
<td>- go slow areas for turtles and dugong;</td>
<td>- navigation and port areas;</td>
<td>- the South Passage area;</td>
</tr>
<tr>
<td>- go slow areas for natural values;</td>
<td>- the disposal and extraction area;</td>
<td>- turtle and dugong areas;</td>
</tr>
<tr>
<td>- material extraction areas;</td>
<td>- the material disposal area;</td>
<td>- the Pumicestone Passage area;</td>
</tr>
<tr>
<td>- the disposal and extraction area;</td>
<td>- mooring areas;</td>
<td>- works areas.</td>
</tr>
<tr>
<td>- the material disposal area;</td>
<td>- no-anchoring areas;</td>
<td></td>
</tr>
<tr>
<td>- works areas.</td>
<td>- works areas.</td>
<td></td>
</tr>
</tbody>
</table>

### Appeal

- **A person who is dissatisfied with the chief executive’s decision to give the person a notice may appeal against the decision to a Magistrates Court (s. 56).**

---

### b. Habitat Protection Zone (HPZ)

Habitat Protection Zones (HPZ) of the MBMP ZP 2008 allow certain fishing activities without permission including traditional uses; whereas in the MBMP ZP 1997, traditional users had special access for using marine resources with permission. Education programmes in the HPZ were under the category of without permission (s.16 in the MBMP ZP 1997), which is now under the category of with permission (s.18). Despite giving access to the HPZ for traditional users, the MBMP ZP 2008 does not specify the fishing practices for other subsistence fishermen in the Bay area.
c. Conservation Park Zone (CPZ)

There are few differences in activities in the HPZ and Conservation Park Zone (CPZ), except trolling, which is limited in the CPZ (s.20). This is the first time in the plan that there are clear definitions for limited crabbing, line fishing and trolling (s.20). In addition, traditional use of marine resources is included in both the ‘without’ and ‘with permission’ categories in the CPZ, which offer the traditional community much more access to the Bay. The MBMP ZP 2008 also adds aquaculture operation, replacing 'operating an oyster ground' in previous zoning plan (s.21, MBMP ZP 2008 and 1997). This extends some opportunities for relevant stakeholders in the CPZ.

d. Marine National Park (MNP)

Generally known as the green zone, the Marine National park (MNP) is a fusion of previously called “Buffer zone” and “Protection zone”. In the MBMP ZP 1997, the purpose of a buffer zone was to provide for the protection of the zone's biological diversity and natural condition to the greatest possible extent (s.24): the buffer zone has been deleted in the MBMP ZP 2008. Waste discharges were prohibited in the buffer zone and protection zone in the MPMB ZP 1997, but not mentioned in the MBMP ZP 2008.

e. Designated areas or special management areas

Nine areas have been established as 'designated areas' or 'special management areas' in the MBMP ZP 2008 (s.26) and eight in the MPMB ZP 1997 (s.33). In the MBMP ZP 2008 areas include: grey nurse shark areas; go slow areas for natural values, go slow areas for turtle and dugong, material extraction, disposal, mooring, no anchoring, and works areas. While Go slow for turtle and dugong is self-explanatory for most marine park users, Go slow for natural values is less clear, specifying that it is to protect the natural integrity and the values of relatively undisturbed areas in the marine park and to increase awareness and understanding of the natural significance of the areas (s.46).

4.4.5 Requirements for particular applications for permissions

The Zones in Part 3 of the MBMP ZP 2008 specify activities that require permission, while others are prohibited (Table 4.2). All the conditions are similar between the two plans, except the chief executive’s discriminatory decision-making power regarding major construction has been limited to the zones of general use and habitat protection rather than the entire park area (s.15 and 18). There is no clarification why this limitation only applies to the certain zones in the MBMP ZP 2008, as it was for the entire park in the MPMB ZP 1997.
Table 4.2 Matters requiring considerations by Chief Executive during assessing applications for permission in the MBMP

<table>
<thead>
<tr>
<th>In MBMP ZP 2008</th>
<th>In MPMB ZP 1997</th>
<th>Learning evidence in MBMP ZP 2008</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any unacceptable environmental impact on the zone</td>
<td>Any unacceptable environmental impact on the zone</td>
<td>All the conditions are the same except the chief executive’s discriminatory decision making power regarding major construction has been limited to the zones of general use and habitat protection rather than entire park area.</td>
<td>This might be a sign of positive learning though it is not clear whether this is management’s own realisation or as a response to a particular incident or stakeholders’ demand.</td>
</tr>
<tr>
<td>Be consistent with the maintenance of the biological diversity and ecological functioning of the marine park</td>
<td>Be consistent with the maintenance of the biological diversity and ecological functioning of the marine park</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not cause a loss of vegetation essential to the productivity of the marine park</td>
<td>Does not cause a loss of vegetation essential to the productivity of the marine park</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prejudice the natural amenity and condition of the marine park</td>
<td>Prejudice the natural amenity and condition of the marine park</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No effect on the environment as a result of the marine park’s natural hydrological pattern or natural coastal processes</td>
<td>No effect on the environment as a result of the marine park’s natural hydrological pattern or natural coastal processes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No cumulative impact, effect on shorebirds or involves the entry to or use of a designated area—the objects of the area.</td>
<td>No cumulative impact, effect on shorebirds or involves the entry to or use of a designated area—the objects of the area.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No effect on shorebirds particularly international migratory species</td>
<td>No effect on shorebirds particularly international migratory species</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No entry or use involving entry or using of a designated area</td>
<td>No entry or use involving entry or using of a designated area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In case of major works that are inconsistent with the objects of the general use zone or habitat protection zone, the chief executive need not consider the matters mentioned earlier.</td>
<td>Conditions mentioned earlier do not apply in case of chief executive’s decision making about an application for carrying out major works in the marine park.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4.4.6 Legislative and institutional layers

There are 18 different acts and regulations acknowledged in the MBMP ZP 2008 affiliated with local, State and the Commonwealth governments rule on management of the MPA (Figure 4.4). Regarding application of other statutory instruments to the MBMP, the MBMP ZP 2008 states that local government can make a local law for environmental protection within the park area. In addition, a regulation can be made to protect the environment under the *Fisheries Act 1994* (s.4 (1)). The MBMP ZP 2008 also states that in case of inconsistency between the plan and the local law or regulation, ‘the instrument that provides the most stringent protection of the marine park prevails’ (s.4 (2)). However, it fails to leave room for consideration about the impacts of stringent protection of the Bay on stakeholders’ livelihoods. In addition, no clear priorities are established in relation to other legislation and regulations. It appears that legislation is applied independently, such as a person may enter or use a mooring area for carrying out a mooring activity without a permit for the area, if it is authorised under the *Transport Operations (Marine Safety) Act 1994*. However, they would still need a permit under the MP Act and zoning plan, making for a clumsy system.
The Transport Operations (Marine Safety) Act 1994 does not include any consideration regarding the marine park, as there was no established marine park in the Moreton Bay area at the time the Act came into effect and no follow-up amendment. As a result, there is no mechanism for institutional coordination despite the involvement and overlapping of operational functions in the marine park with local government and other state government agencies. Considerations might be made to enable, where possible, both environmental and social protection in the MBMP ZP 2008 to take precedence over local and all state regulations in that particular marine park area. Commonwealth legislation takes priority over all state legislation and, in the case of MBMP, is limited to Native Title matters, Historic Shipwrecks, and the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), each of which specify a relationship to the States.

4.5 SWOT analysis

4.5.1 Strengths

Despite little evidence of learning being explicit, the MBMP ZP 2008 has some positive and negative learning potentials (Table 4.3). The zoning provisions in the MBMP ZP 2008 provide specific advice for each zone including a list of activities allowed without permission, with permission and prohibited. An added clause mentioning ‘another purpose’ enables room for decision making about any activities that are not covered by the three lists of activities in the plan (s.15). This flexibility may offer limited extended opportunity for stakeholders to use the Bay without affecting the ecosystem.

Table 4.3 Identified SWOT results from the MBMP ZP 2008
<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear rules: Clear zoning provision with lists of activities allowed and prohibited</td>
<td>Zones' objects, except designated areas, are referred to in other document, rather than mentioning under each zone section (s.13, 16, 19 and 22.)</td>
<td>Scope to further increase the percentage of protected area inside the park</td>
<td>Chance of sectoral conflict</td>
</tr>
<tr>
<td>Good user friendly guide to rules: Detailed zoning maps with an instruction for “to do” and “not to do”</td>
<td>No clear mechanism for dealing with statutory instruments, other than that of the local governments (s. 4 and 12)</td>
<td>Become a guiding/test document for management plan (if initiate)</td>
<td>Chance of zonal conflicts (s. 27)</td>
</tr>
<tr>
<td>Enables multilevel governance: Recognition of local government role, local laws for environmental protection in the park area (s. 4)</td>
<td>Prohibiting activities near artificial reef (s. 103)</td>
<td>Scope to become dynamic and adaptive</td>
<td>Chance of violating fundamental rights of the stakeholders</td>
</tr>
<tr>
<td>Protection precedence to resolve inconsistency with local law or regulation and instrument, and overlap (s. 4 and 12)</td>
<td>Confusion about go slow area for natural value (schedule 2, p 164) “Unacceptable environmental impact” (s. 10) undefined</td>
<td></td>
<td>Chance of overfishing</td>
</tr>
<tr>
<td>Allowing users’ especially fishing activities in much of the MP and in most zones (s.14, 15, 17, 18, 20, 21, 23 and 24) without permission.</td>
<td>No clear provision for subsistence fishermen</td>
<td></td>
<td>Chance of irresponsible fishing</td>
</tr>
<tr>
<td>Special management areas for special values in the park (s. 26 and 30)</td>
<td>No management plan</td>
<td></td>
<td>Chance of power discrimination (s. 10)</td>
</tr>
<tr>
<td>Freedom for emergency management (s. 66)</td>
<td>No mention to climate change or uncertainty</td>
<td></td>
<td>Chance of inconsistency with commonwealth and international instruments</td>
</tr>
<tr>
<td>Authorisation for management related programmes (s. 67)</td>
<td>No mechanism for involving stakeholders in implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No comprehensive monitoring programme</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No programme for community education and learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No livelihood assurance programme for stakeholders</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No transparent process of addressing stakeholders comments/knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No appeal clause</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Undefined “Chief Executive” (schedule 4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The *MBMP ZP 2008* includes detailed maps, not only for the zoning boundary, but also for the special designated areas (Figure 4.5). The maps have many features, such as geospatial accuracy for habitat locations (e.g., coral reef), colour coding, clear demarcation for park areas and designated areas within the zones that would assist commercial and recreational fishermen in identifying specific zones. The maps also have brief ‘to do and not to do’ instructions for the zones in the marine park, which allows for a good level of interpretation. All the maps are available in hard copy and electronically available on the DNPRSR website. For ease of access, the maps can be viewed on a range of devices, such as smart phones. Therefore, park users can use the maps with a GPS, to check their position within the MBMP.

Fishermen are able to carry out many activities and traditional use of the marine resources in all zones except MNPs or green zones (s.14, 15, 17, 18, 20, 21, 23 and 24) and much of the MP area. Special management for certain areas and species extends the opportunity
of increased protection for the marine park’s natural values (s.26 and 30). These areas are protected for their natural integrity and values of relatively undisturbed areas for creating awareness and understanding, which is an overall goal for the marine park.

Mandatory consultation with the chief executive for any public authority, exercising statutory powers in a designated area (s.30), may help resolve management conflict in the designated areas. An option would have been to include these special management areas in a management plan. However, including them in the zoning plan ensured these activities were included from commencement of the Plan and reduced the necessity for additional provisions of a management plan.

The MBMP ZP 2008 has a provision for conducting any lifesaving programme without permission in the case of an emergency or to deal with a threat of pollution to the marine environment under a law of the Commonwealth or a national emergency response (s.66). Similarly, an authorised person may carry out research or an education program relating to the management of the area, without permission (s.67), which may allow flexible learning opportunities for academic communities.
Figure 4.5. Moreton Bay Marine Park zoning plan 2008
4.5.2 Weaknesses

Despite having fishing opportunities in the zones except MNP, the \textit{MBMP ZP 2008} does not give any direction for livelihood protection for many consumptive beneficiaries, such as fishermen. No accurate statistics are available regarding what percentage of the fishing grounds are under the no fishing zone (MNP) in the plan, as not all of the Bay is viable for fishing. No evidence of either scientific or local ecological knowledge are available in support of identifying special management areas, such as go slow areas for natural values (s.46).

a. Unclear guideline for tourism use

While the zoning plan is the primary guideline for all stakeholders, tourism operators have to maintain their legitimate use through following specific objectives for the zones: these objects are in other documents (s.13, 16, 19 and 22). These sections state objectives for the zones that align with objectives in the \textit{Marine Parks (Declaration) Regulation 2006}. This regulation requires conservation of areas along with the provision of opportunities for reasonable use. Tourism activities might be considered reasonable use, but nothing is specified about tourism opportunities in \textit{MBMP ZP 2008}. Hence, the plan might require a clear definition about ‘reasonable use’, which is missing even in the glossary of terms provided with the \textit{MBMP ZP 2008}. The zoning plan is not a comprehensive management guideline for stakeholders, such as tourism operators.

b. Inadequate use of artificial reefs

Artificial reef establishment gives recreational fishermen increased opportunities for game fishing (Queensland Government 2013a). However, they limit exploring recreational activities for other stakeholders, such as tourism operators, because activities such as diving and snorkelling are prohibited near the artificial reef (s.103).

c. Unclear statement for ‘go slow’ area

Go slow areas for natural values might create confusion, as the reason and justification of the areas for maintaining go slow restrictions were not explained. Unlike the self-explanatory designated ‘go slow areas for turtles and dugong’, it might be necessary to clearly inform stakeholders of the broad natural values to be protected in go slow areas.

d. Unclear definition of ‘unaccepted environmental impact’

Entry to the MPA is not allowed if it may have an ‘unacceptable environmental impact’ (s. 10). However, the \textit{MBMP 2008} does not specify the types and extent of unacceptable
environmental impacts not even in the *Marine Parks Act 2004* or in the *Marine Parks (Declaration) Regulation 2006*.

e. No management plan

The *Marine Parks Act 2004* (s. 21, 29) emphasises the need for both the zoning plan and management plan. Section 21 to 28 of this act describes the processes for making a zoning plan and section 29 to 40 for a management plan. The main focus of the legislative procedures in the matters relating to preparation, content and consultation was for both the plans. However, there is no indication in the *MBMP ZP 2008* regarding formulating a management plan, which could be much more detailed than the zoning plan. Consequently, the MBMP 2008 misses the chance for community engagement, education and training programmes in implementation, because a management plan usually incorporates these aspects (e.g., Marine park management plans in South Australia3).

f. Lack of appeal clause

Unlike the *MPMB ZP 1997*, the *MBMP ZP 2008* omitted the ‘Appeal’ section. This limits stakeholder opportunities of being heard in the simplest way if they are dissatisfied with the chief executive’s decision to give notice. This provision was available in the *MBMP ZP 1997*. However, a dissatisfied stakeholder has an opportunity to put a complaint to the Queensland Civil and Administrative Tribunal (QCAT)4 about any decision made by CEO (Chief Executive Officer). Complaint to the QCAT should be under relevant Acts (e.g., Marine Parks Act 2004 in case of the MBMP), but the stakeholders are much more familiar with the *MBMP ZP 2008*, as a working document, than the Act.

4.5.3 Opportunities

a. Opening discussion on management strategies

Although the statement about the designated ‘go slow area for natural values’ appears confusing, it may increase stakeholder awareness about respecting pristine areas. If it is implemented successfully, and the effect of maintaining this protocol can be communicated, it might also help any future decision making on applying any other resource management tools for those particular areas.

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b. Facilitating public discussion

The MBMP ZP 2008 made public notice mandatory for persons proposing to carry out major works, which offers opportunities for stakeholders to provide input. The chief executive must also consider any written submission received in response to the public notice within the stipulated period. Therefore, it leaves room for stakeholder participation in decision making regarding any major works in the park areas.

c. Management plan to facilitate use of stakeholder knowledge

Part 3 of the Marine Parks Act 2004 (s 29) creates grounds for formulating a marine park management plan. Like a zoning plan, formulating and implementing a management plan is also a statutory obligation. The Act also requires the management plan to be reviewed every ten years, which could make it dynamic/adaptive through revision with stakeholder feedback. Management plans would ideally cover the detailed implementation strategy of a zoning plan including community involvement (e.g., Marine park management plan in South Australia). Therefore, the formulation of a future management plan for the marine park would provide opportunity to incorporating stakeholder knowledge.

4.5.4 Threats

a. Overlapping legislation

The MBMP ZP 2008 allows application of laws made by a local government about protecting the environment within the marine park or regulations made under the Fisheries Act 1994 about protecting the environment within the marine park. This may create sectoral conflict for overlapping areas and areas of interests in the marine park. The MBMP ZP 2008 only specifies precedence to local laws if any conflict arises within the park area, but any such precedence is not established in case of other Acts or Regulations. Therefore, it might be difficult to enforce such regulations in the marine park and this could lead to inter-departmental conflict. There may also be confusion in relation to designated areas within zones, with some areas in more than one zone. Despite the Marine Parks Act 2004 (s.24) stating that, the draft and final zoning plan must state its objects, the MBMP ZP 2008 relies on a Regulation for a description of purposes for the designated areas, which makes the understanding of it complicated.

b. Unclear appeal process

Citizens have the right to be given reasons for administrative decisions made affecting them by government officials (Australian Government 2013b), but there is no room for judicial review in the MBMP ZP 2008 if a person is dissatisfied with any decision. This could be considered a violation of a citizen’s fundamental rights. However, the Marine
Chapter 4 Policy learning for Moreton Bay Marine Park area management

Parks Act 2004 has a provision for review of the decision regarding compliance notice (s117).

c. Increase fishing pressure outside of no take zones

As the rezoning, under MBMP ZP 2008, increases the ‘no take’ zones from 0.5% to 16%, it decreases the usual fishing areas for fishermen and potentially leads to fishing pressure in areas outside the restricted zones. The higher fishing pressure might not only result from the increased number of fishermen but also from the intention to increase the fish take to offset the increasing fuel cost to travel greater distances than before (van de Geer et al. 2013). This may affect the existing fish stock before getting the expected spill-over effect from the no take zones. It also could reduce the customary practice of replenishment where the fishermen allowed fishing grounds to rest before fishing again (van de Geer et al. 2013). In addition, many have suggested that marine reserves can displace fishing effort into smaller areas and change local community structure sufficiently in the ecosystem to facilitate invasion by exotic species (Kellner & Hastings 2009). The rezoning system may also lead fishermen towards irresponsible fishing, although the presumption is that no take zones will keep the Bay productive through the spill-over effect, which is always advocated by conservationists who are in favour of protected areas.

d. No IUCN category definition

According to the guidelines for applying the IUCN Protected Area Management Categories to Marine Protected Areas (Day et al. 2012), a MPA will have a primary stated aim of nature conservation with a set of objectives that will allow the site in its entirety to be assigned to an IUCN protected area management category. However, neither the whole MBMP nor any of the zones/designated areas are categorised in a way that aligns with the IUCN criteria, despite the Commonwealth marine reserves system adoption of the IUCN’s internationally recognised set of seven protected area management categories (Australian Government 2013a). These categories have been given legal effect in relation to Commonwealth marine protected areas in the EPBC Act 1999. Under this act, any zones within the Commonwealth marine protected areas must be assigned to an IUCN category (http://www.environment.gov.au/topics/marinemarine-reserves/overview/legalframework) (Australian Government 2013a). With the exception of the Great Barrier Reef Marine Park, Commonwealth marine reserves would usually assign one of four IUCN categories (Table 4.4).
Table 4.4. Commonwealth marine reserves IUCN protected area management categories
(Source: Australian Government 2013a)

<table>
<thead>
<tr>
<th>Category name</th>
<th>IUCN category number</th>
<th>Management objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strict nature reserve</td>
<td>Ia</td>
<td>Managed primarily for scientific research or environmental monitoring.</td>
</tr>
<tr>
<td>National park</td>
<td>II</td>
<td>Protected and managed to preserve its natural condition.</td>
</tr>
<tr>
<td>Habitat/species management area</td>
<td>IV</td>
<td>Managed primarily, including (if necessary) through active intervention, to ensure the maintenance of habitats or to meet the requirements of specific species.</td>
</tr>
<tr>
<td>Managed resource protected area</td>
<td>VI</td>
<td>Managed to ensure long-term protection and maintenance of biological diversity with sustainable flow of natural products and services to meet community needs.</td>
</tr>
</tbody>
</table>

While this only applies to Commonwealth marine reserves, the MBMP seems to fit the category ‘managed resource protected area (VI)’, which is neither strict protection nor irresponsible resource extraction. There are considerable benefits of using a single category system in MPA management, as many people do not consider MPAs as protected areas like National Parks over terrestrial areas (Wells & Day 2004). Applying a separate category and disseminating the information about the category might help reduce misconceptions, as the categories clearly articulate their objectives and can be aligned with the objectives of the target MPAs. The entire Great Barrier Reef Marine Park (GBRMP) is assigned to Category VI. Despite similar objectives to the GBRMP, and no categorisation of this marine park by the Queensland government, the ‘protected planet’ page of the IUCN website shows that MBMP is designated under the category IV (Figure 4.6) (http://www.protectedplanet.net/sites/Moreton_Bay_Marine_Park), which is definitely not the right category to be aligned with the objectives of the MBMP ZP 2008.
4.6 Word analysis

4.6.1 Key word frequencies in MBMP ZP 2008 and MBMP ZP 1997

As keywords might help to give a quick overview of any document, a keyword search related to co-learning was applied to the MBMP ZP 2008 and the MBMP ZP 1997 (Figure 4.7). There is no appearance of words relating to learning or knowledge, especially local or stakeholder experiential knowledge, appearing in the zoning plan. Similarly, words representing stakeholder participation, consultation, collaboration or integration, monitoring and feedback are also missing.

The larger number of words, such as research (95 times) and traditional (79 times), appearing in the document suggests some opportunity for conducting research activities and traditional use of resources in particular areas of the zone (s.14, 15, 17, 18, 20, 21, 23, 24, 67, 95, 96 and 97). The MBMP ZP 2008 gives discriminatory power to prevent accredited research or educational institutions from working in the Bay or imposing new conditions or suspension, if the Chief Executive is dissatisfied with the proposed activities (s.87, 88 and 89).
The word penalty is used 40 times, but nothing about benefit or reward. This might suggest that the plan is enforcement biased, rather than a collaborative arrangement with stakeholders for better management. There is no indication of any emphasis given to words that mandate or encourage social learning in the implementation of the plan, as there is no word ‘social’ and ‘learning’ or a combination of these. Climate change issues are also missing in the MBMP ZP 2008. In many government documents, ‘climate hazards’ are used instead of ‘climate change’, but the rezoning plan does not include the word ‘climate’. This seems to be a clear indication of completely ignoring climate change issues.

In addition to a radar chart (Figure 4.7), an individual word tree analysis shows how these words are used in the document. As this dissertation considers integrated use of different types of information, such as local, experiential, community derived and scientific, and its free flow sharing, the word ‘information’ was explored. This word is used 22 times in the MBMP ZP 2008, which is 4.4 times higher than that used in the MBMP ZP 1997. This could be considered a sign of a change of emphasis from enforcement to a new collaborative approach. However, there is no use of terms, such as ‘local’, or ‘experiential’ or ‘stakeholders’ connected to the word information (Figure 4.8). This indicates that the word ‘information’ was never linked back to stakeholder experiential knowledge. Also any information collected was not explicitly shared with stakeholders. The inadequacies of collecting, integrating and using stakeholders local knowledge during the preparation of the rezoning plan fails to guide using such information even in the day-to-day management of the MBMP.
Figure 4.8 Word tree analysis for the word “Information” in the MBMP ZP 2008
(These are the sentences in the document having the word ‘information’; sentences will be completed
by adding two fragments from left and right sides having ‘information’ in the middle)

4.7 Discussion

a. Lack of clear and concise information

As a primary document regarding MBMP management, the MBMP ZP 2008 does not clearly require park management to incorporate stakeholder knowledge and learning. This instrument does not provide clear guidance about objectives of the zones and overall goal of the areas (s.13, 16, 19 and 22). Some designated areas have no clear justification and
reasoning to be understood by the stakeholders in an easy way, such as go slow areas for natural values (schedule 2). No entry is permitted in the zones if there is a chance of unacceptable environmental impacts (s.10). However, there is no definition of either acceptable or unacceptable environmental impacts. This issue is not clarified in the Marine Parks Act 2004 or in the Marine Parks Regulation 2006. The MBMP ZP 2008 does not reflect good use of local knowledge or information in defining or making the zoning boundaries or the protocols to be maintained inside the zones.

b. Lack of clarification, coordination and collaboration

Coordination and collaboration are essential for developing and implementing a plan covering multi-purpose uses regulated by multiple legislation, such as in marine protected areas. As a primary authority of management for the MBMP, the DNPRSR plays a dominating role over other related departments, such as the Department of Agriculture, Fisheries and Forestry (DAFF). The Acts and regulations, referred in the MBMP ZP 2008, have not been clarified about the boundary of their application and implementation in case of conflict due to multi-institutional responsibilities for implementation. It is not clear which rules will be superseded if jurisdictional conflict arises with the zone/zones’ rules and regulations. Within the MBMP ZP 2008, there is no enunciation of an effective integrated compliance strategy with a partnership arrangement between agencies such as DAFF or community organisations. This gap could be appropriately addressed in a management plan (but this neither exists nor planned for preparation).

c. Tension between biophysical and social safeguards

As the MBMP is a multipurpose resource use area, it is required to protect both the ecological integrity of the Bay and to ensure socio-economic security for resource dependent stakeholders. However, the MBMP ZP 2008 has given much attention to the ecological aspects of the Bay, possibly at the expense of the livelihoods of stakeholders (Figure 4.9). The DNPRSR has the indemnity in exercising power to allow activities (under ‘must’ and ‘must not’ categories in the Figure 4.9) that could affect the biological protection of the Bay. This indicates the commitment about protecting ecological integrity although there is no evidence of similar commitment to protect stakeholder livelihoods.

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d. Lack of balance between traditional users and others

Stakeholder activities in the MBMP areas are categorised in three major groups. Stakeholders may conduct some low impact activities without permission, some are allowed with permission and some are prohibited. The MBMP ZP 2008 gives greater flexibility to traditional (Indigenous) users for fishing and collecting other marine resources from the park area (Figure 4.10). This could be considered a major strength of the plan, as it helps protect rights of minority groups in the Moreton Bay area. Traditional users may use the Bay for all of their purposes. Only some of these activities require permission. Harvesting protected species is the only activity that is prohibited. These permitted activities for traditional owners are not equally similar for other stakeholders in the park areas (Figure 4.11).
Figure 4.10 Activities allowed and prohibited for traditional users

Figure 4.11 Activities allowed for other stakeholders with permission
Many of the low impact activities, such as fishing and collecting resources for traditional use are allowed without permission for traditional (Indigenous) owners (s.21), whereas other stakeholders may require prior permission for such activities (s.15) in the same areas (Figure 4.11). The prohibited lists of activities for other stakeholders are much more than that for the traditional owners (s.32, 33, 47, 57, 94, 99, 100 and 103). This imbalance may lead to conflict between users if other groups feel they are deprived of equal rights.

e. Lack of a management plan

The MBMP ZP 2008 gives clear guidelines for the boundary of the zones and the activities allowed or prohibited in the areas, but the implementation strategy and mechanisms, usually the subjects of a management plan, are missing. Matters for a management plan might include tools to address management challenges, stewardship programmes through engaging communities in plan implementation, related awareness and education programmes, compliance mechanisms, monitoring and performance assessment, and knowledge reviews.

f. Lack of a comprehensive monitoring programme

A comprehensive monitoring programme is essential for successful implementation and compliance of the MBMP ZP 2008, by collecting day-to-day management and use information. It is critical for adaptive management and continuous improvement, and critical for future review. As the boundary demarcation in the marine park is not like that in terrestrial areas, the success of stakeholder compliance requires appropriate monitoring systems. Prior to the MBMP ZP 2008, the DNPRSR (previous DERM) put in place a monitoring programme to evaluate the health of the marine park (Queensland Government 2012), through $4.6 million research grants to individual academic researchers and institutions. This does not appear to be a comprehensive monitoring programme despite covering some fragmented research activities, such as fishing activities and fish abundance before and after rezoning, impacts on shore birds, and human attitudes about the Bay. From the documentation, there is no overt programme of documenting day-to-day management activities of government agencies, use and activities of users in every zone of the park, nor a programme of assessing socio-economic impacts on stakeholder groups. Therefore, the lack of a comprehensive monitoring programme may lead to failure in enabling assessment of MBMP management effectiveness and does not address the issue of continuing data scarcity.
4.8 Conclusions

A comparison of the two plans reveals that there is limited learning reflected in the MBMP ZP 2008, except for increasing the no take zone or green zone (MNP) areas from 0.5% to 16%. The DNPRSR took initiatives to minimise the knowledge gap in the preparation of the MBMP ZP 2008, but the effort is not reflected by incorporation of stakeholder local and experiential knowledge, which needs to be integrated with expert opinion.

Critical analysis of the MBMP ZP 2008 using a SWOT and NVIVO analysis of the text in this chapter also identified strengths and opportunities along with the scope for improvement through addressing weaknesses and threats. The analysis shows that the potential benefits available from the MBMP ZP 2008 are wide-ranging and go beyond improvements to marine conservation. The MBMP ZP 2008 also has the potential to include greater levels of public awareness regarding the existing conditions and future strategy for MBMP management, a greater degree of public accountability, and recognition of stakeholder learning contributions.

The MBMP ZP 2008 is a primary tool in park management, which would be further improved with documented experiences from the implementation journey, through monitoring of use and social, economic and environmental impacts, review and adaptive management. It might also be considered as a useful guideline, due to its clear zoning boundary with geographic coordinates, maps and the list of allowed and prohibited activities in the zones. In contrast, the lack of a detailed management plan as a legislative and practical requirement for successful implementation with coordinated compliance and community involvement and stewardship is a major deficit. The mandatory requirement to review the non-existent plan in 2018 (after 10 years of implementation) should require incorporation of much more stakeholder experiential knowledge. Stakeholder experiential knowledge might be incorporated through engaging them in all stages of the process, especially during the draft plan preparation rather than asking for submissions only after the preparation of the draft plan.

This chapter drew on the two MBMP Zoning Plans (1997 and 2008) to determine the extent of learning through the MBMP zoning. It found that learning was not well demonstrated because of the limitations of such statutory mechanisms and inability to access public submissions. Neither the whole MBMP nor any of the zones/designated areas are categorised in a way that connects IUCN protected area categories that would seem to be an example of missed policy learning opportunity. Direct primary data analysis of stakeholder interviews in Chapters 5 and 6 illustrate levels of engagement, use of information, and learning that occurred during the MBMP zoning process.
Chapter 5

RESULTS: STAKEHOLDER PARTICIPATION IN CO-LEARNING IN MORETON BAY MARINE PARK MANAGEMENT
Figure 5.1  Structure of Chapter 5
CHAPTER 5
RESULTS (INTERVIEW DATA ANALYSIS):
STAKEHOLDER PARTICIPATION IN CO-LEARNING IN MORETON BAY MARINE PARK MANAGEMENT

5.1 Chapter overview

This chapter presents the results related to the issue of local knowledge integration through stakeholder participation in Moreton Bay Marine Park (MBMP) planning and management during the preparation of the MBMP ZP 2008 and afterwards. The results derive from analysis of the semi-structured interviews conducted for the study. Factors that affect the learning processes are identified. This research started with asking questions such as whether co-learning forms part of MBMP management and what knowledge and learning are being used for that purpose (Chapter 1, Section 1.6). This chapter addresses the RQ1, RQ2 and RQ4 through searching answers for-

- What evidence of co-learning existed in MBMP planning and management?
- What knowledge and/or learning was used?
- What were the barriers to co-learning?

For this purpose, a thematic analysis was undertaken using NVivo10, qualitative analysis software (see Chapter 3, Section 3.5). Then the “stakeholders” and “knowledge/learning”-related codes from interview data were selected and presented along with discussions and conclusions.

5.2 Introduction

Marine protected area (MPA) management is the management of ecosystems not only for conserving marine resources, but also to promote the sustainable use of resources. While there is often detailed knowledge of specific research subjects and sites, and knowledge of broad scale processes, there are significant challenges in integrating current knowledge and learning across the range of scales needed for effective management of a MPA. Most agencies dealing with MPAs are beginning to learn how to design and conduct an effective participatory process for MPAs, and gradually understanding the implications of increased stakeholder involvement in improving the process. While there is growing awareness of the need for involvement of stakeholders in consultation processes, there is a lack of understanding of the implications of co-learning as an essential element in stakeholder participation. As policy-making continues to evolve, it is critical to understand the role of
stakeholder involvement and, in particular, how participatory decision-making processes can be improved through mutual learning. Significant participation occurs in an MPA when a range of stakeholders learn and apply their knowledge together in formulation and implementation of a plan or management guidelines. An example is consumptive beneficiaries exchanging their knowledge with the management authority, DNPRSR, in the MBMP ZP 2008. This strengthens their capacity to deal with changes throughout the process.

5.3 Existing stakeholder learning/participation process in the MBMP area management

Effective community consultation processes could be a mirror for effective community learning. Lack of such consultation could lead to lack of community learning especially if the consultation process is not transparent. A transparent process involves building good relationships, which help create a learning environment. This study explored whether the MBMP management processes were able to create a suitable environment for stakeholders learning and how (Table 5.1).

<table>
<thead>
<tr>
<th>Learning features</th>
<th>Academic</th>
<th>Non-Consumptive Beneficiaries (NCB)</th>
<th>Local Government Beneficiaries (LGB)</th>
<th>Consumptive Beneficiaries (CB)</th>
<th>State Government Beneficiaries (SGB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor and confidential process</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Biophysical science biased</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Local knowledge ignored</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Stakeholders’ feedback ignored</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Knowledge gaps/overlaps</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Social learning not facilitated</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marginally consulted</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Adverse learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.3.1 Poor and confidential processes affects learning

Government planning processes are often highly confidential, providing very little room for other stakeholders to learn and contribute. Stakeholders outside of government were given an opportunity to comment only after the release of a draft plan, not during draft preparation. Despite the legislative accountability requirement for planners to consider all public comments, final modification of the draft plan remains the responsibility of the government planners rather than representing the collective response of stakeholders:

It is quite confidential and then all of a sudden it gets sent off to the State for checks. Then it goes out to the community for their input and comment …
That is really the only opportunity that the community have to comment. Then it comes back to council and we change everything, but based on what people have commented on, or what the State has commented on. [LGB]

A change of key personnel within the government organisation can lead to a discontinuity in approach. This affects stakeholder learning, as new personnel may, or may not, have a similar attitude, experience, professional knowledge and skills about dealing with different stakeholders.

Things used to be fairly open between government, council departments and community groups. You could usually walk in and have a chat, but now they have all got these special locks on their doors so you can't get in. [NCB]

In many cases, community consultation happens quickly to meet limited timeframes. It is assumed that comprehensive community consultation would take time, resulting in deadlines not being met.

The main reason for limited community consultation is the need to meet a timeframe. [LGB]

The processes of preparing the MBMP ZP 2008 plan were quick, and poorly resourced.

That is the old linear pattern of Australian thinking. … I think this was a hurried and not very well resourced process. [Academic]

Therefore, the consultation processes for the MBMP planning, conducted by the department, EPA, were not transparent, and eventually undermined many good relationships with other stakeholders. It also suggests that opportunities were reduced for all stakeholders to reflect on community learning during the preparation of the MBMP ZP 2008.

5.3.2 Biophysical science biased

Biophysical and social values of the marine environment have an uneasy relationship. Biophysical sciences often dominate social issues in the establishment and management of a MPA. This was reflected in the planning of the MBMP area. The Queensland Government's approach to planning was more biophysical science focused, not only to increase the functionality of the ecosystem but also to make it more acceptable to some community elements, such as conservation groups, the game fishing organisation and academics or biophysical scientists who advocated for science (biophysical) based rezoning and management of the MBMP. Consequently, stakeholders believed that comments or submissions based on biophysical science rather than emotion have a greater chance of

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6 LGB: Local Government Beneficiaries
7 NCB: Non Consumptive Beneficiaries (Indirect users of the MBMP)
8 Academic: Interviewees from academic and research institutions
9 EPA: Environment Protection Agency; former name of the Department of National Park, Recreation, Sports and Racing

90 Sustainability Research Centre and Faculty of Arts and Business
consideration by governments, with the observation of one interviewee that this approach was a characteristic of Queensland when compared with other states.

Science should be the primary information source as to how we should actually go through this marine process. … the social and economic impacts of any sort of redistribution of resources is absolutely critical in the process. But you need to take the emotion out of it and really look at the science, first and foremost. [CB10]

We always tell our members and communities it is important to put your heartfelt words to your submissions, but for a submission to be successful, it has to be based on science. [NCB]

I think, throughout State Government, it has always been a bit of a feature of Queensland. It is changing, but very scientifically driven. … Science equals physical science and that is what knowledge is … Less into a more collaborative and negotiated approach to doing things than the other states. [Academic]

There was general agreement that priority was given to biophysical science rather than social values by all sectors in the MBMP management. This practice can lead to lack of incorporating valuable social information and learning into management guidelines, as stakeholders deliberately try to be objective and exclude values from the submissions.

5.3.3 Local knowledge underutilised

The lack of local consumptive and non-consumptive stakeholders in the expert advisory panel for the MBMP ZP 2008 was of concern to some interviewees. As a result, local stakeholder knowledge from well-organised marine conservation groups conversant in the language of government was easily incorporated in the plan, whereas experiential knowledge of fishermen was not used or incorporated effectively into the plan. This gap in representation of local people conversant about the MBMP area meant that local knowledge was not taken into account.

If I’d had the understanding of the Bay then that I have now … I could talk generically as a scientific expert on how people work and how things work, but I didn’t have a strong sense of local knowledge of many parts of the Bay. [Academic]

Fishermen around the MBMP area have considerable intergenerational knowledge about fishing, which they do not share, even with each other.

When you are a fisherman, your favourite place is secret. … It could have been where your dad went, or your grandad went. So you have got this whole local knowledge and local history. … Fishermen don’t talk to one another about these

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10 CB: Consumptive Beneficiaries (Direct users of the MBMP)
things, so they don't have that bond. ... They do not come and say, guess where I fished today and guess how many I got. ... They do not share that, that's secret knowledge. [Academic]

Fishermen believe that they can contribute significantly to knowledge gaps and data inadequacy related to fishing. Other than the Department of Primary Industries (DPI), no agency of the Queensland Government was keen to have fishermen's input to assist planning and management, despite fishermen being the main observers of day-to-day changes in the MBMP area. Some stakeholders in the MBMP area were trying to transfer their experiential knowledge to the next generation through their own effort. The DNPRSR\textsuperscript{11} neither tried to gather this knowledge to enrich their decision-making nor promoted continuance of this social learning trend. In addition, many of the fishermen left the business after the introduction of the new zoning plan that introduced controversial and complicated license buy-back systems.

The consultation process devalued the lifetime's achievement, and lifetime's knowledge, and the ecological knowledge, of the fishermen. ... there was no process where the scientists and the fishers worked together. [Academic]

I could get four guys that have got 200 years experiences ... you could ask them any question you want about Moreton Bay from the last 50 years (and even before that because their dad and their dad was fishing) and they can answer it. We have got incredible knowledge that way, but no one asks us. [CB]

With the history project and the code of conduct, we take the boat down, we take all the gear down. We take crab pots, trawls and we explain to the public that this is what we do. Now it is a shame that EPA did not come up and say show us what you do and this is what I don't understand. [CB]

We used our previous experience of Moreton Bay, but we did not obtain any knowledge from the local stakeholders about where to undertake the measurements. [Academic]

A lot of fishermen had retired, the very knowledgeable like my dad. It was only the ones that were handed down from father to son or from crew to crew that had the knowledge to keep going. ... You'd put them out of business in 12 months; they're all out....[CB]

The DPI ... want the people with the knowledge to help them in making their decision. ... But National Parks, Department of Environment and Heritage, all these other agencies they want nothing to do with us. [Though] we are there every day. We notice every little change, every shell, we notice every starfish. .... [CB]

\textsuperscript{11} DNPRSR: Department of National Parks, Recreation, Sport and Racing of Queensland Government, Australia.
Fishermen expected government to be pro-active in collecting their experiential knowledge and using it, because there was no other mechanism available for collecting it. They also believed that government does not trust them.

For the Government to use fishermen’s knowledge, there’s just got to be a different line of thinking. We cannot force our knowledge on them... The trouble is that the government agencies always have this perception of fishermen as trying to pull something over their eyes. [CB]

Government departments, on the other hand, claimed they used local knowledge about use of the Bay through surveys and rangers' day-to-day management knowledge.

Not as much as we probably could have. We certainly have captured that in some of the survey type work ... where people go out and do this discussion with people, but it is not about their own knowledge of where they have been catching things. [SGB]

Local knowledge from this office was fed into the zoning plan. We have knowledge of researchers doing studies. Local knowledge has been used in the zoning plan through submissions. Local knowledge from rangers also fed into the zoning plan and day-to-day management. [SGB]

Therefore, reluctance to share secret local knowledge about fishing activities with government and lack of effective initiatives by government to incorporate this knowledge into management resulted in a lack of social learning practices in the MBMP area.

5.3.4 Stakeholders’ feedback underutilised

Effective stakeholder participation in a planning process may help fill gaps if their feedback is considered and addressed in the final plan. In contrast, ignoring feedback can jeopardise the whole process of participation and learning.

Community submissions were the only stakeholder input involved in the MBMP ZP 2008 planning process. Stakeholders claimed that the submissions had no influence on improving the MBMP ZP 2008, as departmental reviewers and planners did not consider the input in the final version of the document. Consequently, many stakeholders believed that it was a waste of time to participate in activities, such as meetings or preparing submissions, as their input had no value. However, they acknowledged that the consultation process appeared to be comprehensive at the beginning, but it did not end up as expected, due to their feedback being ignored.

But the disappointing thing was when it went to the Department of Environment, they just ignored nearly everything that was put in. [LGB]

\[12\] SGB: State Government Beneficiaries (entry level to executives)
The biggest problem, even in Fisheries over the years, is when they ask for information and stakeholders put it in, … it just gets totally ignored and they do what they were going to do anyway... why did we waste all that time going to meetings, filling out submissions, sending it in … They do not listen to the stakeholders. [CB]

The Moreton Bay process was one of the best processes ever put in place. Unfortunately, they didn't take much notice of the information they got from the stakeholders... it was probably a little bit unfair because certain areas that we can justify got tweaked to what we wanted. [CB]

By sharing knowledge in an area of potential difficulty in enforcement due to consistent sand movement in a proposed green zone, Moreton Bay Access Alliance\textsuperscript{13} (MBAA) proposed not to declare that area as a green zone. Government did not pay any attention to the feedback. Fishing is being continued in that green zone, and regulations have become difficult to enforce there.

Some of the information we provided was not picked up... one of the green zones was in an area where the sand consistently moves, and you cannot physically put signs in because they get washed away... There is a small community there ... which always fished this area and continue to fish now because it cannot be enforced. [Academic]

Therefore, the interviewees indicated that government put little value on stakeholder feedback, whether based on experiential or science-based knowledge. In addition, the reason for not responding to the feedback was not explained or justified.

5.3.5 Knowledge and management gaps/overlaps

Lack of sufficient knowledge, for both biophysical and social aspects, about the marine environment may lead to a misfit between the relevant plan and the ecosystem, as well as the stakeholders’ desired conditions. Likewise, uncoordinated management systems may contribute to departmental conflicts.

A major constraint was that the relevant department involved in the MBMP planning and management had not sufficient knowledge about fish, despite fishing and fishermen being a key dimension of marine park management in the area.

We actually had very little knowledge about what was under the water, and only in very small fields. We knew nothing about fish, as a group. My group really did not do anything on fish except some freshwater fish work. [SGB]

The authority for park management lies in one department (DNPRSR); however, the authority to manage other specific activities such as fishing lies in another department.

\textsuperscript{13} MBAA: This was an alliance during the preparation of the MBMP ZP 2008 with the representation from the industry partners using the Bay such as commercial fishermen, recreational fishermen, tackle industries etc.
Effective coordination mechanism did not appear to deal with this overlap of management responsibility.

We have now been starting to push back against this management regime from Parks and …, you manage your park, but don’t be overlaying a whole range of other management arrangements over the top of our existing fishery arrangements. [SGB]

A similar issue was acknowledged in terms of social scientists having little experience in marine areas.

Very few social scientists know anything about marine areas. Our training is on land… One of the wake-ups …from the GBRMPA, and then from the Aboriginal groups …, and then Healthy Waterways, was that we don’t know enough – there is not enough social science done on marine areas. [Academic]

Knowledge gaps and management overlaps are an obstacle to sound planning and management, but prior identification of these gaps and overlaps would contribute to learning. This acknowledgement could make the plan more acceptable to stakeholders.

5.3.6 Social learning not facilitated

Social learning, which requires respectful relationships, may fill the communication gaps between stakeholders. Social learning could be an effective way to transfer learning across stakeholders, if well facilitated.

According to the participants, the main evidence for social learning occurring in preparation of the MBMP ZP 2008 occurred between the expert panel and the biophysical research team who were refining models and their use in response to the specific conditions of the MBMP area.

If everybody talks respectfully, learning goes on, and I don’t always notice it because it’s what I do all the time. [Academic]

We had sensible discussions, but there was limited material we could discuss… I do not think there was a lot of opportunity for social learning. But sometimes I overlook this myself and people tell me later. [Academic]

They did modelling… and I think there has been a different social learning process… The continual refinement of that modelling, and how to use it in protected area planning, I think has been a social learning process… [Academic]

How are they going to use what was learned at Moreton Bay to do Great Sandy which would be a much more immediate question. How likely .. it will

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14 DAFF: Department of Agriculture, Fisheries and Forestry of Queensland Government.
be that mistakes that were made or learning that were in Moreton Bay will be repeated at Great Sandy? [Academic]

Recognition of the importance of using social learning practices, which was largely not evident in the MBMP planning process, would assist future marine park planning.

5.3.7 Marginally consulted

Good community consultation may facilitate the opportunity of getting direct views from concerned stakeholders who are the target group for following a particular plan. In contrast, inadequate consultation, such as following the minimalistic legislative procedures and not seriously considering the community response, may diminish public acceptability of a plan developed in this way.

According to the s. 22 of the Marine Parks Act 2004, government departments are obliged to undertake community consultation after formulating a draft marine park zoning plan. Despite the assurance of taking into consideration of all stakeholders’ comments from submissions, neither legislation nor guidelines specified the detailed procedure for consultation. This allowed the department to comply with the minimum requirements (a ‘tick box’ mechanism-NCB), rather than design a comprehensive participation program.

It is really about tick the boxes... to get to where they wanted to be, which is a marine park plan. There’s a whole set of criteria that they have to go through. Community consultation is one of those boxes. Just so long as they can tick the box, they can say that it has been done. [CB]

I think the difficulty is, there is so many state policies that we have to reflect. Community would not have an ability to change. That is just for the statutory stuff. So, by the time you show that to the community, it is really the stuff that we have to put in there anyway. [LGB]

All they do is go out, follow the things, call for public submissions, consider those submissions, they have ticked the boxes. Governments often do what I call... plastic consultation. [NCB]

Stakeholders believed that government used the need to consider other policies as an excuse for poor consultation. Community consultation in the MBMP ZP was not as comprehensive as stakeholders expected and this limited co-learning.

5.3.8 Adverse learning

Learning from good stakeholder participation may help change knowledge, skills and behaviour with positive outcomes for marine park planning and management. In contrast, if the desired change is negative, the result can be adverse learning. Such adverse learning may foster reluctance in stakeholders to freely share their knowledge in the future or may convince them to derive a completely different strategy, which is untested.
Because stakeholders had previously experienced situations in which their participation and comments had not influenced government decisions, they became less interested in sharing information or participating in subsequent planning process and management actions.

The last one that came out we all commented on that, and we got nothing. So why would we waste our time filling another one in. … people are just fed up with it. [CB]

After the introduction of the MBMP ZP 2008, some community groups, with greater experience of being able to politically influence governments, lobbied the government to get more access to the Bay. They were quite successful in this way, as the DNPRSR has already proposed a discussion paper on proposed recreational fishing changes for ‘Scotts Point’, one of the green zones of the MBMP (DNPRSR 2014). This was released for community comments with the deadline for submission 24 March 2014.

Sunfish are now aggressively lobbying government; they have had a meeting with the minister before we did. They have now organised a meeting with the director general to put forward their case for what they want to see. They are lobbying at a national level, they're lobbying local politicians... because they just saw that being a passive participant was just not good enough. [SGB]

Learning is essential for desired positive change of stakeholders’ knowledge, skill and attitude, but adverse learning can influence this change, and can eventually disrupt effective and open communication between stakeholders.

5.4 Communication

5.4.1 Not well communicated

Communication is vital for facilitating learning between stakeholders. Effective communication can occur if all stakeholders understand the messages shared with them. If the message is not the result of well-researched and coordinated effort, it can easily create miscommunication.

Multi-resource use MPA, such as the MBMP requires good communication between stakeholders and across social networks. Necessary communication could be formal or informal or a combination of both. Government organisations often rely on formal communication, whereas non-government or community organisations prefer informal communication media for sharing ideas and debating issues. In 2007, there were some communication initiatives by the DNPRSR, such as a manned display at a boat show, which enabled better interaction with stakeholders than that in preparing the previous zoning plan in 1997, but was not sufficient. Despite these initiatives, several other
communication issues were raised by the interviewees, as one of the key elements requiring improvement for co-learning to occur between stakeholders in the MBMP ZP 2008 process (Table 5.2).

**Table 5.2 Communication issues in the MBMP management**

<table>
<thead>
<tr>
<th>Issues</th>
<th>Consumptive Beneficiaries (CB)</th>
<th>Academic</th>
<th>State Government Beneficiaries (SGB)</th>
<th>Non-Consumptive Beneficiaries (NCB)</th>
<th>Local Government Beneficiaries (LGB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not well communicated with stakeholders</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Poor inter-departmental communication reported</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Formal communication dominated</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Online communication underutilized</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Research in NRM, especially in co-management, emphasises the need for respect between those with a scientific knowledge base and a traditional ecological or experiential knowledge base.

There were masses and masses of research in co-management, in building communication across sectors, building communication not only between the science and the managers - but across the people who are well educated and the people … with a lifetime of skill. [Academic]

Co-management and co-learning works when all the sides respect each other and … know the motivation, … understanding and the background of the other. [Academic]

Lack of consolidation of information from different stakeholders resulted in ineffective use of multiple lines of evidence, which mitigated against effective communication between stakeholders.

I see a lack of co-ordination of all the data that is available, and it is not in a form yet that I think would be very good for the public or academics to get an overall picture. [NCB]

Therefore, lack of coordination across transmitters, receivers, channels and the materials provided for communication lead to lack of effective communication, which significantly affected the learning processes in the MBMP.

5.4.2 Poor inter-departmental communication reported

Effective knowledge sharing through good inter-departmental communication is key to consensus-based decision-making. However, poor inter-departmental communication leads to confused public messages, which eventually affects the whole learning process.
The MBMP is a place of multi-departmental involvement for ensuring the sustainable use of its resources and activities (e.g., fisheries, sand mines, and tourism). Despite most of the relevant government department offices being located in close proximity, there was a lack of effective inter-departmental communication.

About five different government agencies have an impact on fishing in Moreton Bay. A lot of them are in the one building... None of them are communicating with each other. For instance, Fisheries will say we are going to open this area ... Then next week the Department of Environment and Heritage will say we are going to close that area ... [CB]

Lack of effective involvement of the Department of Agriculture and Fisheries (DAFF) in the “fishing license buy back” process created considerable concern.

There was a buy back in the compensation package for commercial fishers that was not run by Fisheries and it was an absolute disaster. [SGB]

In some cases, stakeholders did not get a chance to meet any departmental personnel involved in the MBMP ZP 2008.

No one there would talk to me and I am the head of ... The Minister was in one week and I got a meeting with him, but I cannot get a meeting with the EPA. [CB]

In addition to the organisational communication system, officer-to-officer communication was evident between local government and state government agencies. This type of communication is based on individual relationships, which are often broken due to changing personnel.

With local government and other government agencies, we usually have officer-officer contact. It is relationship based, not organisation based and when a person leaves, it is not continued. [SGB]

Therefore, lack of good inter-departmental communication not only affects public understanding due to chaotic messages, but also affects relationships with stakeholders.

5.4.3 Formal communication dominated

Formal communication may help an organisation achieve its overall goal, whereas informal communication creates a platform for sharing individual desires and ideas. As informal communication is usually unstructured, people may interact without fear. In such conditions, a stakeholder may share ideas with top managers, or lower level employees may enjoy a friendly and open talk with their superiors or high-level officers without any official format. When formal communication takes precedence over informal
communication, the chances of building good relationships across the stakeholders and the organisation are reduced.

There were some activities (e.g., ‘boat shows’) where government officers had face-to-face informal communication with stakeholders that they felt was helpful. Some community groups used informal meetings with their networks for sharing ideas, views and learning. However, the overall communication across the stakeholders regarding MBMP ZP 2008 was formal. The research team maintained formal communication with the DNPRSR, but not with the other stakeholders who came to know about the plan only when it was released for community comment. Before and after that, the process remained formal. Learning at an organisational level was also formal, especially with the upper levels of management, and constituted an obstacle to creating a learning space across the organisation.

Co-management cannot just work and co-learning cannot just work, on one way. One has to be multi-faceted. That would include going to have a drink together, having a barbie, having a - whatever it is. Going out on the Bay and talking - this is the thing. [Academic]

We do two boat shows a year, one is on the Gold Coast and we do the local Tinny and Tackle show. So it is a way of us actually seeing thousands of people...[SGB]

There was lots of learning from it. We actually had a session afterwards where we actually had a debrief... at a barbecue with the AMCS team... about what worked and what did not work. [NCB]

[we communicate with] the people who have commissioned the research in DERM... about the progress of our work. We do formal reporting and written reports that summarise our results... [Academic]

[Consultation] was very formalised and it was quite distant. ... There was no sitting together developing a relationship and in particular developing a relationship of trust over time. [Academic]

Even with the zoning plan, it was quite a formal consultation process, even with council, just as it was with the other stakeholders. [LGB]

All of the people in here are happy to hear feedback. Once it goes past the managing director level, it then becomes very hierarchical and very structured. So you have to be very, very cautious about what you say and how you actually present information like that. [SGB]

The formal consultation processes in MBMP management were not capable of building trust between government institutions and other stakeholders. Participants feel comfortable sharing facts as well as anecdotal information in informal communication processes, as it is much more unstructured and flexible than formal communication.
Therefore, informal communication could play a vital role in co-learning because it would facilitate an environment for multifaceted learning across groups.

5.4.4 Online communication poorly used

An online communication system may provide a wealth of easily accessible data for stakeholders, if it is used with a good intention to reach the people outside the organisation or at a distance. In contrast, a lack of quality information, a non-user-friendly search engine and lack of transparency contribute to failure to achieve the goal of using online communication.

Participants reported that governments were not always keen to use online communication, despite its popularity for communication, especially with younger generations. Information in the right form, at the right time was not always accessible on the government website. In addition, government website search engines were not user-friendly. The SGB reported that they relied on online communication not with the intention for providing access to communities, but for avoiding hostile community groups.

> With the web, people everywhere have a quality of access to that information. I think there is some good ways in which communication and information can be shared, and we live in very fortunate times. There is no reason why government and others should not and could not come [to] that clear and transparent process. [CB]

> ... governments are very cagey about what they put on the web and so you don't often get a lot of things. They try not to do it or if they put it on the web, they hide it away. So there is not a huge amount of information to date. [Academic]

> When it is explosive, you just do not want to send staff out there ... to community groups ... That was a traditional way of doing things. [SGB]

> ... finding things on government sites is not always hyper-successful. Seem to have to use very much the exact words in order to get things to come up. So improving search engines would certainly help... [SGB]

It appeared that government use of online communication was not designed to reach the vast community with quality information about MBMP management or to increase transparency. Instead, it appeared to be used to avoid the difficulties of face-to-face communication.

5.5 Key factors affecting stakeholder learning

5.5.1 Lack of monitoring decreases learning opportunity

Lack of proper learning and communication among stakeholders in the MBMP management were the results of many factors (Table 5.3). Sustainable marine protected
area management is more likely to occur when management is properly informed about current performance through effective monitoring of biophysical condition and usage. Lack of monitoring performance decreases the opportunity of generating data that can be used to analyse the success and improvement of managing marine protected areas.

Comprehensive monitoring was clearly missing in MBMP management, yet it is an integral part of learning and the adaptive management process. Inadequate monitoring and enforcement made it difficult to examine the performance and usage of different zones by different stakeholders, such as ongoing weekend fishing in the green zones. Evidence exists within participant responses that a community-based monitoring system might be widely supported, and could help create an environment for sharing knowledge between researchers and users. These types of programmes were not evident in MBMP management.

There are still issues with knowledge and enforcement of the green zones… I was fishing on Sunday night… near a green zone, about 100 meters away from it. There was one person fishing and one person checking crab pots in the green zone. [CB]

[social monitoring is] the missing ingredient I want for monitoring the marine park. [Academic]

A lot of community monitoring occurred after the Great Barrier Reef Marine Park was rezoned… anglers are tagging 6000 fish in green, yellow and all other zones. [They are also] working with geneticists to look at recruitment rates… [They have] really integrated research into the local fishing community. … We really did not do that down here. [SGB]

Monitoring that effectively involves the community cannot only help measure the success and failure of the MBMP management, but can help generate data for informed management in the future. Despite significant influence of comprehensive monitoring on stakeholder learning, participants stressed the effect of lack of appropriate legislation, organisational democracy, underestimating community capacity, social status and contested views of stakeholders.

**Table 5.3 Key factors influencing stakeholders’ learning in MBMP management**

(✓) indicates the beneficiaries who talked about the issues)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Consumptive Beneficiaries (CB)</th>
<th>Academic</th>
<th>State Government Beneficiaries (SGB)</th>
<th>Non-Consumptive Beneficiaries (NCB)</th>
<th>Local Government Beneficiaries (LGB)</th>
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</thead>
<tbody>
<tr>
<td>Lack of proper monitoring</td>
<td>✓</td>
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<tr>
<td>Legislative complexities</td>
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<td>Political influence</td>
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<td>Lack of context specific plan</td>
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<td>Social status of stakeholders</td>
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<tr>
<td>Factors</td>
<td>Consumptive Beneficiaries (CB)</td>
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<td>Underestimating community capacity</td>
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<td>Contested views of stakeholders</td>
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<tr>
<td>Lack of organisational democracy</td>
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5.5.2 Legislative support for consultation

The government departments conducted stakeholder consultation as a legislative requirement, but the legislation did not make the relevant authority accountable for comprehensive consultation. In most cases, legislation, such as Marine Parks Act 2004 states that the Minister will prepare draft plan and give public notice for their comments or submission within a stipulated period (e.g., 28 days) (s 22), but there is no clear procedure for engaging stakeholders during the draft plan preparation. In addition, local government officers indicated that they were willing to do more community consultation if the state government required it. Lack of integration in legislation and pressures at the time meant that there was little attempt within government to seek a consensus among the extractive and more conservation-oriented agencies. There was a tendency for consultation to be delayed until the last minute to avoid demand for legislation change. While existing legislative instruments do not necessarily require comprehensive consultation, stakeholders may consider demanding new legislation to ensure effective participation. Change in legislation requires ample time. Participants’ perception was that government departments set a deadline for stakeholder consultation or submission close to the time of the final draft to avoid demand for legislation change. However, earlier changes in a plan might be useful to save time and money in comparison to that required to reduce conflicts later.

Good practices are evolving all the time as a matter of experience, you could prescribe it in legislation and say, all stakeholder groups need to be consulted. [Academic]

We tend to respond to a lot of what the State tells us to do. If the State stipulated that we must do much more community consultation, we would have to do it. [LGB]

There is multiple layers of legislation, so do not add to the complexity. Take a position, if it is wrong, reverse it completely. If it is not wrong, leave it alone... You're going to end up with Sunfish saying, you promised to allow us to fish in green zones and actually what they said was, we would review the science and
see if it is possible. ...the broader community does not care about ...what you have said. All they heard was, fishing in green zones, bring it on. [SGB]

No integrated plan for Moreton Bay, nothing whatsoever. They do not learn. [CB]

The way the Act was written they were answerable to nobody, the way their department was made up. They weren't answerable to National Parks. They weren't answerable to DPI, they weren't answerable to anyone. So they virtually did what they wanted to. Now because they had that power, there was no feedback, there was no talking to each other, there was no nothing. [CB]

It is cheaper and easier for everybody to consult early and change your plans earlier, but nobody likes changing legislation. [Academic]

The Marine Park Act 2004 could not only specify a clear procedure for comprehensive consultation processes to ensure effective stakeholder participation, but also require more effective inter-agency consensus. However, strong political commitment is required to achieve such coordination.

5.5.3 Political influence

Political factors such as lobbying and change in government may influence government decisions. Lobbying may assist governments with valuable insights, but it may also help a group get unfair advantage over others. Subsequently, stakeholder interests might be at risk if the decisions are heavily biased towards such inequitable political influence.

Lobby groups had significant influences on the final MBMP ZP 2008, with government making changes to meet government's commitment to them. As particular lobby groups heavily influenced political decisions, DNPRSR was very cautious about making data easily available to avoid its misuse by interest groups, which could lead to public misinterpretation.

They [fishermen] went, they spoke, they shared, they put stuff on maps. They have their log books. ... But they felt, in the end, it was a political decision, and that they were disrespected. [Academic]

When you go through a consultation process, everyone comes with a position, even though they do not all agree with it. Then the Government changes it on the fly because some lobby group goes in there, or the Government's made a commitment to them, to do something different. That just destroys the whole process. [NCB]

Political decisions are going to be made on the voice of a few lobby groups who like to be able to drive absolutely everywhere. ... So, the question is what information to put out and how - not hiding anything from the public, but avoiding ridiculous confusion. [Academic]
I think you can see just from the structure of the zoning that there were certain
groups whose views were taken in very strongly. [Academic]

Green zones (i.e., Marine National Park zone) in the MBMP area created the most conflict,
because these were not based on consensus between stakeholders. The CB group
believed that this was much more about gaining green votes (i.e., green group
campaigning) for the government than real protection of ecosystems. Consequently, the
NCB group realized that it might be good to form an alliance with similar organisations to
influence governments’ decision-making.

Everyone is having a major fight with Mr … now. The first plan he put out for
Marine Park closures everyone could have lived with. Since then they have
added more and more green zones - twice more… we know most of it is done
just to appease the Green political vote. [CB]

I guess we are learning every time. … engagement with like-minded
organisations is probably the key to getting better outcomes in the future.
The environment sector's been very good in the past, but I think it is become
harder now, and you have a lot of governments that will follow the votes, or
perceived votes. [NCB]

The change in government in Queensland (from LNP\textsuperscript{15} to Labor\textsuperscript{16}) in 2012 had a pivotal
role in stakeholders’ influence. Most importantly, the SGB interviewees thought that the
new LNP government focused on economic benefit over environment issues that might
result in changed access in the green zones.

We conducted a stakeholder analysis at the beginning. Tend to have fallen a
bit because of elections … then …actively working in the boating and fishing
media, which is not something we have done much in the past. I do not think
we will be doing that with the new government. [SGB]

We had a change in government. That government, through its media
releases, has expressed some different views to the previous government
about access and use of protected areas. [SGB]

Therefore, unfair lobbying, deliberate efforts to secure votes from particular groups
and changing government not only puts stakeholder interests at risk but also led to
a potential lack of continuity of stakeholder learning in MBMP planning and
management.

5.5.4 Lack of organisational democracy and representativeness

Individuals who disagree with dominant views in an organisation are often marginalised if
the organisation does not have a culture of democratic practices and organisational
learning. In contrast, lack of organisational democracy reduces the ability for

\textsuperscript{15} LNP: Liberal National Party
\textsuperscript{16} Labor: Australian Labor party
transformation of an organisation's environment, culture and leadership, which reduces the perceived credibility of the organisation by external parties.

Organisational democratic practices in the MBMP area were poor, not only in the government organisations but also in the community organisations. Community organisations did not have a culture of democratic practice in decision making regarding submission of comments for the MBMP ZP 2008. Consequently, community submissions did not necessarily represent views of the majority of the members as the organisation claimed. This might be one of the reasons that the DNPRSR showed reservation about using the information provided by community organisations.

We do not necessarily take on board their comments, but it's good to get their feedback and seeing we're not too far off the mark as far as the broader environment movement's view and things. [NCB]

Your councils, generally, are made up of members, you hope, who have an interest in the organisation, with a good connection to the membership. I cannot see that changing. I do not see community groups having that capacity to run through a democratic process in the perfect way. [NCB]

[Recreation fishing groups] are not particularly structured in any way... They are not well-supported in the general recreational fishing community. So it is quite difficult for us to use the information they give us as a peak body as being a point. [SGB]

It is just – they are the loud messages you get. It is obvious that there's a lot of fishing, or fishing groups - I don't know how representative they are of the broader community...[SGB]

Substantial democratic change in decision-making processes in an organisation might lead to redistribution of power within the organisation that help increase representativeness of the organisation in the society. In contrast, lack of democratic processes within many of the organisations inhibited organisational learning and reduced external credibility.

5.5.5 Underestimating stakeholders capacity

Depending on adequate facilitation, stakeholders may contribute valuable data and experiential knowledge of the local context, which is quite difficult to collect by government. A number of examples exist where communities have successfully participated in active research in natural resource management. However, underestimating community capacity in terms of knowledge and skills may lead to inadequate consultation, which decreases learning opportunities between stakeholders.

Community consultation is often regarded by government as a time consuming process that might hamper a project's timely completion. It was also thought that the appropriate
time for community consultation was when a calm and cool mood exists within the community, rather than a sense of urgency to complete the planning task. These conceptions downplay the powerful capacity of the community to deal with new information in the context of their knowledge.

[Government] understanding is that community consultation might lower things out. I think it is probably a lack of understanding of the capacity of the community to deal with that information and knowledge themselves. [LGB]

It is difficult in those environments where there is been explosive responses to things to do community science. You are better off doing community science when everything is calm and people are not there to make a point out of what they provide. [SGB]

Community groups are rarely recognised as the clients for research, unless there is an ample amount of social research. Increased social research might enhance the chance of developing an agreed and prioritized research agenda. This was not evident with the MBMP monitoring programme.

I set up a program which looked at what the needs of the managers would be from a management perspective of the park and the needs of the policy people. So those I looked at as being my key clients. I did not look at the community as being a client of the research [Academic]

Therefore, the community was not regarded as a valuable knowledge contributor to the consultation process in MBMP management, let alone in the research programme.

5.5.6 Consistency versus context-specific planning approach

In spite of common ecosystem management tools, each MPA is unique in terms of goals, objectives, and user perspectives. The challenge then is to maintain some element of consistency while enabling a management model tailored uniquely for each MPA. Despite the same government within Queensland and similar cultural background of the user communities to the other MPAs in Queensland, unique management models might be better than applying the same model from other MPAs. Application of copy model might stifle innovation or trialling something different to enable comparison of the performance with other ways of management. The trend to apply a successful management model from other MPAs or in an attempt to provide a consistent regulatory approach, is not always appropriate.

There are a range of settings where you cannot take the Great Barrier Reef-derived model and just impose it. ... there are a range of cultural settings where it won't work, especially where you've got places that have been consistently used by the same community of people doing the same thing for
500 or 1000 or 1500 years. You have got that enormous cultural background that does not really exist here. [CB]

Applying a management model copying from other MPAs can reduce innovation and be less acceptable to stakeholders. Therefore, they might not be interested in contributing their knowledge in any further consultation for planning and management of the same or other MPAs.

5.5.7 Respect and social status of stakeholders

Dignity and respect are important for all stakeholders in natural resource management, irrespective of their profession and age groups. It plays a vital role in stimulating stakeholder willingness to work collaboratively with government and other stakeholders. Despite being a key stakeholder, fishermen felt that they were mistreated by others in the community.

We have always been looked at as a second class citizen. We are virtually hated in the community. [CB]

To ensure dignity of stakeholders in MBMP management, government might need to be respectful of stakeholders of all sectors. Without respect, the risk is that stakeholders may not feel comfortable sharing their knowledge in any future learning process.

5.5.8 Contested views of stakeholders

It is not a surprise that each stakeholder has different views about the same ecosystem, based on their interests, experiences and knowledge. Traditionally, fishermen often oppose MPAs and complain that they will suffer economically due to blocking access to their main fishing zones. In contrast, conservation groups often claim that the sizes of no take or no fishing zones are insufficient for sustainable ecosystem functioning. Some stakeholders may completely fail to understand the complex nature of the marine ecosystem, as they consider it similar to land ecosystems. However, these multifaceted views could be turned into good learning opportunities if handled skilfully.

Usually, people consider nature as green, which reflects the dominance of the terrestrial ecosystem in conservation thought. This makes it difficult to communicate the conservation and livelihood values of a blue planet, as many aspects of the marine environment are not easily visible to stakeholders (e.g., biodiversity, ecosystem boundary or connectedness and livelihood dependency). Stakeholders connected to and dependent on the marine and coastal environment, such as fishermen, have unique knowledge and skills that they use in these environments. If for any reason, fishermen need to change their occupation, it is unlikely that they will easily adjust to an alternative income generating activity.
We see nature as green, not as blue. [Academic]

Stakeholders tended to see the marine environment from their own utilitarian perspectives and group's interests, which led to conflict. None of the consumptive and non-consumptive users were fully committed to manage the environment as a whole ecosystem. While non-consumptive stakeholders wanted government to increase the green zones areas and keep the Bay pristine, consumptive stakeholders, such as fishing groups, wanted to see the Bay full of the particular resource they exploit.

Everybody wants to look after the marine environment and ... their own nest as well. Scientists want to look after the science, managers want to make sure that everything is running smoothly. The government wants to make sure that all the lobby groups are happy. [Academic]

People who love the Bay and like to hang out in the Bay, think the Bay is important, not the fishing... But the advocates of the fishing industry seem to have a different view. They advocate for the fishing in the Bay. [SGB]

We were, primarily, interested in maximising the size of the green zones. [NCB]

The income loss of users, such as commercial fishermen, was acknowledged by many stakeholders in the Moreton Bay area, but less attention was given to losses of other livelihoods based on quantitative economic assessment.

The commercial fishing industry suffered quite a lot. There are a lot of people who claim loss of livelihood, but there is also versions encountered in a more quantitative way through the economic information survey that has been done. [SGB]

The scientific expert panel was a vital group in formulating the MBMP ZP 2008. Academics were in favour of forming the panel as a balanced combination of biophysical and social scientists but were not convinced of the need to include other stakeholders. In fact, physical and social scientists often disagreed with each other despite discussing the same ecosystem.

A scientific expert panel should be scientific experts and able to talk as such. Fine mixing social and biophysical... It actually made our discussions in a committee difficult, because we were there with the stakeholders. It is fine to have a committee like that, but you don't call it the scientific experts panel. [Academic]

We thought, awfully small changes, awfully slow changes, but the physical scientists said, no, that was quite transformative. [Academic]

If properly handled, differences in opinions among stakeholders may enrich the discussion and eventually improve learning.
5.6 Discussion

5.6.1 Key features in stakeholders’ learning in the MBMP area management

The study revealed that stakeholder participation in the MBMP planning and management was not satisfactory to any of the interviewees as individuals or groups (Figure 5.2). The circles in Figure 5.2 represent the five stakeholder groups interviewed. The rounded squares are the issues raised by the stakeholders during interviews. The arrows point to the issues raised by particular stakeholders. The common views among interviewee groups (CB, NCB and LGB) considered the process as mandated with minimal consultation, where the government department deliberately ignored stakeholder feedback (Academic, CB and LGB). The opportunity for learning was limited, especially during preparation of the MBMP ZP 2008, as the process was not sufficiently open for rigorous community participation within the short period of time (Academic, NCB and LGB). The planning and management of the MBMP is biophysical-science based (Academic, CB and NCB). Therefore, socio-economic issues of the stakeholders were given a lower priority. Despite the lack of reliable data, local knowledge, especially stakeholder experiential knowledge, was not captured and incorporated during preparation of the MBMP ZP 2008 or in any other management guideline.

Figure 5.2 Key features (rounded squares) in stakeholder (circles) participation in learning in the MBMP area management
(SGB: State Government Beneficiaries; Academic: Academic beneficiaries, particularly from Universities; CB: Consumptive Beneficiaries; NCB: Non Consumptive Beneficiaries; LGB: Local Government Beneficiaries)
The Academic and SGB raised knowledge gap issues and the interdepartmental management overlap. Many fisheries activities in the marine park were considered neither to be well managed nor involved the fisheries department. Adverse stakeholder learning from the use of their information against their interests, and other political influences on government decision-making, are likely to change their strategy in any future consultation (CB and SGB).

The SGB considered the stakeholder participation in the MBMP ZP 2008 was inadequate. The Academic added that there was very little opportunity for social learning in the process. This divergence suggests that the stakeholder participation process helped stimulate some learning at the individual (personal, group or institutional) level despite lack of social learning. Despite some formal communication attempts, co-learning practice was very limited in MBMP area management, because of the limited use of informal, individual or face-to-face communication among the stakeholders.

5.6.2 Key communication issues

The research identified communication gaps across stakeholders in the MBMP planning and management process (Figure 5.3). The Academic believed that this was because of tension between the management authority and user groups, and between science and local experiential knowledge; whereas the NCB pointed to the uncoordinated and invalidated data, which constrains effective communication. The Academic explained that this was also due to lack of respect for each other’s knowledge across the stakeholders. The NCB stated that the lack of coordination of information from different agencies prevented successful communication.
The study also revealed that the communication processes in MBMP planning and management were a combination of formal and informal approaches (Academic, SGB, LGB and NCB). Stakeholders other than government made considerable use of informal media, whereas government departments were very formal within and beyond their organisation. However, some of the staff practised informal communication within their personal networks. The DNPRSR maintained formal communication with particular stakeholders, but not with all, according to the Academic and LGB. Therefore, the user community had very little scope to learn and contribute, except through formal submissions. Even then, many users felt the submissions were neglected, irrespective of the quality of the information provided (CB, NCB, LGB, Academic).

Interdepartmental communication between different relevant government agencies was considered to be very poor by CB and SGB. This may stem from a power issue, cultural practice, or a mandate dominated by politics. The concerned beneficiaries demanded that it needed to be changed. They suggested the need for a body or a system where the mandate would be to look after the Bay as a whole rather than being fragmented through multiple government departmental mandates. This could take the form of an independent forum, which would coordinate all relevant agency activity in the Bay area. Despite the popularity of e-communication, the DNPRSR did not utilise online communication successfully. The SGB confirmed that they used online communication to remove their
Staff from contact with the community when they thought there would be conflict. The DNPRSR was not only cautious in publicising the information in their website, but also it was very difficult to find information due to the lack of a user-friendly interface (SGB, Academic, CB). It was evident that the communication systems practised before, during and after the MBMP ZP 2008 were predominately one way, both in government and non-government organisations and in stakeholders. The DNPRSR was practising a traditional hierarchical bureaucratic process, which allowed less opportunity for getting feedback from the field level officers who know the best about stakeholder reactions. However, the decision-making process in community organisations was also identified as hierarchical and missed the opportunity of having feedback from the majority of their members due to lack of comprehensive discussion and debating practices. They pointed to financial constraints as the reason for their lack of democratic practices in information sharing when making submissions.

5.6.3 Key factors influencing stakeholders’ participation in learning

The interview data indicate that not all the factors (discussed in Section 5.5) have had an equal influence. Dominating factors were legislation, political issues, lack of trust, lack of monitoring and underestimating community capacity (Figure 5.4). Apart from the collective concerns, there were some isolated views regarding respect and replication of a traditional MP model, which potentially has strong implications for fostering co-learning.

5.4 Key factors (rectangles) influencing stakeholders’ (circles) participation in co-learning in the MBMP area management

(SGB: State Government Beneficiaries; Academic: Academic beneficiaries, particularly from Universities; CB: Consumptive Beneficiaries; NCB: Non Consumptive Beneficiaries; LGB: Local Government Beneficiaries)
Many stakeholder interviewees (CB, Academic and SGB) stated that MBMP management did not have a good monitoring programme, which prevents learning for future management. An independent third party or community monitoring system might be a good mechanism, given the existing level of mistrust between stakeholders. This could facilitate stakeholder learning because of the engagement with multiple stakeholders. Most importantly, the monitoring results would have a level of transparency that would help give legitimacy to managerial decisions.

Trust between stakeholders is one of the key factors in achieving stakeholder participation in learning. The formal consultation approach applied in the MBMP area by the DNPRSR contributed little to building trust among stakeholders; rather, ignoring stakeholder feedback diminished any trust that might have been built (Academic, CB). The SGB thought communities did not appreciate even the positive outcomes of any government project, as they did not trust government. Therefore, there was lack of mutual trust between government and other stakeholders.

The legislation allowed the DNPRSR, technically, not to be accountable for undertaking comprehensive community consultation (CB, Academic, SGB and LGB). The lack of detail for a comprehensive accountable process for community consultation did not foster sharing of data and co-learning. If the legislation specified codes of conduct with ramifications for not following the process, it could help improve stakeholder participation.

The study revealed the most powerful influences in MBMP area management were political (lobbying, green votes and change of government) (CB, Academic, SGB and NCB). Lobby groups were considered to overly influence government decision making, irrespective of stakeholder feedback (Academic, CB, NCB). This view undermined the consultation process and outcomes, because stakeholders strongly believed that government changed the plan based on behind the scene lobbying groups, not stakeholder feedback through the consultation process. This was identified as one of the main reasons for mistrusting the government. The DNPRSR also acknowledged that the change in government from Labor to LNP in Queensland would affect any future consultation processes (SGB).

All interviewees, except government, raised concerns for the decision making processes in the government departments, and participants stated that it did not follow democratic ideals, which limits the scope for non-government stakeholders to learn. This was equally identified as a trait of non-government and many other community organisations (SGB, NCB and LGB). These organisations could not ensure every member’s feedback in their submission because of a lack of financial and human resource capacity (NCB). As these organisations, even those that are highly influential, failed to exercise good organisational
democracy, their credibility to be good representatives and advocates for their members diminished (SGB).

5.7 Conclusions/future learning

Co-learning and stakeholder participation are closely related:

- lack of comprehensive and transparent monitoring leads to ‘no adaptive learning’,
- consultation processes are ‘positively aligned’ with increased awareness,
- ‘mutually aligned’ occurred when for example, both conservation groups and government shared information to validate increasing green zones, and
- ‘negatively aligned’ or adverse learning occurred which led the affected stakeholders (e.g. fishers) to withdraw themselves from sharing learning in future participation.

Learning does not only depend on participation of the range of stakeholders, but also on other factors, such as availability of quality knowledge, the processes and methods of sharing such knowledge, and facilitation to create a sharing environment. Other than some co-learning between government and conservationists, the data showed that there was little co-learning practice occurring in MBMP area management. The plan and onsite management had very little success in incorporating different knowledge and learning from the stakeholders of the area because of poor information sharing and communication mechanisms. In addition, many other factors, such as lack of monitoring, mistrust among stakeholders, political interferences and legislation significantly influenced the overall learning environment. It was difficult to satisfy all stakeholder groups, as different stakeholders had very different views and perspectives of using the marine park. Even if the goal of all is ecosystem protection, it might not be possible to satisfy all stakeholders equally. It is not possible to have aquaculture development with pristine conservation; similarly, it is not possible to have pristine conservation with recreational and commercial fishers or any other coastal development. The aim should be to build consensus that involves a package of benefits so that all parties get much of what they want, individual and environmental harm is minimised, and people are compensated for what is lost.

Like many other MPAs, MBMP planning and management also suffers from data scarcity. Participation that engenders stakeholder learning could play a vital role in overcoming the issue of inadequate data. This contribution would not be in the way of submissions from stakeholders or as a ‘reference group’ only, but by involving them in an ‘expert panel’ or other mechanisms. Stakeholder inclusion from the community in such a panel might serve two purposes. The community representative would give an opportunity to observe the evidence-based working processes of the scientific community, which they could translate to the community; and the expert panel might be enriched with the experiential
knowledge from the community representative. However, a strong and transparent monitoring and evaluation program is required so that all stakeholders can learn from the good outcomes and mistakes simultaneously.

In any future planning in the MBMP, the DNPRSR needs to recognise its obligation to provide sufficient information in the planning and management processes. The government also needs to work on a process to incorporate stakeholder learning from the beginning of any plan to ease implementation. Accordingly, user groups need to work on their organisational arrangements so that their comments are representative of their community. Each of these groups needs to listen to each other’s feedback, to respect each other’s reaction, and to reach a consensus for the better use of the MBMP for future generations. Most importantly, stakeholders need to reflect on how to go about a rezoning process and how they would engage communities to contribute stakeholder knowledge throughout the process in any such future endeavour.
CHAPTER 6

RESULTS: STAKEHOLDER INFORMATION (MIS)USED IN MORETON BAY MARINE PARK MANAGEMENT
Figure 6.1 Structure of the Chapter 6
CHAPTER 6
RESULTS (INTERVIEW DATA ANALYSIS): STAKEHOLDER INFORMATION (MIS) USED IN MORETON BAY MARINE PARK MANAGEMENT

6.1 Chapter overview
This chapter presents the results related to the issue of information sharing in co-learning in Moreton Bay Marine Park (MBMP) planning and management. The results are derived from the semi-structured interviews conducted for the study. It discusses impacts of information, as a key learning thread for promoting stakeholder knowledge integration in the MBMP area. It also shows the various forms of information and sharing processes used by the stakeholders during such learning practices. This dissertation started with asking what evidence of co-learning are embedded in the MBMP planning and management process and what knowledge and learning are being used for that purpose (Chapter 1, Section 1.6). Knowledge and learning used in stakeholder participation and communication processes were identified in Chapter 5. Chapter 6 addresses the research question three (RQ3) through searching for the answers to the following sub questions.

- What information/learning was shared and how?
- Whether it was updated with the experience of implementation and how?
- Whether the updated information was shared continually and how? and
- What were the key factors influencing such sharing and learning.

For this purpose, a thematic analysis was undertaken with the help of NVivo10, qualitative analysis software (see Chapter 3, Section 3.5.3). Then the theme “information”-related codes from interview data were selected and presented in a logical manner along with discussions and concluding remarks.

6.2 Introduction
Tension between acceptance and use of scientifically rigorous versus experiential, social and economic information in natural resource management was evident in the MBMP planning and management process (Chapter 5, Section 5.3.2). A range participation and communication methods were used by DNPRSR 17 officers to communicate with stakeholders about their issues and emerging management concerns. Some of these

17 DNPRSR: Department of National Parks, Recreation, Sport and Racing of Queensland Government, Australia
methods were meetings, a web portal, maps, flyers, and an information display. In response, non-government stakeholders also used various methods to communicate within their groups and with DNPRSR like formal and informal meetings, social gatherings, social networks and mass media, radio, newspapers and television. Information was the vital component, and a critical resource in communication between DNPRSR and other stakeholders. From initiation of the review of the MBMP 1997, to the commencement of the MBMP ZP 2008 and day-to-day management, most stakeholders exchanged information about the biophysical conditions of the Bay and the predicted socio-economic impacts on stakeholder livelihoods, as a result of managerial changes.

The interviews revealed that people involved in the planning process approached issues from a different context and had different viewpoints. Therefore, it appeared that information provided by others would be more acceptable if it supported individual views or aligned with individual interests. In contrast, stakeholders might reject information or findings that were against their interests. A sound marine park planning process relies on the identification, selection and application of the information in the final plan or any other related management guidelines. As a result, it requires the right information, in the right form, at the right time, with the understanding that, inevitably, resources constrain the development of a perfect knowledge base. Similarly, stakeholders need to be updated with the most current information so that they can participate effectively in reviewing and developing new plans and management guidelines. Although interviews of DNPRSR officials indicated that there were no problems with the quality of information provided by DNPRSR and its dissemination, different stakeholder groups felt that both the information and the research were inadequate in quality. Adaptive decision-making depends on how involved parties learn from each other and are able to contribute to the process. Sourcing alternative information from different stakeholders, with scientifically collected data, could inform decision making in the MBMP planning and management process. While there was often specific information available at an individual and organisational level, there were significant challenges in sharing such information and learning across the stakeholders. Stakeholder participation may occur in an MPA when they can learn together with the management authority and vice versa, through maintaining a free flow of information.

6.3 Key learning threads/information (mis)used in the MBMP planning and management process

6.3.1 Community-based information underutilised

There was debate about the acceptability of scientifically collected data and community-derived data used in the MBMP planning and management. Ecologically-
focussed groups, such as biophysical scientists and conservation groups, favour use of scientific biophysical data (rigorously collected and analysed according to a scientific paradigm); whereas users, NGOs concerned with aspects of livelihood and social scientists advocate for complementing these data with local, experiential data. This often creates conflict due to questions about the scientific rigor of community information on one hand, and the lack of trust in the scientific information provided by governments. However, a combination of both scientific and local information evidence is required for creating a learning-friendly environment. This did not occur in the MBMP planning and management process (Table 6.1). This table shows the summarised views of the issues reported by the interviewees about the information (mis)used in MBMP management. Devaluing community-derived information may lead stakeholders to believe that governments are only interested in implementing their own agenda, rather than being concerned about community welfare or overall sustainability of resources.

Table 6.1 Key learning threads in the MBMP planning and management process

<table>
<thead>
<tr>
<th>Learning threads in the MBMP planning and management process</th>
<th>Consumptive Beneficiaries (CB)</th>
<th>Academic</th>
<th>State Government Beneficiaries (SGB)</th>
<th>Non-Consumptive Beneficiaries (NCB)</th>
<th>Local Government Beneficiaries (LGB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community-based information underutilised</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Propaganda overruled consistent information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrelevant information used and misinterpreted</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information gaps reported</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Particular groups (e.g., biophysical scientist in Academic group) were strongly biased towards using only scientific biophysical information, such as fish abundance data, captured through video in and outside of the green zones. Community-derived information, such as data from fishermen, were devalued by some stakeholders, labelling these data as anecdotal and useless, despite it being empirical and often longitudinal.

On the ecology side - the sort of information that we were obtaining was either direct observations of the ecology through using videos; so counting the number of fish inside and outside the no-take areas before and after the rezoning. ... We also used catch per unit effort in some areas which was a different type of index but basically gave the same information as the relative abundance [of fish]. [Academic]
You can get some anecdotal stuff from fishing people - they might say, yeah, when I was a boy, we could do this, that and the other, but you have to use what is on the table, the latest scientific information. ... We always say that they should be using scientific information. They should use the information that has been gathered properly. [NCB]

There was an agenda set from the Parks group. ... They had a conservation outcome in mind, they were going to achieve that no matter what was said and they just made up excuses that were fit for purpose... It was based on [information from biophysical] science. [SGB]

Although community-derived data were often considered as not having scientific rigour, it was also acknowledged by academics, and state and local government interviewees that it can contribute relatively accurate information with less collection costs than other methods. In some cases, such as in fisheries, community-derived data could be much more accurate than scientific sampling, because fishermen have strong networks and long term experience.

It was very well designed and data captured. ... it is not scientifically, rigorously done, [but] there's a lack of understanding [that] community-based data can give you data that you would not get any other way, because putting out measuring machines everywhere is far too expensive; ... it can play its role if you understand its role and support it. [Academic]

We have a tagging program that runs ... outside of government ... by one of our stakeholder groups for 40 years. During this Snapper debate, we were talking about how do we re-engage with actually getting some information from rec fishers. The only way we could be assured of any accuracy in the information gathering was ... that we would run a project through this tagging group, who has a very strong community standing. [SGB]

If I wanted to get that underwater ecosystem information or something, I would probably just go through my list of historical contacts, pick up the phone, and start making calls. [LGB]

Therefore, both scientific and community-derived data can be complementary, although possibly contradictory. If complementary, then there may be reasonable confidence in both forms of data. If contradictory, then areas where greater research effort may be needed are identified. Community group involvement in such data collection, and its use, encourages people to take local ownership and do their own learning, because they see that their knowledge is valued, used and something is happening at the ground level.

6.3.2 ‘Propaganda’ overruled consistent information

Informed public opinion is useful in developing planning and management guidelines for natural resource management if the information comes through consultation with proper
facilitation. Lack of proper community consultation may lead to the spread of confusing public messages, which may also manipulate and disrupt the flow of information between governments and other stakeholders.

The lack of consistent information in social media from communities conveyed the impression that it was ‘propaganda’, making it harder for the DNPRSR to accept it for planning. The lack of processes for community dialogue did not help dealing with inconsistent information in the MBMP case study.

If there was more consistent information, ... they [governments] would be able to use that as a way...they would require more effective dialogue or education [against] propaganda ... with the community about what was happening. So that when it [consistent information] came up it would be much easier to communicate their goals or whatever they're trying to...[Academic]

I think there are just confusing messages. ... it is not so much a problem for the general public, but politicians who hear these public messages. So the question is what information to put out and how. ... it is not hiding anything from the public, but is avoiding ridiculous confusion. [Academic]

Regular free sharing of information and its updating is an essential component of co-learning. The absence of co-learning enables publicising of irrelevant information and misinterpretation.

6.3.3 Irrelevant information used and misinterpreted

A concern in MPA planning and management is irrelevant information being used and disseminated by governments. In addition, manipulated interpretation may play a vital role in creating confusion in such management initiatives.

If governments want to use their own data for planning and management, they need to demonstrate that the data is at least or more reliable than other information sources, such as blog activities during the MBMP ZP 2008 process. During this process, NGOs and different stakeholder alliances, such as Moreton Bay Access Alliance devised and published on-line alternative recommendations, based on local information from stakeholders other than government sources, as they did not trust the government sources of information (Chapter 5, Section 5.3.4). The DNPRSR neither accepted their recommendations nor successfully showed that the government's sources of information were more valid than local information. In addition, integrated consideration of all aspects of Bay management, rather than a single perspective, is required for better management. These initiatives were not evident in the MBMP planning and management process.
The problem is there is too much information [outside]. If government departments do not retain their credibility so that they are seen as more informed than a blog ..., [which] is a clear identification that it is a government document and it has [gone] through some sort of a review process. [Therefore], it is competent and important. [SGB]

Part of the issue around management and so on [is] all done within a framework - not looking holistically at physical, emotional, psychological, intellectual and so on. It is looking from a [single] point of view that information is not relevant. [Academic]

Lack of updated time series data, such as fish catch information, decreased the acceptability of government plans.

We always keep saying to Fisheries, what you need is real-time data. ... That was the problem with the Snapper. They were using modelling information that came from 2005. [CB]

Government officers in the MBMP management were cautious about disseminating all information, because they are concerned about misinterpretation of their information by political opponents.

I think there are fears about what the information gets, ... the fears of the different interpretations that will be made on it [and the] fears of political flack. [Academic]

Therefore, updated, accurate real time information is required to be disseminated for better public understanding, and skilled government staff need to be able to address potential misinterpretation by politicians and others.

6.3.4 Information gaps reported

Lack of adequate data was a serious concern during MBMP ZP 1997 formulation. In contrast, MBMP ZP 2008 was not deprived of information but information was not in a readily understandable form for relevant stakeholders. In addition, some detailed biophysical information about the entire Bay, such as bathymetric mapping, was also in demand by some stakeholder, such as Academics, but not available.

Certainly when we designed the '97 plan, we had almost no information, which is how these things work. We knew where people were trawling, we knew a bit about where people were fishing, we knew a bit about intertidal communities and seagrass beds, but we didn't know ... anything else...[Academic]

Information needs to go out to the public in forms that they can readily digest. [Academic]

What we should have around Moreton Bay is high-resolution swatch mapping. That has been done ... on southwest and South Eastern Tasmania and the southern part of the New South Wales coast. We need that information. [Academic]
Community-based information through engaging volunteers, has been used by management authorities in many MPAs (Christie & White 2007; Jentoft et al. 2007). However, this was not practised in the MBMP due primarily to capacity issues (e.g., tight timeframes, resources).

There is a guy ... that runs a thing up in Rockhampton ... and has all done by volunteers. The same system could have been applied here ... A lot of them would not tell you probably exactly where it [fish] is caught but they would probably tell you what they have caught. [CB]

I don't think this process had that luxury. I seem to recollect tight timelines, tight decision timelines, limited information available, limited capacity, limited budget. [Academic]

Information gaps are major impediments to better management planning, but it can help substantially if prior identification of these gaps occurs and is properly addressed during the planning and decision-making processes.

6.4 Information sharing

6.4.1 Fragmented information shared

Stakeholders accept the information that they considered to be the most appropriate to their needs and desires. Similarly, governments often try to disseminate information aligned to their interests. However, incomplete information may result in both parties failing to achieve their objectives, which was evident in the MBMP planning and management process (Table 6.2).

<table>
<thead>
<tr>
<th>Information sharing issues in the MBMP planning and management process</th>
<th>Consumptive Beneficiaries</th>
<th>Academic</th>
<th>State Government Beneficiaries</th>
<th>Non-Consumptive Beneficiaries</th>
<th>Local Government Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragmented information shared</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social networks partially utilised</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Missing links identified</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Boomerang returned</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

During the MBMP ZP 2008 process, there was widespread reaction by stakeholders to DNPRSR’s release of partial information relating to fisheries. Subsequently, stakeholders generated many e-activities, such as blogs and on-line forums, to challenge the incomplete reporting.

At the beginning of the year, we pulled together quite a detailed report [about] fish, crabs, some of the other things associated with the Bay and released.

...The Minister announced it and Channel Nine were there. It generated a lot of
activity and blogs … from the fishing communities. They did not like it, which
was just an overview. They were looking for the detail. [SGB]

As complete information helps develop social learning, fragmented messages may
create an organised campaign or action against particular planning and management
processes.

6.4.2 Social networks partially utilised

Social networks can help foster social learning across stakeholders, if utilised in a
way where both government and non-government stakeholders are actively involved.
Despite a structured government initiative for consultation, community groups and
NGOs made substantial use of social media to share information. In contrast,
government did not use this emerging media form.

The CB and NCB groups strongly used social media for information sharing within
and beyond the groups through social networks and mass media, such as websites,
blogs, Facebook, Twitter, newspaper, radio and television. In addition, some
community groups also shared information through social networking with other
organisations, though all the information was not always reliable.

We used a lot of fishing internet forums to distribute the report. The report was
also freely available on the internet from the Marine Queensland website. [CB]

If we are running campaigns, they will get campaign material. They will get
emails from us. We run blogs. We have websites. Other organisations do
the same thing. We utilise the media, local, regional and national
newspapers. We use the radio. We use TV when we get reporters interested.
… We use Twitter, Facebook, all of that sort of stuff. [NCB]

We have a network with other groups. We work with WWF. We work with
the commercial sector. Commercial sector data is almost public knowledge in
that you can go into Fisheries database and pull out …, the data is there from
the commercial sector and they fill out logbooks on their catches. Sometimes
reliable, sometimes not so reliable, depends what they want at the time. [CB]

I find it is very good in conveying information, particularly, rapport with
different people in the field, so that you can get more work done and you can
have more stakeholders. [LGB]

While social networks were used by local government officers and often by non-
government stakeholders, State Government officers did not use this form of engagement
and communication. Therefore, the MBMP planning and management missed the
opportunity of sharing information freely with the stakeholders as well as getting
continuous feedback.
6.4.3 Missing links identified

Appropriate information sharing may play a vital role in forming relationships between stakeholders. Free flow of information can create new collaborative pathways. In contrast, lack of such sharing across, or with any particular stakeholder, may create learning gaps.

The academic community did not communicate outside of its established networks (e.g., within the academic community). Stakeholder groups used various forms of communication media and strategies for sharing, such as formal and informal methods across their networks (see Section 5.4.3). Despite the academic community having good relationships within their community and with government, there was no link evident between academic and other non-government stakeholders.

The scientific community is pretty good at sharing its information internally and there has been a couple of these sort of hubs that have been set up at the national level where you can deposit your information and either just make it available for blokes to download or just provide links. Therefore, we are good at doing that within the scientific community. [Academic]

We also hope to publish our results in scientific papers and present them at conferences. Therefore, it is not so much presenting to stakeholders but ultimately the stakeholders will get hold of it. They may get hold of it sooner via freedom of information and so on if they are keen. I would not be surprised if some of them are already trying to do that - or have tried - but since it has not formally been signed off and finished yet that may have slowed them down a bit. [Academic]

We are very keen to have that information get out there and we probably would have communicated some of these results from Moreton Bay a lot more openly and widely than what we have. [Academic]

The LGB maintained communications with State Government organisations, but did not maintain such sharing with community stakeholders. However, such two-way communication did not exist, and the LGB reported little information flow from the SGB.

We have mapped out all our shorebird habitat areas and that information is also feeding into our planning scheme. We have also communicated that information to other stakeholders like the State Government like DERM who manage the Marine Park, like DAFF (who manage fisheries). [LGB]

I mean, it is a lot of information. It is not too bad with the estuaries or the marine environment but, for instance, we do the same for platypus and we have platypus project, where we use community groups and then we validate that information. We do not actually get that information back to the community. [LGB]
The academic community is well equipped with the latest research information, which is not easily accessible to other stakeholders. If this community does not share such information in an understandable way, it decreases the chance of fostering social learning across the groups. Therefore, the goal of achieving co-learning in MBMP planning and management process would be difficult.

6.4.4 Information boomerang

Stakeholders and the position they adopt on issues may change over the consultation period based on the outcomes of the information they contribute and receive during the planning process. Many of the user groups’ perception was that their information was used as a weapon against them. This mis-use of information, and the lack of addressing the issues stakeholders raised, will likely make them non-cooperative in the future.

During the process of MBMP ZP 2008, some stakeholders participated actively; sharing valuable information such as location of good fishing grounds and the catches. When the zoning plan came out, they saw that all their regular fishing grounds were under green zones, which shocked them. Eventually, it created deep mistrust with the government department and they did not want to accept any information from government.

Rec(ational) fishers were asked to participate in the process. They did, quite freely, at the start. [They] said, this is where we fish, this is what we catch. They were quite open with their records and their behaviours. In their view - and being polite, they got screwed. Because marine parks just went in and closed areas that were traditional fishing grounds, essentially. [SGB]

We gave our log-book information (to the Department). We told them where we fished, and that information was used against us - the fishermen up North say exactly the same thing. [CB]

They used a whole range of information sources. Some positively, some particularly negatively. ... Commercial and rec fishing information was provided, they actually used that to then close some of those areas. [SGB]

When voluntarily shared information by the stakeholders was used by DNPRSR against stakeholder interests, it helped block the way for free information sharing in the subsequent processes of MBMP planning and management process.

6.5 Key factors influencing stakeholders’ information sharing
6.5.1 Lack of information validation and coordination

Information sharing between stakeholders, which was influenced by factors such as lack of information validation and coordination, was characteristic in the MBMP planning and management process (Table 6.3).

Table 6.3 Key factors influencing stakeholders’ information sharing in the MBMP planning and management process

(“✓” indicates reporting the issues by interviewees)

<table>
<thead>
<tr>
<th>Key factors influencing information sharing in the MBMP planning and management process</th>
<th>Consumptive Beneficiaries</th>
<th>Academic</th>
<th>State Government Beneficiaries</th>
<th>Non-Consumptive Beneficiaries</th>
<th>Local Government Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of information validation and coordination</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Lack of access to information and transparency</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Lack of trust</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of informed policy making</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of independent research funding</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Different views of stakeholders</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

Coordination and validation of data can make them acceptable to the public. In contrast, lack of coordination of data from different stakeholders made the data unusable. Information on the MBMP area was available from a range of consumptive, non-consumptive and government stakeholders. The difficulty was this information was not really coordinated or validated; therefore, it was of little use for management planning or effective sharing.

You have all these different community environmental groups. Then you have us and then you have EPA. No one correlates any of the data so there are heaps of data out there but these are meaningless. [CB]

Everyone has the data and information. It is just about collating it and putting it into the big picture and what does that mean. [LGB]

I see a lack of co-ordination of all the data that is available. It is not in a form yet that would be very good for the public or academics [to] get an overall picture. [NCB]

An expert independent third party validation system, or preferably a collaborative approach by all agencies involved in collecting and analysing data, would make it much more reliable and valuable to all stakeholders.
We would have seen the success of the Healthy Waterways partnership where an independent scientific group validate the monitoring that has been done by governments. The water quality data, collected for the Healthy Waterways partnership, was collected and analysed by government, but validated by an independent scientific committee. Therefore, the data are viewed with a lot of confidence by the community. [Academic]

In some cases, negative results from such validation is uncomfortable for government, as it highlighted the need to improve knowledge of resource status. When all the waterways [in Brisbane] go bad after rainfall in the last couple of years and report card values go down, government does not like it, but they cannot do anything about it. Therefore, [they] have to say what they are going to do about it. [Academic]

The community did not accept the information provided by the government because of a lack of validation, even for biophysical information, and a lack of trust (see Section 6.5.3).

The problem was whether the different groups felt that the information or the research had been adequately done. [SGB]

Here is the statistics, here is the data...They did no assessment of the biodiversity in those areas at all except for seamen looking over sides seeing if they could see a turtle or something on the bottom. [CB]

We've been pleading as an organisation,...for at least 12 years for the government of the day to start a systematic survey [of] Queensland's fauna, because we just do not have that information. Yet there is information being rounded up every day but it is not coordinated into a central depository. [NCB]

Data accuracy is essential for making it acceptable to stakeholders. Validation can help achieve the needed level of confidence in data accuracy.

6.5.2 Lack of access to information and transparency

Information is a key learning element facilitating co-learning between stakeholders if it is in the right form and at the right time. For example, stakeholders require technical and socio-economic information about the MBMP not only in the implementation stage but also during the community consultation period or even in draft preparation stage. This might help integrate stakeholder knowledge as a meaningful contribution to the draft plan, but it did not occur. In contrast, lack of access to information and transparency may lead to no or adverse learning.

Accessing government information was difficult for the stakeholders. Not all the necessary information was available on the Queensland government website, nor
was it easily accessible. Stakeholders believed that transparent open access to government information could bring better outcomes for MBMP management.

Queensland Government is still hard to get information out of. Getting hold of information particularly about fisheries is still difficult. They guard [this information] very jealously. [Academic]

The public has to wind their way through this myriad of websites to try to locate what information there is and of course, there is not a lot of information necessarily up on those websites. A lot of its still tucked behind and access to that is difficult. [NCB]

I was trying to hunt down a submission, one that we had made. I could just find draft letters and I am not sure what actually went out. That is why I could not give you the submission. [LGB]

Governments need to learn that the more they're transparent and open in provision of information, ... that drives a better process. It might be a bit more difficult process... but ultimately the result out of it should be a better outcome. [CB]

Access to information is not only difficult within government departments, but also within the non-government organisations (NGOs).

... branch of ... Society has got funding ... to assist and there's a lot of information contained by NGOs, like this group and all that sort of stuff that have got extensive records ... but accessing them is difficult. [NCB]

Despite the Queensland Government’s commitment to giving the community greater access to information (Queensland Government 2013b), stakeholders did not feel that the process was transparent and straightforward.

Very difficult to access unless you go through Freedom of Information. With Freedom of Information if there is third parties involved, you have to get approval from third parties to release that information. When you get the information, all you get is a letterhead with an address up the top there and a heap of black lines all across it, because it has been embargoed. Therefore, getting information out is difficult. [NCB]

Lack of access to information and transparency both in government and non-government organisations may disrupt relationships and trust across stakeholders and eventually affect co-learning.

6.5.3 Lack of relationship/trust

Stakeholder acceptance of a government department’s information is not only dependent on the accuracy of information, but also the relationship between government and stakeholders and trust built through effort, over time. Some geographical information, such as zoning maps, was available for comment by
stakeholders, but little effort was made by government to build rapport with the stakeholders. The CB considered the situation as quite a distant relationship, which affects the free exchange of information with government. Even the SGB recognised this distrust.

The bits of information they put out were zoning maps and then formalised meetings either with stakeholder groups or public meetings, but what I did not see the one on one, sitting down in some sort of collaborative way, coming up with relationships of trust if that can be done. [Academic]

You can get probably 50 years of information from talking to the right people and they will tell you, [for example] what happened when they built that break wall out there, that changed the water flow and now nothing lives there anymore. [CB]

They have general distrust of government. So, they are very reluctant to actually accept any information that you present to them. [SGB]

Lack of good relationships between government or stakeholders may lead to a decrease in sharing of information, which eventually affects learning across the networks.

6.5.4 Lack of informed policy making

Availability of information means little unless it is used to inform policy and properly address issues raised by stakeholders. Consequently, lack of informed policy making may lead to the policy becoming unacceptable to stakeholders.

Interviewees suggested there was little incorporation of stakeholder information into the policy making process in the MBMP planning and management process. A radical change is required at a higher level of the policy making section of government to shift to participatory policy making.

When it comes to the application of information to policy it starts to diverge where other things take over the decision making process. There is not going to be a lot that we can do about that until there is a massive change in policy at a higher level. [Academic]

The traditional policy making process needs to be much more participatory than hierarchical, as the latter does not adequately ensure stakeholder learning is effectively incorporated into the final plan or ongoing management.

6.5.5 Lack of independent research funding

When a research organisation or independent researcher gets funding from a government agency, they are obliged to send their findings to the relevant department rather than share insights publicly. Then, researchers have no control over a department’s use of the information.
If we wanted to have a press release about our findings we would need to do it jointly with the department. It could be quite different if some other organisation wanted to fund some of this research. [Academic]

Government departments are often forced to make decisions based on inadequate information due to inadequate funding for data collection.

Clearly, the policy is such that they need that information but they’re unable to fund it so they’re going to make a decision without the information. [Academic]

Evidence supported the claim that independent research funding may lead to better public dissemination of scientific research information.

6.5.6 Different views of stakeholders

Different stakeholders may interpret information differently, depending on their needs and perspectives. Some stakeholders liked the information provided to them, while others strongly criticised it and looked for deficiencies. This can lead to confusion and conflict if not addressed by the agency releasing the information. DNPRSR may have been able to resolve issues through a conflict resolution process, bringing targeted stakeholders around a table with an expert facilitator.

Everybody comes in from a different opinion - from a different viewpoint and context. Therefore, they will look at the information and study it and those - where it supports views, those people will praise it and push it. It is always possible that people with divergent opinions will look at it and look for deficiencies. [SGB]

Some will see it as potentially validating their opinions and others will see it as not being robust enough and criticise it. ... Individuals and individual groups will interpret the information in their own way. [SGB]

It does not have much of an impact really, apart from just here is the water, and here is the line of the Marine Park. We need to stay say 100 metres, you have to have limited development within that area and then you can start doing your houses. That is really the information that we look at. [LGB]

Strong facilitation is required to help stakeholders with divergent opinions and needs, reach consensus, understand, and accept legitimate and well-justified loss for the betterment of the whole Bay.

6.6 Discussion

6.6.1 Key learning threads/information (mis)used in the MBMP planning and management process

The study revealed that the information used in stakeholder participation in MBMP planning and management was considered not satisfactory to any of the interviewee groups (Figure 6.2). The NCB, Academic, SGB and LGB considered the process was
heavily biased to biophysical scientific information and did not utilise the community-derived information, which included both biophysical and social-based knowledge. Many stakeholders questioned the validity of the government’s data. Not all the information available during the formulation of the MBMP ZP 2008 was relevant and properly interpreted (Academic, SGB and CB). Despite the new zoning plan preparation commencing in 2007, it suffered from inadequate data and information gap issues as did the first zoning plan in 1997 (Academic and CB). The Academic also claimed that there was a lack of consistent information, comparable to ‘propaganda’, in the social media. The above indicates that information used in the MBMP ZP 2008 was not a good combination of biophysical, use and social-economic information and, through underutilising stakeholder information, missed the opportunity of promoting effective social learning. Despite some formal information collection attempts, co-learning practice was very limited in MBMP area management, because of limited use of other informal and community-derived information.

![Diagram of learning threads in stakeholders' learning in the MBMP planning and management process.](image-url)
6.6.2 Key information sharing issues

Information sharing from management to users is one of the key components in the process of co-learning. If the shared information is not complete, clear, concise and understandable, it will not promote learning. The interviewees identified several issues influencing information sharing in MBMP area management: fragmented information sharing, underutilisation of social networks, information boomerang and missing links (Figure 6.3).

![Diagram showing key information sharing issues]

*Figure 6.3 Key information sharing issues (rounded squares) raised by the interviewees (circles) in the MBMP planning and management process.*

*(SGB: State Government Beneficiaries; Academic: Academic beneficiaries, particularly from Universities; CB: Consumptive Beneficiaries; NCB: Non Consumptive Beneficiaries; LGB: Local Government Beneficiaries)*
Government organisations used formal systems such as meetings, workshops, seminars for information sharing, whereas other stakeholders heavily used social networks and related media, such as web portals, blogs and campaigns. Social networks were increasingly popular for sharing information between stakeholders and beyond in the MBMP area planning and management. The study showed that most of the stakeholders (CB, NCB and LGB) used social networks for information sharing, although the level of use varied considerably between stakeholders. The LGB used social networks mostly at a personal level, whereas other stakeholder groups used them widely across their agency. The SGB acknowledged that fragmented information in the released report for community comments jeopardised the information sharing process.

Successful stakeholder participation is influenced by experiences or learning from the past. It is also positively related to the extent that the relevant authority considers and uses the information provided by stakeholders in policy formulation and implementation. Stakeholders who have experienced a management agency not valuing and considering their contribution in a final plan, may reduce or block the flow of information from users to the authority and even between user groups. This represents a barrier within the social learning process. Because the aspirations of the community are possibly not met, this type of learning also risks breaking relationships between stakeholders, which might make them reluctant to share any such information in the future. The study revealed that the commercial fishing community (CB) shared some information in good faith, such as where they caught a large number of fish, but believed this sharing was used in a detrimental way to their interests, as they saw the identified fishing areas allocated as green (no fishing) zones. This outcome is likely to block them from sharing similar information in the future. The SGB also acknowledged the issue, and acknowledged that some of the information from stakeholders was utilised against their (information providers) interest without explanation of the rationale for the determination.

There was some formal and informal information sharing within or between some stakeholders including government but not between all stakeholders (Table 6.4). The information sharing beyond the group was very little (dotted line) and one-way (arrow with single direction). Interviewees (Academic and LGB) claimed this was a clear flaw in the MBMP area management. Despite a good sharing mechanism within the group, the academics shared little information with other stakeholders, such as CB, NCB, SGB and LGB. They shared their research findings with SGB and LGB due to getting research funding from these organisations. In contrast, CB reported two-way information sharing with their groups, SGB and LGB. This was not free and fearless with SGB and LGB, due to lack of creating informal space for discussions. The NCB had comparatively better
information sharing within their groups and with SGB and LGB because of their aligned position for more conservation (establishing more green zones). Inevitably, government information sharing, in most cases, was uni-directional with the stakeholders. The SGB received information from academics as research outcomes, which they fragmentally shared with CB and NCB, but not with other relevant state departments, such as fisheries. On the other hand, LGB had relatively better relationships with the stakeholders than SGB, but they (LGB) have neither the capacity nor the power to facilitate free and fearless information sharing with stakeholders in the MBMP area. It was quite clear that not much information sharing occurred beyond stakeholder groups. This may have been the result of influence by various internal and external factors.

Table 6.4 Information sharing among stakeholders network
(straight line for no exchange, left arrow for one way from referring stakeholder in column 1 at left to right stakeholders, right arrow for one way from right stakeholder to left and two way arrow for two way sharing).

<table>
<thead>
<tr>
<th></th>
<th>Academic</th>
<th>Consumptive Beneficiaries</th>
<th>Non Consumptive Beneficiaries</th>
<th>State Government Beneficiaries</th>
<th>Local Government Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CB</td>
<td></td>
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<tr>
<td>NCB</td>
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<tr>
<td>SGB</td>
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<tr>
<td>LGB</td>
<td></td>
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</tbody>
</table>

6.6.3 Key factors influencing stakeholder information sharing
Not all the factors influencing stakeholder information sharing had similar influence in MBMP planning and management process. Some were dominating, such as lack of data validation and coordination, lack of access to data, lack of trust, and different views of stakeholders (Figure 6.4). Apart from these commonly raised concerns of all stakeholders, individuals also commented on a lack of informed policy making and lack of independent research funding, which have strong implications in terms of fostering co-learning.
The study revealed that the most consistently identified issue was the lack of data validation and coordination. No stakeholder group (Academic, CB, NCB, SGB and LGB) had confidence in the information provided by the government organisation due to lack of third party validation. Stakeholders believed that independent third party validation would ensure greater reliability than relying solely on the organisation that collects and analyses the data. As validation is a kind of triangulation for the accuracy of the data, if a committee of government and stakeholders jointly reviewed all the data, both scientific and community-derived, the process would facilitate co-learning.

Trust among stakeholders is one of the key components of stakeholder information sharing and learning. Trust and information sharing seems to be interdependent; where trust may ease the transparency of information sharing, and transparent information sharing may establish trust. Formal practices of information sharing in the MBMP planning and management process, such as meeting with stakeholder reference groups, releasing draft zoning maps and a call for submissions by the DNPRSR contributed little to trust.
building among stakeholders. Rather, it diminished trust as it did nothing to reduce the relationship distance with stakeholders (Academic, CB and SGB). The SGB identified that communities did not appreciate even positive outcomes of any government project because they did not trust government.

Poor access to information deprived stakeholders of getting necessary information (Academic, CB, NCB and LGB). According to the Academic and NCB, stakeholders rarely obtain information from government websites, as either the government removes the information from the site or the website is so complex that stakeholders cannot find it easily. However, stakeholders believed that easily accessible information on the government web portal would foster understanding (CB and LGB) and thus co-learning.

All stakeholders, except government, frequently raised concern for the lack of democratic decision-making processes in government departments. This often limits the scope for government officers throughout the hierarchy to learn. Non-government and other community organisations (SGB, NCB) similarly could not ensure every individual member’s feedback in their submission because of their lack of financial and human resources (NCB). A committee often constructed submissions. The submissions from these types of organisations, even very influential ones, were therefore not necessarily representative (SGB) due to lack of organisational learning practices.

Information sharing beyond individual groups varies considerably, based on the quality of the information, communication channel used and the objectives or purposes of communication. However, other factors, such as source of funding, also influence information sharing and quality. Those who fund research usually have requirements about sharing research outcomes publically and only after they have been reviewed by the agency. Much of the current and previous research on the MBMP was funded through DNPRSR, so researchers had little or no control over whether DNPRSR would share their findings in a timely manner (Academic).

The MBMP planning and management process has not only suffered from inadequate information and insufficient sharing among stakeholders, but also the final decision making process failed to address the issues emerging from the available information (Academic), such as fishermen’s experiential knowledge. Stakeholders believed that this failure of informed policymaking was a hierarchical issue that required substantial institutional change at a higher level to address the issue.
6.7 Conclusions

It was clear from the discussions that inadequate information and unbalanced information sharing played a key role in the poor co-learning practices in MBMP planning and management process (RQ3). This led to inadequate reflection of stakeholder learning in the plan and onsite management. In addition, lack of quality information, lack of access and transparency, mistrust among stakeholders, lack of participatory policy making, lack of independent research funding and different views of stakeholders affected the overall learning environment. Stakeholder information could have played a pivotal role in overcoming the paucity of quality scientific data. The DNPRSR considered community submissions as major stakeholder input, but were wary about the lack of a democratic exercise in preparing the submissions within certain community organisations (see Chapter 5).

Some positive initiatives from the DNPRSR for information sharing, such as releasing draft zoning maps, public displays and formal meetings with stakeholder reference groups (see Chapter 4), contributed to information-sharing environments, but it was not as free and spontaneous as could be obtained from informal sharing. Stakeholders expected but did not experience informal information sharing situations, where they could eat and drink together and share their experiences, views, common concerns and even conflicting issues in a fun and friendly manner. Both the zoning plan formulations in 1997 and 2008 were affected by a lack of comprehensive baseline data for the entire Bay, as there was insufficient monitoring. Like the continuous sharing of information, data needs to be updated continuously. A strong and transparent monitoring and evaluation program with participation from stakeholders would be required to collect on-going data, which will not only fulfil the future data scarcity, but also help continuous sharing, updating and sharing the updated information with stakeholders.

Introducing programmes for stakeholders to gather socially might also be a good medium for sharing information continually in a free and friendly manner. Such social programmes could be informal gatherings of like groups. Bringing opposing groups together would require expert facilitation, which tends to make it more formal. These could be organised by LGB, as they are more locally established and connected with local stakeholders. It could also be organised by community-based committees, such as NRM groups that often employ skilled facilitators, although support may also be needed from SGB and/or LGB. Based on the quality of facilitation, these types of social programmes can help government enrich their data repository by documenting local information, which may help in updating the information to be used for any future plan formulation and day-to-day management.
Chapter 7

DISCUSSION AND CONCLUSIONS: LEARNING IN MORETON BAY MARINE PARK MANAGEMENT

Moreton Bay Marine Park
Our bay Our future
Chapter 7
Discussion and Conclusions: Learning in the Moreton Bay Marine Park management

7.1 Chapter overview

7.2 Introduction
7.3 Maine research findings
7.4 Barriers to and opportunities for co-learning

7.5 Overcoming barriers
7.6 Limitations
7.7 Opportunities for future research

7.8 Conclusions

Figure 7.1 Structure of the Chapter 7
CHAPTER 7
DISCUSSION AND CONCLUSIONS:
LEARNING IN MORETON BAY MARINE PARK MANAGEMENT

7.1 Chapter overview

This chapter critically examines the findings against the aims and objectives of the study and reviews the outcomes in relation to the research questions. It reviews the learning practices in the Moreton Bay Marine Park (MBMP) case study in accordance with outcomes and gaps identified in the literature reviews. The chapter discusses the synergies and contrasts between the conceptual framework and the actual learning from the study, along with learning barriers. Future areas of research with the potential to leverage improved information flows within marine protected areas (MPAs) or natural resource management (NRM) are discussed with an explanation of how limitations of the study were addressed. Finally, this chapter points to the need to identify lessons arising from the case studies, and suggests some challenges and opportunities for research to help co-learning practices in similar areas.

7.2 Introduction

In the context of increasing global interest in transitioning MPAs from top-down management to co-management and participatory governance (Berkes 2002; Christie 2011; Chuenpagdee et al. 2013; Jentoft et al. 2007), this dissertation focused on investigating learning between stakeholders, including barriers to and opportunities for co-learning in the case study area, Moreton Bay Marine Park (MBMP), South East Queensland, Australia. Co-management, as an emergent governance approach for complex social-ecological systems connecting the learning function of adaptive management (experimental and experiential) and the linking (vertically and horizontally) function of co-management, is a growing research field (Jacobson et al. 2014; Plummer et al. 2012). MPAs, with their social-ecological links (Pollnac et al. 2010), are widely accepted as a fundamental strategy in managing marine resources (Agardy et al. 2011), which in turn is fostered through co-management (Plummer et al. 2012). Governance arrangements for managing marine resources and MPAs are a major and increasing challenge for governments (Jentoft & Chuenpagdee 2009; Jones et al. 2013) and of increasing concern to other stakeholders who wish to be involved. In the final chapter of this dissertation, I
review the main research findings from the case study analysis, and then discuss them under the umbrella of social learning, particularly identifying the barriers and opportunities for co-learning. Finally, the larger significance of this research is discussed, highlighting theoretical, methodological, and policy contributions, as well as suggesting areas for further research.

7.3 Main research findings

Each of the five research questions for this study contributed to understanding of factors and processes that can affect co-learning in management of MPAs by using the example of MBMP. The answer to the first research question RQ1 *What evidence exists for co-learning being embedded in planning for MPA management?*, is found by integrating the answers to the other questions. Mis-use of knowledge was found from investigating RQ2, *What knowledge/learning is being used in planning and on-site actions?* (Chapters 4 and 5). Key findings from RQ3, *How is the information/learning shared, updated with experience through implementation, and shared updated information?*, such as lack of validation, lack of access to the information and less use of social networks for information sharing, were found (Chapter 6). Stakeholders’ perceptions about factors affecting learning, that is, *What are the barriers to co-learning* (RQ4), were primarily evident in the Chapters 4, 5 and 6. Ways to overcome, that is, *How can these barriers help understanding for stakeholder knowledge integration in MPA planning and management* (RQ5), are discussed later in this chapter.

7.3.1 Role of learning in the MBMP planning and management - response to RQ2 and RQ3

a. Knowledge and learning (mis)use in MPA management

Resource management by the DNPRSR\(^\text{18}\) and resource exploitation by users groups, such as fishermen, have been the subject of a social-ecological debate since the development of the *MBMP ZP 2008*\(^\text{19}\). Social learning during stakeholder participation in MBMP management was considered poor or inadequate, as the processes were heavily biased towards scientifically collected biophysical knowledge and did not value stakeholder knowledge and feedback, even that which was biophysical (Chapter 5, Section 5.3). Global literature highlights the importance of information exchange in natural resource management, because it helps develop new knowledge in an iterative process of collaborative adaptive management, co-management or learning by doing (Allen et al.\(^\text{18}\) DNPRSR-Department of National Parks, Recreation, Sports and Racing, Queensland Government (ex DERM or EPA).\(^\text{19}\) MBMP ZP 2008-Marine Parks (Moreton Bay) Zoning Plan 2008
2011; Baldwin & Ross 2012; Bosch et al. 2013; Chuenpagdee & Jentoft 2009; Jacobson et al. 2011; Kilvington et al. 2011a; Pahl-Wostl et al. 2013). Stakeholder groups function within multiple social spaces in which the process of generating, debating and using science and local knowledge takes place (Kilvington et al. 2011b; McPhee 2011). The MBMP ZP 2008 preparation process was too quick, closed and secretive. It missed the opportunity to incorporate valuable stakeholder knowledge by ignoring community feedback (Chapter 4, Section 4.7). Stakeholders from both resource users and conservation sectors were dissatisfied with the consultation process in the MBMP rezoning, because of their perception that the outcomes were predetermined, and use of feedback was treated inequitably and insufficiently (Chapter 5). While the scientific paradigm suggests that for knowledge to be useful it needs to be acquired through a formal and systematic process that follows codified procedures and universal principles (Nonaka & Takeuchi 1995), there is growing acknowledgement of the need for implicit or tacit knowledge, which is embedded in social interactions and communities of practice (Bouwen & Taillieu 2004; Wagner 1997). During the MBMP rezoning and management processes an opportunity to incorporate implicit knowledge of stakeholders was missed due to a lack of facilitating social learning through informal participation (Chapter 5, Section 5.4.3).

b. Information sharing environment in learning for MPA management

Knowledge, as a participation metaphor (Brown 2002), is formed from the interaction of different actors (Bouwen & Taillieu 2004), where information plays a vital role as supplied raw materials. Communities are equipped with vast local and experiential knowledge, but this does not necessarily mean that they always share this knowledge, which requires a learning-friendly informal environment. Sometimes, communities need relevant scientific information, which gives them much more confidence to share their knowledge when they can validate the information provided to them. The MBMP rezoning process and day-to-day management procedures were not successful in providing such information to the relevant stakeholders. There was some information available that was not well accepted by stakeholders, as it was considered to be irrelevant, misinterpreted and ‘propaganda’ (Chapter 6, Section 6.3). Not only was the lack of information insufficient for facilitating interactive learning among stakeholders, but also there was a lack of a participatory information sharing platform. The formal meeting and consultation initiatives by the DNPRSR were a good start, but insufficient to create an environment where stakeholders felt comfortable about sharing information and asking ‘dumb questions’, which they can do in an informal gathering for better clarification of points of confusion. Sharing fragmented information and not utilising social media also affects information sharing among stakeholders. Both management and users groups could have contributed much better to
decision making, especially during the rezoning processes, if they were equipped with good information (Baldwin & Ross 2012). The MBMP planning process, like many NRM systems (Allen et al. 2011), failed to address the underlying social processes that would facilitate social learning. Case specific information dissemination, through social and learning networks, can clearly influence stakeholder perceptions of MPAs (Christie 2011) and could have contributed better to the MBMP rezoning. The DNPRSR neither participated in social networks nor made use of those networks, in marked contrast to many of the non-government stakeholders (Chapter 6, Section 6.4.2).

7.3.2 Learning practices in MPAs

As co-learning shares common features with other learning practices, such as adaptive learning, social learning, organisational learning, policy learning, participatory planning and implementation and anticipated action learning (Chapter 2), this research investigated the synergy between these practices in MBMP management (Chapters 4-6). Identified learning practices were grouped into these six categories, which are a combination of categories used by learning scholars for addressing natural resource management (Chapter 2). Using these six interconnected categories is useful for visualising the (mis)alignment of learning practices in MBMP planning and management. This points to areas that require greater attention for fostering co-learning in MPAs management.

a. Adaptive learning

Adaptive learning embraces other forms of learning to respond to changes in ecosystems and society, and ensure ongoing participation of affected stakeholders (Table 7.1). Adaptive learning for coastal management includes social learning, sustainability learning, organisational learning and a bias towards reviewing and changing policy and management practice (Smith et al. 2009), with the insights from experience. The rationale for adaptive learning in management systems rests on three key elements: (1) rapid knowledge acquisition, (2) effective information flow, and (3) processes for creating shared understandings (McLain & Lee 1996). These learning practices were minimal in MBMP management. Affected stakeholders, such as fisher groups, did not get many opportunities to interact with the management staff of DNPRSR. Different types of available knowledge, such as stakeholder local knowledge, socio-economic and biophysical information, were not integrated to make the rezoning and management process socio-ecological friendly. It was not only because the community information was not validated or rigorous, but also through underestimating community knowledge and capacity. Information sharing occurred within stakeholder groups or between particular groups,

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such as academic and government beneficiaries, but not across all stakeholder groups. This is mainly because of relationships between groups and the lack of a facilitated information sharing platform.

Table 7.1 Co-learning in global literature and its alignment with the case study results (*✓* means aligned, partially aligned or inversely aligned; whereas “no tick” means negligible)

<table>
<thead>
<tr>
<th>Components</th>
<th>Key characteristics</th>
<th>MBMP management</th>
<th>Reference sections</th>
</tr>
</thead>
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<tr>
<td>Adaptive learning</td>
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<td>5.3</td>
<td>4.3</td>
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<tr>
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<td>Multi-way information flow</td>
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<td>Combination of different types (biological and social; experiential and local) of knowledge</td>
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<td>Collective action and reflection in management</td>
<td>5.3.8</td>
<td></td>
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<tr>
<td>Social learning</td>
<td>Interaction and sharing experiences for joint action</td>
<td>5.3.3; 6.3.1</td>
<td></td>
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<tr>
<td>Social learning</td>
<td>Rigorous dialogue among diverse stakeholders</td>
<td>5.3.5</td>
<td></td>
</tr>
<tr>
<td>Social learning</td>
<td>Collaborate, understand and respect other’s role</td>
<td>5.3.9</td>
<td></td>
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<tr>
<td>Social learning</td>
<td>Learning by imitating or copying from others</td>
<td>✓</td>
<td></td>
</tr>
<tr>
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<td>Integration of scientific and local knowledge</td>
<td>6.3.1</td>
<td></td>
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<tr>
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<td>5.4.2; 5.3.9; 6.4.4</td>
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<td>Social interaction among stakeholders and beyond</td>
<td>5.4.2; 5.4.4</td>
<td></td>
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<td>6.4.2</td>
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<td>Practice of social learning in policy process</td>
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<td>Consistency of community information and effort with policy framework and management plan</td>
<td>4.7; 6.3.2; 6.3.3; 6.4.1; 6.5.4</td>
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<td>Rigorous dialogue among communities in policy development</td>
<td>4.5.2; 5.5.5; 6.3.1; 6.3.4</td>
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<td>Use of local knowledge through planning process, starting early influence of policy to create supportive learning environment</td>
<td>4.6.1</td>
<td></td>
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<tr>
<td>Policy learning</td>
<td>Policy development by political biased versus stakeholder focused</td>
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<td>4.5.2; 4.7; 5.5.1; 5.5.2; 5.5.5; 6.3.1; 5.5.3</td>
</tr>
<tr>
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<td>Continual improvement through monitoring and evaluation</td>
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<td></td>
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<tr>
<td>Anticipated action learning</td>
<td>Addressing future uncertainties (e.g., climate change)</td>
<td>4.5.2; 4.6.1</td>
<td></td>
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<td>Adaptation plan to face new challenge or uncertainty</td>
<td>✓</td>
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<td>Integration of scientific and local knowledge</td>
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<td>Adequate resources for participatory planning and implementation</td>
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</table>
b. Social learning

Despite strong social networks among non-government stakeholders, social learning was not facilitated between the government and non-government stakeholders. Lack of informal meetings and communication between government and stakeholders and underutilisation of social networks by the DNPRSR were vital factors affecting social learning. Lack of involvement of all stakeholder groups in every stage of planning and management, lack of independent facilitation, and the absence of collective decision making through consensus building and appropriate information management also led to creating a non-learning environment. Some of the non-government organisation or non-consumptive beneficiaries (NCB), such conservation groups, have good processes and relationships for sharing information. In most cases, relationships are at a personal level, rather than institutional. Consumptive beneficiaries (CB), such as commercial and recreational fishers, did not have such relationships. These two groups seem to have good internal social networks for sharing ideas and concerns, but not between the groups. Not utilising the range of stakeholder local knowledge and integrating it with scientific information failed to create a stimulus for the stakeholders and did not foster social learning across their networks and with government beneficiaries.

c. Organisational learning

Organisations are the social groupings of individuals within which learning occurs (Kemp & Weehuizen 2005). None of the government or non-government institutions in the MBMP areas exercised democratic processes in their decision making, which did not foster the creation of an organisational learning environment. While government organisations commonly practice hierarchical procedures in decision making (Cook et al. 2012), this was also evident in the non-government organisations. The study showed that conservation groups and recreational fisher groups took decisions about their submissions at the executive level, rather than debating or negotiating the issues with all or the majority of their members. In most cases, lack of financial capacity and time was the reason given for not conducting comprehensive consultation with members. This probably also applies to government organisations. Non-government stakeholders had rich local experiential knowledge, and were successful in sharing that information among themselves through strong social networks. On the other hand, government stakeholders did not use the opportunity available in social networks to disseminate knowledge and information they held. This might have been because politicians felt insecure about enabling staff to use social media or they did not have expertise to monitor and respond to the media in a timely and thorough fashion. Lack of good facilitators, negotiators or conflict resolution
experts in government organisations is another reason, with political directives and resource constraints, for their narrow participatory practices.

d. Policy learning

Individual learning, organisational learning and social learning all contribute to learning that informs policy development (Kemp & Weehuizen 2005). As policy is designed and implemented by a range of organisations (Kemp & Weehuizen 2005), its effectiveness might be measured/assessed by how effective the policy is in creating a stimulus for facilitating individual learning within organisations and facilitating social learning among organisations. None of the policy learning criteria (Table 7.1) were observed in the MBMP rezoning document analysis and from the stakeholder interviews, except stakeholders believed that rezoning policy was highly biased by political influence, such as strong lobby groups that could secure green votes for the government. Actors as knowledge contributors in the MBMP rezoning policy were mainly from academia, statistical agencies and research institutes and provided biophysical, economic and some social data, but missed the opportunity to integrate stakeholder knowledge. Therefore, the MBMP rezoning plan was not as acceptable to the stakeholders, especially users groups, as expected by the DNPRSR.

e. Anticipated action learning

Given the constant and often rapid pace of changes in environment and society, planning needs to address future uncertainty. These uncertainties may stem from events related to climate change, population growth, social and ecosystem dysfunctions or other uncertainties, such as terrorism/war. Responding to future scenarios requires sound data and flexible structures that involve all stakeholder representatives. This is not evident in the MBMP rezoning and management. The commercial fishers group, taking a stewardship approach, continues to disseminate their practical knowledge and values on fishing in the MBMP area to the next generation of family members but without the advantage of sophisticated consideration of possible scenarios that would foreshadow the need to adapt. The lack of discussion on the resilience features proposed through the rezoning of the MBMP precluded fishers becoming involved in a dialogue about the future.

f. Participatory planning and implementation

Participatory approaches have become a major pillar in environmental resource management that reflects the need for new modes of governance and knowledge generation to deal with increasing uncertainty and complexity (Pahl-Wostl 2009). Effective participatory planning means people are involved in identifying their problems and
solutions by themselves with facilitation from experts or institutions (Bosch et al. 2013; Chambers 1994; Quaghebeur et al. 2004; Sherwill et al. 2007). Neither the rezoning plan nor the onsite management of the MBMP was participatory in that sense, because stakeholders only had the opportunity to be involved in the process through limited formal meetings and written submissions on the draft plan. Possible explanations might be the traditional regulatory approach of the DNPRSR, fear that stakeholder participation might result in loss of authority and control, or the lack of experts to conduct participatory planning and implementation.

7.3.3 Conceptual framework and actual scenarios

In Chapter 1, Section 1.8 of this dissertation, a conceptual framework for co-learning was presented (Figure 1.2), based on existing knowledge presented in the literature and my experiences in the field of NRM, in particular fisheries and aquaculture management. The assumption was that the management practices in MPAs are mainly directive and enforcement based with resultant disgruntled compliance or non-compliance by users (Figure 7.2, modified from Figure 1.2). Evidence from the MBMP case study showed that the management system applied was enforcement-based, and the rezoning plan gave more regulatory power to the DNPRSR (double lines in the Figure 7.2). The strong regulatory power of the DNPRSR influenced power sharing, interdepartmental communication and organisational learning, trust-building, as well as learning and knowledge co-production, which affected co-learning.

It was assumed that consultation between government and non-government stakeholders would be sufficient to address stakeholder feedback in the plan and onsite management, as per legislative requirements. The study showed that consultation was poor (broken lines in the Figure 7.2), insufficient, and stakeholder feedback was poorly considered (Chapter 5, Section 5.3). Many stakeholders believed that the legislative requirement for consultation has a ‘loophole’ through which the DNPRSR could escape technically by “ticking the box” of consultation without accomplishing it comprehensively. Non-government stakeholders, such as commercial fishers, were much more concerned about social-economic factors and livelihood aspects of the Bay users, whereas the DNPRSR (and others) emphasized the biophysical value of the Bay and enforceable outcomes (Chapter 6, Section 6.3.1).

Climate change and other uncertainties are issues that were considered less urgent by the DNPRSR in the conceptual framework (broken grey line in the Figure 7.2). Not only was the issue given low priority, but also totally ignored (missing line in the Figure 7.2) from
the beginning of the rezoning process to the implementation of the MBMP ZP 2008 (Chapter 4, Sections 4.5.1, 4.5.2, 4.6.1).

![Figure 7.2 Actual scenarios of the conceptual framework; modified from Figure 1.2](image)

*Figure 7.2 Actual scenarios of the conceptual framework; modified from Figure 1.2 (broken lines denote loosely addressed, missing line denotes not addressed and double lines denote increasing intensity)*

The absence of data was an issue identified when preparing the first zoning plan 1997 (Chapter 5, Section 5.7). Despite little improvement in data availability to inform preparation of the MBMP ZP 2008, this shortfall has still not been comprehensively addressed for use in future planning and to support adaptive management (Chapter 5, Section 5.5.1 and Chapter 6, Section 6.5.1). Unlike many other MPAs, no encouragement exists to establish or support community-based monitoring. Academic researchers however were funded by the DNPRS for status data on individual aspects of the Bay, such as sea grass and fish abundance, which was erroneously called monitoring programmes. Partnership between scientists, managers and the community in the participatory monitoring of MPAs is generally regarded as one of the principal components of compliance and access to the no take areas (Carter & Ross 2013; Christie 2005; Jacobson et al. 2014; McPhee 2011; Pollnac et al. 2010).

Management of a multi-stakeholder used resource, such as MPAs, requires stakeholder engagement through building consensus, relationships and trust (Allen et al. 2011; Baldwin & Ross 2012; Cook et al. 2012; Jentoft et al. 2011). Neither government nor the non-government stakeholders trusted each other (broken line in the Figure 7.2). This affected information sharing, knowledge exchange and overall learning (Chapter 5, Section 5.6.3; Chapter 6, Section 6.5.3).
7.4 Barriers to and opportunities for co-learning - response to RQ 4 and RQ 5

This research found numerous barriers, but also several opportunities for the emergence of co-learning in MBMP management. In addition, some factors can be both barriers and opportunities. The research findings on barriers (Table 7.2) are largely consistent with the factors contributing to failure of social learning (Allen et al. 2011; Bouwen & Taillieu 2004; Kilvington et al. 2011b; Muro & Jeffrey 2008; Pahl-Wostl & Hare 2004; Reed et al. 2010), co-management and adaptive co-management (Armitage et al. 2008; Jones & Burgess 2005; Leys & Vanclay 2010a; Olsson et al. 2004; Plummer et al. 2012; Pomeroy 1995; Sandstrom & Rova 2010; Zurba et al. 2012). These factors included conflict of interests of those involved, power asymmetries, insufficient resources (e.g., financial, human, technical), absence of social networks, and lack of homogeneity among resource systems and users (Plummer et al. 2012). Two major barriers emerge from this research that have received little attention in the natural resource management literature, namely ‘legislative loophole’ and ‘political/lobby influence’.

7.4.1 Learning/knowledge sharing barriers and opportunities

A lack of a learning-friendly environment in the MBMP management, which is influenced by many factors (Table 7.2), is the main barrier to stakeholder learning. Despite community engagement being a costly process, there is no alternative to comprehensive community consultation in MPAs establishment, rezoning and on site management (Carballo-Cárdenas et al. 2013; Christie et al. 2005; Hockings 1998; Jentoft et al. 2011; Jones et al. 2013; OSPAR Commission 2008; Pomeroy et al. 2005). Consultation would have to be meaningful with the necessary time and space for stakeholder debate and negotiation, with clear evidence of incorporating their feedback in final decision-making. This is crucial because stakeholder experiences with consultation, when it does not clearly integrate information shared during consultation, may block any future learning opportunity. Choosing the representative stakeholder organisations or an individual for consultation is also crucial, as reported by the DNPRSR. This was constrained in the case study, by a lack of institutional capacity (e.g. technical and financial) in the government organisation for comprehensive stakeholder analysis, and the absence of democratic practices in the non-government organisations.
Table 7.2 Barriers to and opportunities for transitioning towards co-learning in the MBMP management

<table>
<thead>
<tr>
<th>Barriers or challenges</th>
<th>Reference section</th>
<th>Converting to opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning/ knowledge</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimal consultation with consumptive</td>
<td>5.3.1</td>
<td>Comprehensive consultation could reduce the chance of policy failure</td>
</tr>
<tr>
<td>stakeholders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Devaluing local knowledge</td>
<td>5.3.3; 5.3.4</td>
<td>Local could help minimising knowledge scarcity</td>
</tr>
<tr>
<td>Lack of monitoring</td>
<td>5.5.1</td>
<td>Comprehensive monitoring could stimuli for learning</td>
</tr>
<tr>
<td>Lack of practising organisational democracy</td>
<td>5.5.4</td>
<td>Democratic decision making could help ensuring more acceptability to stakeholders</td>
</tr>
<tr>
<td>Underestimating community capacity</td>
<td>5.5.5</td>
<td>Involving community could help filling the human resources gap</td>
</tr>
<tr>
<td>Lack of respect between stakeholders</td>
<td>5.5.7; 5.3.8</td>
<td>Showing respect to each other could help building trust between stakeholders</td>
</tr>
<tr>
<td>Lack of involving users in expert panel</td>
<td>5.5.8</td>
<td>Involving users representative could help filling the gap of local knowledge expert</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over reliance of biophysical information</td>
<td>4.6.1; 5.3.2; 6.3.1</td>
<td>Balance integration of scientific and local information could help getting more support from users groups</td>
</tr>
<tr>
<td>Lack of validation and accuracy of information</td>
<td>6.3.3; 6.5.1</td>
<td>Validation could help minimising stakeholders conflicts</td>
</tr>
<tr>
<td>Underutilising social networks and media</td>
<td>6.4.2</td>
<td>Using social media could help reducing propaganda</td>
</tr>
<tr>
<td>Lack of inter stakeholders sharing mechanisms</td>
<td>6.4.3</td>
<td>Inter stakeholders sharing could help establishing useful social networks</td>
</tr>
<tr>
<td>Use of stakeholders’ information against their</td>
<td>6.4.4</td>
<td>Particpatory analysis of stakeholders information (e.g. focus group) could help them understanding the use of that information</td>
</tr>
<tr>
<td>stake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of access, transparency and trust</td>
<td>6.5.2; 6.5.3</td>
<td>Access to information could build trust and trust could ease the access to information</td>
</tr>
<tr>
<td>Influence of research funding</td>
<td>6.5.5</td>
<td>Independent research fund could help disseminating findings more broadly</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of multi-ways communication</td>
<td>5.4.1</td>
<td>Multi-ways communication could help facilitating social learning</td>
</tr>
<tr>
<td>Poor inter and intra organisational</td>
<td>5.4.2</td>
<td>Could help minimising conflicts through establishing intermediate forum or organisation</td>
</tr>
<tr>
<td>communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of practising informal communications</td>
<td>5.4.3</td>
<td>Informal communication could help getting more realistic information from stakeholders</td>
</tr>
<tr>
<td>Underutilising online communications</td>
<td>5.4.4</td>
<td>Online communication could help educating stakeholders quicker and easier way</td>
</tr>
<tr>
<td><strong>Policy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of informed, participatory policy making</td>
<td>4.5.2, 5.5.5; 6.3.1; 6.3.4; 6.5.4</td>
<td>Could help stakeholders focused formulation and implementation of policy</td>
</tr>
<tr>
<td>Lack of context specific plan</td>
<td>5.5.6</td>
<td>Context specific plan could help getting more acceptability to stakeholders</td>
</tr>
<tr>
<td>Lack of coordinating mechanism with other</td>
<td>4.5.2</td>
<td>Could minimise interdepartmental conflicts</td>
</tr>
<tr>
<td>policy or statutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of strategic foresight</td>
<td>4.5.2; 4.6.1</td>
<td>Strategic foresight could offer flexibility to deal with future uncertainties</td>
</tr>
<tr>
<td>Lack of consistency with international</td>
<td>4.5.4</td>
<td>Could help following ratified bindings or liabilities</td>
</tr>
<tr>
<td>instruments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lobby biased policy formulation</td>
<td>5.5.3</td>
<td>Not to be sold to lobby could help getting greater acceptability of the policy</td>
</tr>
<tr>
<td>Legislative loopholes</td>
<td>4.4.6; 5.5.2</td>
<td>Legislative roadmap for conducting comprehensive community consultation could help reducing almost all the barriers mentioned in the first column in this table.</td>
</tr>
</tbody>
</table>

Community knowledge and feedback are often poorly considered by the government, with certain groups, such as recreational fishers claiming that they were marginalised (Section
5.5.4). Lack of respect between stakeholders is also an impediment to creating a learning environment. The study found that consumptive stakeholders, such as commercial fishers, believed they were mistreated by the government. The scientific expert panel of academics, mainly from biophysical backgrounds, led the acquisition of knowledge for rezoning the MBMP. Many academics thought that the panel should be a balanced combination of biophysical and social scientists, but should not include other stakeholders, because it is an ‘expert’ panel. It was clear that local knowledge attracted no ‘expert’ value and was not considered or incorporated in discussions of the expert panel despite its empirical and longitudinal nature. This also meant that scientists did not value discourse that might arise and potential consensus that could be built among the range of stakeholders in such environments.

7.4.2 Information sharing barriers and opportunities

Prioritising biophysical information over local knowledge, lack of validation, ignoring stakeholder feedback, sharing fragmented information, and lack of access and trust inhibited the flow of information between the stakeholders. A recent study based on 87 global MPAs from 40 countries found that most (59%) were not ecologically distinguishable from fished sites (Edgar et al. 2014), though designing or rezoning and management of the MBMP were primarily based on biophysical information. At the initial stage of the 2008 MBMP rezoning, consumptive stakeholders, such as fisher groups, shared information about their preferred fishing grounds, fish species they usually caught, and seasonal catch rates. They found many of these areas appeared as green zones (no-take zones) in the final zoning plan. This seriously discouraged these stakeholders in sharing such local information and experiential knowledge. Academic research on MBMP produces new information about the ecosystem, but not all stakeholders have easy access to this information, as the researchers often did not have the freedom to share the information publicly due to funding support from the DNPRSR. Independent research might help disseminate such information across stakeholders. Mistreating the stakeholders was also an issue regarding poor information sharing by the consumptive stakeholders, as they felt humiliated by the behaviour of government stakeholders.

7.4.3 Communication barriers and opportunities

Cross-sectoral and diverse communication is a prerequisite for fostering collaborative learning and promoting trust among stakeholders (Bosch et al. 2013; Christie 2005; Chuenpagdee & Jentoft 2009). This was not evident in MBMP management for a number of reasons. The bureaucratic nature and constraints on the government organisations did not facilitate opportunity for interdepartmental communication, and communication with
other stakeholders was also not successful due to a lack of use of informal communication channels. Government departments’ concern about face-to-face meetings with community groups was a reason given for not maintaining good communication with other stakeholders, which they could overcome through comprehensive use of online communication. MPA management authorities, such as DNPRSR, often consider it difficult to communicate conservation or ecosystem protection issues with all stakeholder groups, as different stakeholders have different views and purposes about use of the Bay. Scientists want to do good science; managers want to meet their objectives and facilitate smooth management; politicians want to make lobby groups happy and avoid news-worthy conflict; non-consumptive beneficiaries, such as conservation groups, want to prevent environmental deterioration and if possible improve environmental quality; and consumptive beneficiaries, such as fishers, want to gain economic benefit from resource use and provide needed food for the community. By applying innovative participatory discussions, such as focus groups or consensus building exercises with representatives from affected stakeholders, DNPRSR could avoid difficulties of communicating with diverse cross-sectoral stakeholders. Effective consensus building exercises can foster mutual respect, helps identify common ground and contributes towards a negotiated package of possible best alternatives that address all groups’ concerns (Baldwin & Ross 2012; Davis 2005; Tan et al. 2012).

7.4.4 Policy barriers and opportunities

There is a growing trend and interest in incorporating public participation in policy formulation for achieving common goals in natural resource management (Bosch et al. 2013; Bouwen & Taillieu 2004). A lack of expert facilitators in the DNPRSR does not justify the lack of a participatory approach, because they could solve it by outsourcing participation experts. A hidden reason might be the politician’s fear of losing control of the process, resulting in negative media publicity. Participatory mechanisms often require much more time than traditional policy formulation process, but politicians want to see the quicker outcomes. This political pressure on bureaucrats might be another reason for a lack of interest in applying participatory practices. What is missing is consideration of the longer term benefits of participatory planning and stewardship.

The lack of coordination between different governmental functions was also an obstacle to creating a co-learning environment. For example, the mandate in the Fisheries Act 1994, implemented through the DAFF21, was different from the Marine Park Act 2004 and its implementation through the DNPRSR. These need to be coordinated so that there are no

21 DAFF-Department of Agriculture, Fisheries and Forestry, Queensland Government, Australia
overlaps or ambiguities, with management roles applied to the most appropriate department for the job. For example, compensation to fishermen might more effectively have been done by DAFF, who were accustomed with the fishing industry and where they fish. The rezoning process should have established a mechanism for inter-departmental coordination.

The information-hiding tendency by government departments and political ramifications also blocked the free flow of information in MBMP management. This study found that government is often fearful of presenting news about a policy decision that might be considered negative by an affected community. By reporting probable effects of any new initiative, positive and negative, intended or unintended (Christie 2005), to affected stakeholders, government could avoid such situations and demonstrate open accountable governance. This reporting could be improved if a community of practice was informed, as a matter of courtesy, prior to or with public release. Strong participation processes that include media can handle such issues effectively.

A statutory requirement for meaningful community engagement could facilitate improved stakeholder participation in future MBMP rezoning and management. Policy guidelines for comprehensive community consultation and response to valid community comments could complement legislation to establish an effective participation programme. Confidentiality of the government planning process, especially in the plan drafting period, and bias towards lobby groups were identified as treacherous elements affecting the stakeholders learning environment. Participatory development of a statutory guideline for comprehensive stakeholder consultation could be a strong initiative in the next review of the MBMP.

Government policy often adopted quantitative measures to assess objectives, which led to lost opportunities to consider qualitative information to inform interventions. The cumulative positive results of no-take zones in MPAs, through spill-over effects and positive impacts on fisher income is well-established (Agardy et al. 2011; Christie & White 2007; Degnbol et al. 2006; Jones 2013; McPhee 2011; Pollnac et al. 2010). However, it is much more difficult to address the perception of inequity, and loss of values, traditions and emotional response of fisher families to loss of traditional fishing grounds. As government want to see the short-term positive influence of policy interventions, they offered funding mostly for quantitative research about resource status, rather than social assessment of possible interventions. Qualitative research would reveal the negative impacts on communities, and of a resource protection policy emphasis.
7.5 Overcoming barriers through co-learning

Studies on co-management and adaptive co-management in natural resource management show several factors contributing to meaningful success, such as social networks, learning, stakeholder participation, information and knowledge generation, use, and sharing, development of necessary attitudes and skills, enforcement with strong monitoring and evaluation, flexibility and funding (Armitage et al. 2008; Campbell et al. 2013; Jentoft et al. 2012; Jones & Burgess 2005; Nursey-Bray & Phillip 2009; Plummer et al. 2012; Pomeroy 1995; Sandstrom & Rova 2010; Zurba et al. 2012). This dissertation considered co-learning as integral to the factors that might contribute to transitioning towards sustainable MPAs management. This study also observed that political influence and co-learning are closely interrelated. Lack of strong political commitment to the affected stakeholders and lobbying by interest groups jeopardised the co-learning environment during the MBMP rezoning process. Commitment to co-learning that fosters continuous dialogue and debate among all stakeholders would influence politicians to consider stakeholders concerns and issues.

The MBMP management case study provided empirical evidence that lack of co-learning practices between stakeholders (consumptive, non-consumptive, local government, state government and academics) were related to manageable factors, which, without management, presented barriers to effective decision-making (see Table 7.2). Trust building at the institutional level, which was found very poor in the study area, becomes essential between government and non-government stakeholders. The existing relationships between government and other stakeholders in the MBMP area were found to be more personal than institutional. Not only was social learning among networks lacking, but also lack of anticipatory action and adaptive learning with a sharing loop that could be the binding agent for the scattered learning practices, which prevented an optimum outcome. A sharing loop might also work for relationship improvement and solidifying stakeholder learning (Figure 7.3).
A programme of informal consultations with stakeholders might help government successfully use social networks. This research found that government neither participated in social networks nor monitored or reviewed these to obtain insight to the reaction of stakeholders to the rezoning of the MBMP. They could have embraced the social networks as information and knowledge sharing platforms, if they had adequate resources. On 11 July 2013, DNPRSR officially joined ‘Facebook’ (https://www.facebook.com/qldnationalparks/info) with a view to create an open platform for sharing community stories, experience and suggestions. This initiative was not explored during rezoning of the MBMP, but at that time, Facebook was not commonly used. Users were ahead of government, as they had several such social media networks and blogs. It is clear that government is increasingly recognising the benefits of social media and other networks. They could make good use of them by clarifying confusion or ‘propaganda’ and take into consideration the community suggestions for further validation.

The need for strong monitoring and evaluation is advocated by many co-management and social learning scholars in the field of MPAs and NRM (Allen et al. 2001; Armitage et al. 2008; Berkes 2002; Campbell et al. 2013; Christie et al. 2005). Many promulgate the
value of adopting community based monitoring and evaluation approaches (Carter & Ross 2013; Christie 2005; Hockings et al. 2000; Jacobson et al. 2014; Jacobson et al. 2013; Mahanty 2007; Pahl-Wostl et al. 2013; Schusler & Decker 2002; Smith et al. 2007). Like much research in MPA management, the impression given by government stakeholders was that this data collection approach threatened government’s control of data collection and dissemination under the guise of its lack of validity. Community monitoring information would be much more acceptable to the community and would help broaden the communities’ knowledge base about Moreton Bay and about their responsibilities for the Bay but would also alleviate impressions of government control and power.

Government organisations often argued that comprehensive monitoring and evaluation programmes are expensive. Community monitoring or involving community representatives in monitoring may not only reduce the cost of a programme but also help get accurate information and increase ownership by the users groups, which is vital for sustainable NRM.

7.6 Limitations of the study

Qualitative research about implementing various forms of learning theories in MPAs is not without limitations. An important challenge was to cover the diverse MBMP user groups and different levels of government. Despite the initiatives of reducing errors in research design and sampling, the limitations of this study were addressed as follows.

• The limited focus on one case study, rather than a comparative study, was compensated for by undertaking 23 in-depth (1529 minutes in total) interviews of a range of government and non-government stakeholders, complemented by document analysis to provide a comprehensive analysis. Wider applicability was enhanced by reference to international literature.

• The focus on consumptive (fisheries-related) stakeholders and conservation stakeholders represented the key areas of debate about the zoning plan. This meant that no attention was given in the thesis to the interests of Aboriginal and Torres Strait Islanders, who were legitimate stakeholders but with whom the researcher had little experience and insufficient time to build the required rapport. Those interested in this aspect of MBMP should refer to the works of Low Choy (Low Choy et al. 2013; Low Choy et al. 2010; Low Choy et al. 2011).

• Social learning and learning organisations are new concepts in MPA management, therefore relevant data are not gathered by relevant organisations but needed to be identified by continuous re-reading of the gathered interview and documented data to elicit meaning.
• While efforts were made to access all possible information, not all the organisations interviewed, shared their complete information. For example, community submissions were not made available and were only able to viewed if provided by an organisation.

• Methods of inquiry such as broader surveys and participatory action research for this research were not feasible because the research began after the rezoning process was completed.

7.7 Opportunities for future research

Several areas for further research were identified throughout the study and would be worthwhile implementing in advance of the review of rezoning in 2018.

• The process and outcomes of rezoning, analysed in this dissertation (Chapter 4), could be tested by government through involving a broader range of stakeholders well ahead of time with a way of documenting learning in the revision.

• Further research could focus on the political context: the possibility and constraints of the role of participatory decision making within the DNPRS, and how the influence of lobby groups can be negotiated.

• Learning gaps identified by this study and recognized by many scholars (Carter & Ross 2013; Hockings 1998; Jacobson et al. 2011; Jacobson et al. 2014; Jacobson et al. 2013; Plummer et al. 2012; Schusler & Decker 2002; Stelzenmüller et al. 2013) emphasise the requirement for a comprehensive monitoring and evaluation framework to assess the process and the relationship between goals and outcomes of MPAs that also involves collaboration of stakeholders who share formal empirical science as well as local knowledge. This would include how and to what degree stakeholder knowledge could be considered, validated and utilised. Such a system and research process should be established as soon as possible in advance of the 2018 review.

• Validity of customary knowledge and its transfer has been explored in studies of co-management in other places in the world (Armitage et al. 2008; Cundill & Fabricius 2009; Granek & Brown 2005; Nursey-Bray & Phillip 2009; Trimble et al. 2014; Zurba et al. 2012). The on-going local or customary learning processes embedded in stakeholders, such as fishers' lifestyle in MBMP and the possibility of demonstrating and promoting their stewardship, is another opportunity of future research in MPA management. It would be important to know the traditional code of practices of fishers compared to regulatory fisheries management practices and the scientific alignments between the practices. By identifying learning leaders within fisher groups and making use of the opportunity of engaging them in creating future learning leaders would foster an effective and continuing stewardship programme. Traditional
fisheries knowledge, which is being lost day-by-day, would then be preserved, understood, integrated and utilised for the longer term.

7.8. Contribution to knowledge

7.8.1 Theoretical contributions

Based on the result on the MBMP case, this research contributed to the field of learning-based management, proposing a co-learning framework. The literature on co-management and adaptive co-management (Armitage et al. 2008; Cundill & Fabricius 2009; Jones & Burgess 2005; Leys & Vanday 2010a; Nursey-Bray & Phillip 2009; Olsson et al. 2004; Pomeroy 1995; Zurba et al. 2012) indicates the importance of learning or social learning. Authors argue, often from an ideological perspective, for participatory or a bottom-up approach in relation to power sharing. These contributions to knowledge (i.e. co-learning and the barriers to achieve it for understanding knowledge gaps in the MBMP rezoning and management) will potentially serve for other states of Australia or countries transitioning towards collaborative management of marine protected area as well as natural resources or environmental management. This research also identified a feedback loop, as a gap between existing learning practices and co-learning had not been empirically investigated in the shared learning context in MPA management.

Since social learning is gaining increasing attention in the natural resource management literature, the study of the connection between social learning and MPA management is in its infancy. The literature on social learning in NRM focuses on stakeholders but dominated by consideration of terrestrial natural resources and water management (Fernandez-Gimenez et al. 2008; Leys & Vanclay 2010b; Muro & Jeffrey 2008; Pahl-Wostl 2002; Pahl-Wostl 2009; Pahl-Wostl & Hare 2004; Pahl-Wostl et al. 2008; Pahl-Wostl et al. 2007). The research reported here is one of the few to examine learning to identify how co-learning can contribute to better stakeholder knowledge integration in MPA management, as decision-making structures in both government and non-government organisations constrain co-learning. Multiple stakeholder participation is necessary for adaptive or co-management (Chambers 1994; Hoelting et al. 2013; Kilvington et al. 2011a; McPhee et al. 2008; Mulrennan et al. 2012), though it is not often easy to deal with the power relationships between stakeholder groups. In this context, my research identified the importance of using social media and informal communication practices, and thus contributed to reconceptualise some of the participation barriers in MPA management, which require social and adaptive learning for addressing livelihood connection of stakeholders.
This research identified factors that are critical to the co-learning process as well as the barriers that impede partnership formation and shared learning continuation between stakeholders. This improved understanding from the research contributes to increasing the capacity of relevant organisations and groups to better respond to future coastal environment challenges. It might also create a new platform for considering actors’ (managers and stakeholders) past mistakes and opportunities for learning and informing future decisions.

7.8.2 Policy and practice contributions

The entire analysis of barriers to and opportunities for co-learning in the MBMP rezoning and management is a meaningful contribution to policy and practice because the DNPRSR will have to review the MBMP ZP 2008 in 2018 for necessary adjustment or amendment. In this regard, this research identified that stakeholders have useful knowledge and are willing to share, but government needs to be responsive and act with good will. This cannot start when the planning round starts. It has to occur through the intermediary time between plans. Hence, this finding has contributed to understanding the complexities of stakeholder participation in consultation to reduce the impacts of knowledge and communication gap in the previous plan to make the new plan much more adaptive.

Hierarchical decision-making process, especially in non-government organisations, has been poorly addressed in social learning scholarship. This research identified that non-government decision-making processes are not democratic or necessarily inclusive or representative of ‘membership’ opinion. This has policy and practice implications, as the opinions or submissions from these organisations may not be valued by the government organisation due to lack of representativeness.

7.8.3 Disciplinary contributions

Environmental Studies, as a trans-disciplinary stream, contributes to environmental management of natural resources, such as marine park management. Considering the dynamic nature of Marine Parks, the literature stresses practising adaptive management in which stakeholder learning and knowledge can make a significant contribution. This research provides a framework of co-learning for better understanding the necessity of, and barriers to, stakeholder knowledge integration in marine protected area planning and management. It outlines the impacts of different initiatives for communication and information sharing by government and non-government stakeholder groups in the study area. Under the broad stream of Environmental Studies, this research contributed to the
field of wildlife and park management, by unpacking co-learning barriers. The identification of barriers, especially political factors, such as impacts of lobbying, opens a new avenue of thinking for addressing such issues in the MBMP and other marine parks in the future.

7.9 Conclusions

MBMP management is in transition. The rezoning process was a major shift in practice by increasing the percentage of protection of the Bay (from 5% to 16%) in 2008. This was not because resource management was being questioned due to declining fish catches or other resource uses; rather, the DNPRSR was seeking longer term ecosystem resilience by additional protective measures, reinforced by political and other pressures. In 2008, the DNPRSR (then DERM\textsuperscript{22}), in charge of marine park management, conducted a review for the *MBMP ZP 1997*, under the mandatory legislative requirement (*Marine Parks Act 2004*), to increase green zones (no-take zones) and improve provisions for compliance. This research found that the review was not participatory, with minimal stakeholder consultation, which created barriers for incorporating local knowledge in the rezoning plan. In 2009, the *MBMP ZP 2008* was endorsed, which included much more restricted zones with tighter enforcement power. This study found that this was influenced by conservation groups and lobbying to secure so called ‘green votes’. Government personnel were under political direction for a quick process that would achieve these outcomes, resulting in less consideration of other stakeholders, such as fishers. Two things were very detrimental to the idea of knowledge and information sharing among stakeholders. The lack of attention by government to consumptive beneficiaries, such as fishers, resulted in feelings of unequal and inequitable treatment in comparison with other stakeholders. This undermined relationships between fishers and the DNPRSR, which are conducive to information sharing. Also giving prominence to suggestions made by the conservation lobby, led to adverse learning, as recreational fishers started to lobby in favour of recreational fishing access in the green zone (Chapter 5, Section 5.3.9). It was also evident that government was fearful of political and lobby group influence on the process and outcomes. Government staff did not present information in a meaningful way that would develop a common understanding of what was known, the magnitude of pressures, the state of the resource and the range of possible responses. This might be because of a political mandate of the government as well as lack of

\textsuperscript{22} DERM-Department of Environment and Resource Management, Queensland Government, Australia
resources. Therefore, stakeholders were deprived of updating their knowledge with accurate real time information.

Fisheries not only provides economic benefits, but also contributes to broader livelihood of local communities in the MBMP area. The DNPRSR provided compensation to the affected fishers through controversial ‘license buy back’, which might have better been administered by the DAFF, which manages fisheries (Chapter 5, section 5.4.2). This was one example identified in this study of poor interdepartmental coordination in the MBMP rezoning and management. Similar scenarios emerged with many other relevant government and nongovernment organisations. These obstacles led to conflict-laden relationships between management agencies. These conflicts, with other interdepartmental learning barriers, might have been overcome through establishing an intermediate forum or organisation. As it is usual practice to have an interdepartmental forum with members from all relevant departments to manage the overlap in different Acts, Regulations and activities in the MBMP and devise integrated collaborative solutions, the absence of this approach appeared to some stakeholders to be a deliberate attempt to block such communication.

Designing, establishing and managing MPAs suffer from data scarcity and information gaps. This was the case in the MBMP zoning in 1997 and rezoning in 2008. This suggests that the information used in the MBMP ZP 2008 was not a balanced combination of biophysical and socio-economic information, nor of empirical and lay-collected biophysical data. Through underutilising stakeholder information, the opportunity to foster effective social learning was lost. Despite some formal information collection attempts, co-learning practice was limited in the MBMP area management because of limited use of other informal and community-derived information. Participatory data collection involving stakeholders groups, utilising social networks and social learning might help in co-production of knowledge and learning that would eventually improve overall management.

Despite underutilising local knowledge and information in the MBMP rezoning and management, stakeholders had opportunities to acquire new knowledge and skills. The rezoning process, from reviewing the old zoning plan (1997) to the finalisation of the new zoning plan (2008), brought new skills to the stakeholders. Biophysical researchers have used underwater videos to collect information and broad-scale surveys of human activity around the Bay. This has opened other ways of looking at the abundance of fish and finding out what people are doing in terms of their use of the marine environment. This has increased the capacity of research organisations involved in the MBMP rezoning process to do this work in other areas. The social researchers, involved in the rezoning process, experienced with the socio-economic dynamics of the stakeholders, such as the
livelihood of aquarium fish collectors and commercial fishers, in the MBMP area can contribute this experience to future MPAs planning, rezoning and management. Despite this positive learning by academics, consumptive stakeholders have experienced adverse learning as a result of lobbying government in favour of their demands, rather than sharing knowledge or information to improve management practices.

The main findings identify that several results from addressing the research questions are consistent with the current situation or predominant features of non-participatory MPAs management worldwide. These include weak organisational capacities of stakeholder groups, conflict-laden relationships with management agencies, importance of participatory or community-based resource management, unsatisfactory participatory initiatives led by the government, and a lack of use of informal communication systems. Findings regarding political influence are particularly insightful because of the effect on trust building and co-learning practices between non-government and government stakeholders. This is a contribution to the global literature on the topic. Co-learning practices can help government avoid political pressure, if they can maintain a strong and transparent sharing loop for updating and incorporating stakeholder knowledge. Assuming that actual co-learning between stakeholders is consistent with adaptive co-management, democratic principles should lead to improved decision-making, collaboration among users, and government agencies moving beyond top-down, enforcement based management approaches.

The co-learning framework from this study, covering six major learning components with an iterative sharing loop, can also be applied to help understand how to reverse the current trend of low stakeholder participation in meetings with the government. Comprehensive qualitative research attention would be required to understand stakeholder relationships with the government institution, at a personal level, towards achieving a better understanding of whether, how, and to what degree, user interests are being represented by that organisation. Further, studying the (mis)use of social networks by government and non-government organisations, would benefit the establishment of connections between stakeholders, which would ultimately help promote relationships and trust. Learning from such study might help policy makers better incorporate stakeholders experiential knowledge and learning, particularly from the users in MPAs management.
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APPENDICES: REFERENCE DOCUMENTS FOR FURTHER INFORMATION
## Appendix 1

### Learning theories related to the theoretical framework

(source: Aussie educator;  

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<td>Adult Learning (K. P. Cross 1976; 1981)</td>
<td>Characteristics of Adults as Learners (CAL) model consists of two classes of variables: personal characteristics and situational characteristics. Personal characteristics include: aging, life phases, and developmental stages. These three dimensions have different characteristics as far as lifelong learning is concerned. Situational characteristics consist of part-time versus full-time learning, and voluntary versus compulsory learning. The administration of learning (i.e., schedules, locations, procedures) is strongly affected by the first variable; the second pertains to the self-directed, problem-centered nature of most adult learning.</td>
<td>1. Adult learning programs should capitalize on the experience of participants. 2. Adult learning programs should adapt to the aging limitations of the participants. 3. Adults should be challenged to move to increasingly advanced stages of personal development. 4. Adults should have as much choice as possible in the availability and organisation of learning programs.</td>
<td>The CAL model is intended to provide guidelines for adult education programs. There is no known research to support the model.</td>
<td>This model may be considered during dealing with stakeholders as both personal and situational characteristics may have influence on co-learning.</td>
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<td>Andragogy (M. Knowles 1984)</td>
<td>Andragogy makes the following assumptions about the design of learning: (1) Adults need to know why they need to learn something (2) Adults need to learn experientially, (3) Adults approach learning as problem-solving, and (4) Adults learn best when the topic is of immediate value. In practical terms, andragogy means that instruction for adults needs to focus more on the process and less on the content being taught.</td>
<td>1. Adults need to be involved in the planning and evaluation of their instruction. 2. Experience (including mistakes) provides the basis for learning activities. 3. Adults are most interested in learning subjects that have immediate relevance to their job or personal life. 4. Adult learning is problem-centered</td>
<td>Andragogy applies to any form of adult learning and has been used extensively in the design of organisational training programs (especially for “soft skill” domains such as management development).</td>
<td>This theory will help assessing the existing management instruments to see whether there are learning rooms for the stakeholders or not.</td>
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| Attribution Theory (B. Weiner 1974; 1980; 1986) | A three-stage process underlies an attribution: (1) the person must perceive or observe the behaviour, (2) then the person must believe that the behaviour was intentionally performed, and (3) then the person must determine if they believe the other person was forced to perform the behaviour (in which case the cause is attributed to the situation) or not (in which case the cause is attributed to the other person). | 1. Attribution is a three stage process: (1) behaviour is observed, (2) behaviour is determined to be deliberate, and (3) behaviour is attributed to internal or external causes.  
2. Achievement can be attributed to (1) effort, (2) ability, (3) level of task difficulty, or (4) luck.  
3. Causal dimensions of behaviour are (1) locus of control, (2) stability, and (3) controllability. | Weiner’s theory has been widely applied in education, law, clinical psychology, and the mental health domain. Weiner (1980) states: “Causal attributions determine affective reactions to success and failure.” | This theory may help understand the social learning process among stakeholders. |
| Cognitive Dissonance Theory (L. Festinger 1957) | According to cognitive dissonance theory, there is a tendency for individuals to seek consistency among their cognitions (i.e., beliefs, opinions). When there is an inconsistency between attitudes or behaviours (dissonance), something must change to eliminate the dissonance. Dissonance occurs most often in situations where an individual must choose between two incompatible beliefs or actions. Furthermore, attitude change is more likely in the direction of less incentive since this results in lower dissonance. In this respect, dissonance theory is contradictory to most behavioural theories which would predict greater attitude change with increased incentive (i.e., reinforcement). | 1. Dissonance results when an individual must choose between attitudes and behaviours that are contradictory.  
2. Dissonance can be eliminated by reducing the importance of the conflicting beliefs, acquiring new beliefs that change the balance, or removing the conflicting attitude or behaviour. | Dissonance theory applies to all situations involving attitude formation and change. It is especially relevant to decision-making and problem-solving. | As the theory deals with the dilemma of decision making in a situation of two equally important issues this will help understand the barriers of scientific learning by stakeholders due to having equally or even more important experiential learning. |
| Cognitive Flexibility Theory (R. Spiro, P. Feltovitch and R. Coulson) | Cognitive flexibility theory focuses on the nature of learning in complex and ill-structured domains. Spiro and Jehng (1990, p. 165) state: "By cognitive flexibility, we mean the ability to spontaneously restructure one’s knowledge, in many | 1. Learning activities must provide multiple representations of content.  
Cognitive flexibility theory is especially formulated to support the use of interactive technology (e.g., | This theory may also help assessing the information dissemination system as the theory is |
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| Connectionism                  | Thorndike’s theory consists of three primary laws: (1) law of effect—responses to a situation which are followed by a rewarding state of affairs will be strengthened and become habitual responses to that situation, (2) law of readiness— a series of responses can be chained together to satisfy some goal which will result in annoyance if blocked, and (3) law of exercise—connections become strengthened with practice and weakened when practice is discontinued. A corollary of the law of effect was that responses that reduce the likelihood of achieving a rewarding state (i.e., punishments, failures) will decrease in strength. The theory suggests that transfer of learning depends upon the presence of identical elements in the original and new learning situations; i.e., transfer is always specific, never general. In later versions of the theory, the concept of “belongingness” was introduced; connections are more readily established if the person perceives that stimuli or responses go together (c.f. Gestalt principles). Another concept introduced was “polarity” which specifies that connections occur more easily in the direction in which they were originally formed than the opposite. Thorndike also introduced the “spread of effect”  | 1. Learning requires both practice and rewards (laws of effect/exercise)  
2. A series of S-R connections can be chained together if they belong to the same action sequence (law of readiness).  
3. Transfer of learning occurs because of previously encountered situations.  
4. Intelligence is a function of the number of connections learned.  | Connectionism was meant to be a general theory of learning for animals and humans. Thorndike was especially interested in the application of his theory to education including mathematics (Thorndike, 1922), spelling and reading (Thorndike, 1921), measurement of intelligence (Thorndike et al., 1927) and adult learning (Thorndike et al., 1928). | This theory may help develop co-learning framework, as it denotes that the exchange of learning depends upon the presence of identical elements in the original and new learning situations. |
| 1988; 1992)                    | ways, in adaptive response to radically changing situational demands...This is a function of both the way knowledge is represented (e.g., along multiple rather single conceptual dimensions) and the processes that operate on those mental representations (e.g., processes of schema assembly rather than intact schema retrieval).” The theory is largely concerned with transfer of knowledge and skills beyond their initial learning situation. For this reason, emphasis is placed upon the presentation of information from multiple perspectives and use of many case studies that present diverse examples. The theory also asserts that effective learning is context-dependent, so instruction needs to be very specific. In addition, the theory stresses the importance of constructed knowledge; learners must be given an opportunity to develop their own representations of information in order to properly learn.                                                                 | 2. Instructional materials should avoid oversimplifying the content domain and support context-dependent knowledge.  
3. Instruction should be case-based and emphasize knowledge construction, not transmission of information.  
4. Knowledge sources should be highly interconnected rather than compartmentalised. | videodisc, hypertext). Its primary applications have been literary comprehension, history, biology and medicine. | largely concerned with transfer of knowledge and skills and stresses on the presentation of information. |
### Constructivist Theory

**Theory**

**Overview**
- A major theme in the theoretical framework of Bruner is that learning is an active process in which learners construct new ideas or concepts based upon their current/past knowledge.

**Principles**

1. Instruction must be concerned with the experiences and contexts that make the student willing and able to learn (readiness).

2. Instruction must be structured so that it can be easily grasped by the student (spiral organisation).

3. Instruction should be designed to facilitate extrapolation and or fill in the gaps (going beyond the information given).

**Example in education sector**
- Much of the theory is linked to child development research (especially Piaget). The original development of the framework for reasoning processes is described in Bruner, Goodnow and Austin (1951). Bruner (1983) focuses on language learning in young children.

**Application in co-learning study**
- As Co-learning is actually co-production of knowledge for mutual benefit so this theory may help constructing co-learning framework.

**Notes**
- Bruner (1966) states that a theory of instruction should address four major aspects: (1) predisposition towards learning, (2) the ways in which a body of knowledge can be structured so that it can be most readily grasped by the learner, (3) the most effective sequences in which to present material, and (4) the nature and pacing of rewards and punishments.
- Good methods for structuring knowledge should result in simplifying, generating new propositions, and increasing the manipulation of information.

- In his more recent work, Bruner (1986, 1990, 1996) has expanded his theoretical framework to encompass the social and cultural aspects of learning as well as the practice of law.

### Experiential Learning

**Theory**
- Rogers, C. (1969)

**Overview**
- Rogers distinguished two types of learning: cognitive (meaningless) and experiential (significant). The key to the distinction is that experiential learning addresses the needs and wants of the learner. Rogers lists these qualities of experiential learning: personal involvement, self-initiated, evaluated by learner, and pervasive effects on learner.

**Principles**

1. Significant learning takes place when the subject matter is relevant to the personal interests of the student.

2. Learning which is threatening to the self (e.g., new attitudes or perspectives) are more easily assimilated when external threats are at a minimum.

3. Learning proceeds faster when the threat to Rogers’s theory of learning originates from his views about psychotherapy and humanistic approach to psychology. It applies primarily to adult learners and has influenced other theories of adult learning such as Knowles and Cross. Combs (1982) examines this theory will help understanding the experiential knowledge of the stakeholders and its importance in developing co-learning framework.

**Application in co-learning study**
- To Rogers, experiential learning is equivalent to personal change and growth. Rogers feels that all human beings have a natural propensity to learn; the role of the teacher is to facilitate such learning. This includes: (1) setting a positive climate for learning, (2) clarifying the purposes of the learner(s), (3)
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<td><strong>Functional Context</strong> (T. Sticht 1975; 1976; 1987; 1988)</td>
<td>The functional context approach to learning stresses the importance of making learning relevant to the experience of learners and their work context. The learning of new information is facilitated by making it possible for the learner to relate it to knowledge already possessed and transform old knowledge into new knowledge. By using materials that the learner will use after training, transfer of learning from the classroom to the &quot;real world&quot; will be enhanced. The model of the cognitive system underlying this approach emphasizes the interaction of three components: (1) a knowledge base (i.e., long term memory) of what the individual knows, (2) processing skills including language, problem-solving, and learning strategies, and (3) information displays that present information. The performance of a task requires knowledge about what one is reading or writing, processing skills for comprehension and communication, and displays of information to be processed.</td>
<td>1. Instruction should be made as meaningful as possible to the learner in terms of the learner's prior knowledge. 2. Use material and equipment that the learner will actually use after training. 3. Literacy can be improved by: improving content knowledge, information processing skills, or the design of the learning materials. 4. Valid assessment of learning requires context/content specific measurement.</td>
<td>The functional context approach was developed specifically for adult technical and literacy training (reading/writing/mathematics) in military programs, but it has implications for learning of basic skills in general (e.g., Sticht, 1976) and reading in particular (Sticht, 1975). Sticht's functional context framework has been the basis for major workplace training and literacy programs sponsored by the U.S. Department of Labor and Department of Education.</td>
<td>As the theory stresses the learning relevance with experiences and present work this may help understand the basic learning gaps, process and barriers and developing co-learning framework as well.</td>
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<td><strong>Phenomenography</strong> (F. Marton and N. Entwistle 1983; 1984)</td>
<td>This conceptual framework focuses on the experience of learning from the student's perspective and is based upon a phenomenological approach to research. Entwistle explains: &quot;Our task is thus to describe more clearly how learning takes place in higher education and to point out how teaching and assessment affect the quality of learning. From these descriptions teachers should be able to draw their</td>
<td>1. Researchers should seek an understanding of the phenomenon of learning by examining the students' experiences. 2. Research about learning needs to be conducted in a</td>
<td>The scope of phenomenographic research is focused on learning in higher education. Initial studies focused on student learning experience in reading articles, attending lectures, writing</td>
<td>This theory may help examining the existing learning phenomena to understand the process and gap as well.</td>
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<td>Situated Learning (J. Lave 1988; Lave and Wenger 1990)</td>
<td>Lave argues that learning as it normally occurs is a function of the activity, context and culture in which it occurs (i.e., it is situated). Social interaction is a critical component of situated learning – learners become involved in a “community of practice” which embodies certain beliefs and behaviours to be acquired. Brown, Collins and Duguid (1989) emphasize the idea of cognitive apprenticeship, which supports learning in a domain by enabling students to acquire, develop and use cognitive tools in authentic domain activity. Learning, both outside and inside school, advances through collaborative social interaction and the social construction of knowledge.”</td>
<td>1. Knowledge needs to be presented in an authentic context, i.e., settings and applications that would normally involve that knowledge. 2. Learning requires social interaction and collaboration.</td>
<td>Situated is a theory of general learning acquisition. It has been applied in knowledge the context of technology-based learning activities for schools that focus on problem-solving skills (Cognition and Technology Group at Vanderbilt, 1993).</td>
<td>This one of the may be core theory the study as it present of stresses social on interaction and collaboration for learning.</td>
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<td>Social Learning Theory (A. Bandura 1973; 1977; 1986; 1997)</td>
<td>The social learning theory of Bandura emphasizes the importance of observing and modelling the behaviours, attitudes, and emotional reactions of others. Bandura (1977) states: “Learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. Social learning theory explains human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural, and environmental influences. Bandura’s theory improves upon the strictly behavioural interpretation of modelling provided by Miller and Dollard (1941). Bandura’s work is related to the theories of Vygotsky and Lave which also emphasize the central role of social learning.</td>
<td>1. The highest level of observational learning is achieved by first organizing and rehearsing the modelled behaviour symbolically and then enacting overtly. Modelled behaviour into Coding words, labels or results in better images retention than simply it observing. 2. Individuals are more likely to adopt a modelled behaviour if it results in outcomes they value. 3. Individuals are more likely to adopt a modelled behaviour if the model is similar to the observer and has admired status and the behaviour has functional value.</td>
<td>Social theory has been learning applied extensively to the understanding of aggression (Bandura, 1973) and psychological disorders particularly in the context of behaviour modification (Bandura, 1969). It is also the theoretical foundation for the technique of behaviour modelling which is widely used in training programs.</td>
<td>This is the core part of theoretical framework for this research as it emphasizes the central role of social learning, which is considered as a driving force by this research for developing co-learning framework.</td>
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### Appendix 1 Learning theories related to the theoretical framework

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<td>Social Development Theory (L. Vygotsky 1962; 1978)</td>
<td>The major theme of Vygotsky's theoretical framework is that social interaction plays a fundamental role in the development of cognition. This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. A second aspect of Vygotsky's theory is the idea that the potential for cognitive development depends upon the zone of proximal development (ZPD): a level of development attained when children engage in social behavior. Full development of the ZPD depends upon full social interaction. The range of skill that can be developed with adult guidance or peer collaboration exceeds what can be attained alone. Vygotsky's theory is complementary to the work of Bandura on social learning and a key component of situated learning theory.</td>
<td>1. Cognitive development is limited to a certain range at any given age. 2. Full cognitive development requires social interaction.</td>
<td>This is a general theory of cognitive development. Most of the original work was done in the context of language learning in children (Vygotsky, 1962), although later applications of the framework have been broader (see Wertsch, 1985).</td>
<td>This theory will also help understanding the social learning as this is complementary to the work of Bandura.</td>
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<td>Triarchic Theory (R. Sternberg 1977; 1983; 1985; 1997; 1999)</td>
<td>The triarchic theory of intelligence consists of three subtheories: (i) the componential subtheory which outlines the structures and mechanisms that underlie intelligent behaviour categorized as metacognitive, performance, or knowledge acquisition components, (ii) the experimental subtheory that proposes intelligent behaviour be interpreted along a continuum of experience from novel to highly familiar tasks/situations, (iii) the contextual subtheory which specifies that intelligent behaviour is defined by the sociocultural context in which it takes place and involves adaptation to the environment, selection of better environments, and shaping of the present environment. The componential subtheory specifies the potential set of mental processes that underlies behavior (i.e., how the behavior is generated) while the contextual subtheory relates</td>
<td>1. Training of intellectual performance must be socioculturally relevant to the individual 2. A training program should provide links between the training and real-world behaviour. 3. A training program should provide explicit instruction in strategies for coping with novel tasks/situations 4. A training program should provide explicit instruction in both executive and non-executive information processing and interactions between the two. 5. Training programs</td>
<td>The triarchic theory is a general theory of human intelligence. Much of Sternberg's early research focused on analogies and syllogistic reasoning. Sternberg has used the theory to explain exceptional intelligence (gifted and retardation) in children and also to critique existing intelligence tests. Sternberg (1983) outlines the implications of the theory for skill training. Later work examines topics such as learning styles (Sternberg, 1997) and creativity (Sternberg, 1999).</td>
<td>This theory may be useful to see whether the management authority uses this during stakeholders’ training or not as training is one of the important part of information dissemination</td>
</tr>
<tr>
<td>Theory</td>
<td>Overview</td>
<td>Principles</td>
<td>Example in education sector</td>
<td>Application in co-learning study</td>
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<td>--------</td>
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<tr>
<td>Transformative Learning (J. Mezirow)</td>
<td>The theory has two basic kinds of learning: instrumental and communicative learning. Instrumental learning focuses on learning through task-oriented problem solving and determination of cause and effect relationships. Communicative learning involves how individuals communicate their feelings, needs and desires. Meaning structures (perspectives and schemes) are a major component of the theory. Reflection is similar to problem solving and Mezirow talks about how we “reflect on the content of the problem, the process of problem-solving, or the premise of the problem” (Mezirow, 1991). Merizow also proposed that there are four ways of learning. They are “by refining or elaborating our meaning schemes, learning new meaning schemes, learning new meaning schemes, transforming meaning schemes, and transforming meaning perspectives” (Mezirow 1991). The theory has commonalities with other theories of adult learning such as andragogy (Knowles), experiential learning (Rogers), and Cross.</td>
<td>should actively encourage individuals to manifest their differences in strategies and styles.</td>
<td>1. Adult exhibit two kinds of learning: instrumental (e.g., cause/effect) and communicative (e.g., feelings). 2. Learning involves change to meaning structures (perspectives and schemes). 3. Change to meaning structures occurs through reflection about content, process or premises. 4. Learning can involve: refining/elaborating meaning schemes, learning new schemes, transforming schemes, or transforming perspectives.</td>
<td>Transformative Learning theory is focused on adult learning, particularly in the context of post-secondary education (e.g., Craig et al., 2001; King, 2002). Taylor (2007) provides a summary of research studies about the theory.</td>
</tr>
</tbody>
</table>
Appendix 2

Interview Questions

Name of the participant:
Place:                                                                                       Date:
Start time:                                                                    Finish time:

Introduction

I am interested in what you have learned individually, or collectively as a team or group, regarding co-learning during the process for revising the zoning plan in the Moreton Bay Marine Park (MBMP) 2007-2008, and after it was enacted in 2009. I am also interested in lessons about the difficulties or barriers you faced in sharing information, knowledge and learning including the possible ways for dealing with such barriers.

1. Can you tell me about the activities of you and your organisation in the Moreton Bay Marine Park area?
   - What are the roles and responsibilities of your organisation in relation to MBMP?
   - What are your roles and responsibilities in the organisation related to MBMP?
   - What type of information do you use for your activities in the MBMP? Information might include spatial, biological, social, institutional, and anecdotal.
   - How do you use this information such as in day to day management, conflict resolution, policy and planning instrument, legislation, enforcement, monitoring, annual report, summary report for decision maker?
   - Is the data accurate and how do you make a judgement or validate the quality of the information from various sources (from your own collection or from third party) ?
   - How do you gain access to and share the information within and beyond your organisation? Is there any formal or informal methods you applied?
   - What types of practices were used to involve: a) your team members in decision making; and b) other stakeholders in decision making about zoning of MBMP? and ongoing management?
   - Has the organisation changed its activities or approaches based on new information? If so, how?

2. Can you tell me about knowledge dissemination and information sharing in Moreton Bay Marine park management (what, why, where, when, to whom and how)?
   - Are you aware of any local knowledge (such as experiential, community practices, informal information) that was used in a) developing the zoning plan; Please explain how.
   - b) day to day management? Please explain how.
     - c) How can it be used in future planning and implementation?
   - How do you feel about the changes in the new zoning plan (neutral or positive or negative) and why?
   - How was your feedback/information offered during the zoning plan review taken into account within your organisation?
How was your organisational feedback/information offered during review taken into account in the new zoning plan and management in MBMP?

3. Are you aware of how uncertainty or extreme events are considered in policy instruments and day to day or future management of MBMP?
   - To what extent are alternative perspectives/solutions sought or tried?
   - What types of precautionary approach/activities have been taken to cope with future extreme events? If none-why?

4. Which organisations/who are involved in a) monitoring and b) evaluation of zoning plan success and how? How is this information shared or what is the reporting mechanism?

5. What do you think about the quality of the M&E data gathered and is this a factor in how it is used?
   - How do you make sure that the information is accurate, complete and accessible?

6. How is day to day management effectiveness evaluated? and how accessible is information regarding weakness and strength of management?
   - How do you feel about the institutional arrangements of MBMP management such as data collection, enforcement, policy development, monitoring and evaluation, research?

7. Has the MBMP zoning process in 2007-2009 affected rapport, respect and trust among your team/group/organization and with other stakeholders (why and how)?

8. What changes in knowledge, skills, attitude and practices have you or your organisation made since the new zoning plan is in place?

9. In summary, how do you feel about the potential and problems of shared learning/co-learning to improve the Moreton Bay Marine Park management across the diverse stakeholders/groups?
Appendix 3

Most 100 frequently used word list found in the interview data
(exclusively interviewee text excluding the texts of interviewer)
Appendix-4

Relative abundance of the most 100 frequently used word list found in the interview data
(exclusively interviewee text excluding the texts of interviewer)
Mohammad Abdul Latif Siddique, M.A.L. 2014,
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