

Exploring local narratives of environmental change and adaptation

A report from the VCCCAR Project:
'Framing multi-level and multi-actor adaptation responses
in the Victorian context'

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Final Report

September 2012

ISBN 978 0 7340 4826 4
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TABLE OF CONTENTS

TABLES	iii
IMAGES.....	iii
ACRONYMS	iii
ACKNOWLEDGEMENTS	iv
EXECUTIVE SUMMARY	1
1 REPORT STRUCTURE AND READING ‘MAP’	3
2 INTRODUCTION	4
2.1 Project context and objectives	4
2.2 Theoretical framework and methods.....	5
2.2.1 Why narrative?.....	5
2.2.2 Methodological implications and material.....	5
3 PORT FAIRY CASE STUDY.....	7
3.1 Selection of the case study area.....	7
3.1.1 Stakeholder mapping and participant recruitment.....	7
3.1.2 Narrative interviews and participant observation.....	7
3.1.3 Consultation and feedback on research findings.....	8
3.2 Port Fairy: A description of the local context.....	8
3.2.1 Port Fairy, its community, culture and environment	8
3.2.2 Industry and employment.....	9
3.2.3 Local governance	10
3.2.4 Port Fairy’s environment.....	10
3.3 The perspective of the community	11
3.3.1 Local knowledge(s).....	11
3.3.2 Perceptions of global climate change in Port Fairy.....	11
3.3.3 Perceptions of local environmental change and adaptation in Port Fairy	15
3.3.4 The erosion on East Beach and the South-West passage-debate	16
3.3.5 Knowledge and local identity	19
3.3.6 Knowledge and trust.....	21
3.3.7 Knowledge and communication.....	22
3.3.8 Knowledge and the role of local government.....	23
3.4 Determinants of adaptive capacity in Port Fairy.....	27
3.4.1 What is adaptive capacity?.....	27
3.4.2 Barriers to and enablers of local adaptive capacity in Port Fairy.....	30
Table 4: Institutional factors (both formal and informal).....	33
3.4.3 Existing enablers of adaptive capacity in Port Fairy.....	33
4 CITY OF MELBOURNE CASE STUDY.....	35
4.1 Selection of the case study area.....	35
4.1.1 Stakeholder mapping and participant recruitment.....	35
4.1.2 Consultation and feedback on research findings.....	36
4.2 Exploring Narratives of Climate Change and Adaptation in the City of Melbourne.....	36
4.2.1 Project context.....	36
4.2.2 City of Melbourne: A description of the local context.....	36
4.3 Findings and key themes.....	37
4.3.1 Global climate change and adaptation responses.....	37
4.3.2 Risk awareness of climate-based disasters.....	38
4.3.3 Environmental education.....	38
4.3.4 Resonance with resilience	38
4.3.5 Community-based suggestions to local and state policy/decision-makers.....	39
4.3.6 Implications for policy and practice	39
4.3.7 Implications for framing future climate change adaptation policy	40
4.4 City of Melbourne Workshop Report.....	40
4.4.1 Participants	40
4.4.2 Introduction	41
4.4.3 Workshop objectives	41
4.4.4 Presentation of the main findings of the research project.....	41

Table 5: Key themes from conversational interviews.....	42
4.4.5 Workshop methodology	43
4.4.6 Summary of the conversation mapping and discussion	43
4.4.7 Actions suggested by the participants.....	44
4.4.8 Summary of the workshop	44
5 CONCLUSIONS AND PROJECT LEARNINGS	46
REFERENCES	50
Appendix 1 – Location map of case studies.....	61
Appendix 2 – Port Fairy’s environment and planning issues.....	62
Appendix 3 – Overview of Participant characteristics.....	64
Appendix 4 - demographic data Port Fairy	65
Appendix 5 – Port Fairy and Bay aerial shots.....	66
Appendix 6 - Conferences	67

TABLES

Table 1: Socio-cultural factors (including language, values and beliefs).....	38
Table 2: Economic factors.....	39
Table 3: Individual/ psychological/ emotional factors.....	39
Table 4: Institutional factors (both formal and informal).....	40
Table 5: Key themes from conversational interviews.....	47
Table 6: Conversational mapping themes: issues, challenges and opportunities.....	49

IMAGES

Images 1 and 2: Scenes from the workshop with City of Melbourne Cast Study interviewees.....	48
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ACRONYMS

AR4	Fourth Assessment Report of the IPCC (see below)
CoM	City of Melbourne
DSE	Victorian Government Department of Sustainability and Environment
DPCD	Victorian Government Department of Planning and Community Development
CSIRO	Australian Commonwealth Scientific and Industrial Research Organisation
IPCC	Intergovernmental Panel on Climate Change
MAV	Municipal Association of Victoria
PFCCC	Port Fairy Community Coastal Challenge
PFWG	Port Fairy Working Group
RMIT University	Royal Melbourne Institute of Technology University
UNFCCC	United Nations Framework Convention on Climate Change
VCCCAR	Victorian Centre for Climate Change Adaptation Research

ACKNOWLEDGEMENTS

The authors would particularly like to acknowledge the support and assistance of Dr Philip Wallis from the Monash Sustainability Institute (MSI). We also thank our colleagues from the VCCCAR funded 'Framing Project' of which this was a part. VCCCAR Director, Prof. Rod Keenan made supportive administrative interventions for which we are grateful. Staff in the School of Geography and Environmental Science, particularly Heather Fletcher, and MSI have helped the project achieve its objectives. Assistance with office accommodation and access to facilities was kindly made by the staff of UNIWATER at the University of Melbourne. We also thank colleagues from DSE, DPCD and Melbourne City Council who assisted in shaping and commenting on the project as it progressed. In particular we thank the citizens of Melbourne and Port Fairy who participated in the interviews for so generously making time.

Special acknowledgement goes to Halley McCann (DSE), Samuel Pendergast (DPCD), Ben Iaquinto and Nikki Reichelt for their assistance in preparing and finalising this report.

EXECUTIVE SUMMARY

This project aimed to explore the role of social research in climate change adaptation planning, and to map the determinants of adaptive capacity in Victorian communities facing significant near-term impacts of climate change.

Desk studies and in-depth interviews were used to research experiences of adaptation to environmental change in two contrasting localities: Port Fairy in Western Victoria (22 interview participants) which is experiencing significant coastal erosion and increased storm surges and Carlton and Docklands in central Melbourne (28 interview participants from the two sites), where residents may be particularly vulnerable in the case of heat waves and other weather-related emergencies.

The Project used a qualitative approach, generating first hand narratives to gain an understanding of how people perceive climate change and used analysis to explore underlying assumptions and value systems in regard to adaptive capacity, sensitivity and vulnerability. Stories of change elicited by the research provide insights into the values and perceptions, practices and knowledge(s) on past and anticipated local change. This can enable Government to better understand local contexts and needs, and therefore deliver specifically tailored programs and policies that are more locally relevant and 'fit for purpose'.

Key findings

In Port Fairy the community is willing to work to adapt – but needs to be empowered by and strengthened (rather than divided) by the process. A sense of vulnerability was more often linked to a perceived inability to act (feeling excluded from adaptive processes) than to the climate change driver or impact.

Community resilience is a function of a high level of involvement and participation in local groups. A lively and involved (year-round) 'club' culture can build the skills, networks and knowledge base for adaptation.

Strong communities have their own experts and champions, and will mobilise behind them. Adaptation planners can support local processes by ensuring champions are kept informed of, and are involved in, risk assessments.

'Exclusive' language (used by 'experts') is a barrier to a community's understanding and willingness to adapt to the impacts of climate change. The community were confused by the distinction between mitigation and adaptation when this may not have any practical relevance.

Climate change can present a sense of uncertainty and powerlessness. Being able to identify local causes of change and achievable local responses is important to motivate adaptation responses. Agencies should build on demonstrated local skills and experiences of adaptation. This can include involvement in measurement and interpretation of climate change impact data. Having information that is transparent, timely, robust and regular is a critical determinant in building and retaining community trust.

In the City of Melbourne, respondents were confident that they were witnessing the effects of global climate change in Australia and overseas, and there was general agreement that human activity will have negative impacts the planet and the climate. Resilience was understood to involve the ability to act individually and collectively in order to reduce vulnerability to extreme events and longer-term climatic changes. This requires consideration of the psychological, social and institutional barriers that inhibit development of community resilience.

As in Port Fairy, interviewees saw little requirement to differentiate between adaptation and mitigation. Saving water and energy, recycling and consuming in environmentally sensitive ways were mentioned as existing everyday practices. Participants expressed the need for improved infrastructure to allow adaptive as well as mitigation behaviours, such as recycling; cycling; public

transport; retrofitted buildings; access to alternative energy sources and the expansion and improved accessibility of urban green spaces.

There is a growing sense of frustration in the community about the lack of action on these issues that is increasing community tensions. Participants felt that different levels of government are not listening and that current practices and arrangements did not give them agency to act. This sense of personal and collective ability to act is a key determinant of capacity to adapt to change. Major barriers to action were gaining information and exchanging knowledge between the community and the role of external environmental and planning professionals, and state and local government authorities.

There is an absence of environmental assets or 'objects' for local people to coalesce around in the central metropolitan area. This could be addressed through community gardens, not so much for food production but as social spaces to meet and take joint action.

The project indicated that social research can have a useful role in adaptation planning. It identified the value that the community places on local over 'expert' knowledge and the need for locally developed, 'fit for purpose' responses. The use and interpretation of concepts such as vulnerability, resilience and adaptive capacity needs to be considered in a local context. The narrative approach has the potential to inform the design of tailored programs that can conserve and build local adaptive capacity and collaborative adaptation planning. Social research can provide a bridge between planning and enacting effective interventions for community based adaptation to climate change and can facilitate involvement of different actors from community, science and policy in collective experimentation and learning.

1 REPORT STRUCTURE AND READING 'MAP'

This report presents research findings from a 12 month project combining two Victorian case studies, one urban and one regional, as complementary study sites that when combined provide research evidence to guide policy development and local planning decision making around environmental change. The project is nested within a larger research programme that is a partnership between the Victorian Centre for Climate Change Adaptation Research (VCCCAR), the Department of Sustainability and Environment (DSE) and the City of Melbourne. In 2011 this research partnership formed as Work Package 4 (WP4) to explore local narratives of adaptation as a component of a broader investigation through the VCCCAR project - 'Framing multi-level and multi-actor adaptation responses in the Victorian context'.

Adaptation activity is strongly influenced by perceptions of risk either driven by underlying value and belief systems, or recent personal experience of weather-related extreme events, or as built into historical institutional arrangements and practices. How different actors perceive climate risks and differentiate risk from uncertainty (and how they think these will impact their activity) will ultimately be a critical influence on how individuals and organisations respond. This cross cutting Workpackage looked at the narrative settings and the historical institutional basis which major stakeholder groups bring to their engagement with climate change adaptation. Each of the case studies delivers theoretical and methodological advances as well as changes in understandings and practices amongst key stakeholders. (See VCCCAR website - <http://www.vcccar.org.au>)

This report is an amalgamation of two stand-alone reports from the Port Fairy and the City of Melbourne research sites. Developed within the same overall project framework and research conditions, the two case studies have been combined as a final report to be read as sequential sections:

- Section 2 provides a general research context to WP4 and outlines the objectives, a brief description of narrative theory and methodology with a rationale for such an approach;
- Section 3 presents the Port Fairy case study providing a description of the local context, particular findings and outcomes for adaptation framing;
- Section 4 presents the City of Melbourne case study providing a description of the local context, particular findings and outcomes for adaptation framing;
- Section 5 combines the particular findings from both case studies in the form of project learnings and implications for adaptation policy and practice at local and regional scales

2 INTRODUCTION

2.1 Project context and objectives

Appreciating how communities understand and manage change either individually or collectively is strategically important in the Victorian and Australian context. It is important that governance arrangements, including relevant policies, can accommodate rainfall variability, fire events, temperature extremes, coastal erosion and human-induced 'surprises', such as pollution events. In policy development, communities can be seen as part of the problem or part of the solution, or both. To do this requires policy developers to give consideration to how and by whom particular issues or problems are framed. If this framing is carried out by a small group of experts from a single discipline, or by only urban-based bureaucrats, then there is a chance that the situations of concern may be framed in ways that lead to unexpected systemic failures in the longer term (RCEP, 2010).

The research reported here focuses on 'Exploring local narratives of environmental change and adaptation' using two case studies. As outlined earlier it also constitutes a work package in the Victorian Centre for Climate Change Adaptation Research (VCCCAR) project 'Framing multi-level and multi-actor adaptation responses in the Victorian context'.

Qualitative social research, as undertaken in this 'Local narratives project', plays a crucial, complementary role in policy development and planning for future change. The social science method of narrative or story-telling interviews used in this research was designed to appreciate the diversity of perspectives held about social and environmental change as well as generating a rich and value driven type of data and information that quantitative surveys do not. Quantitative data collection methods, i.e. surveys, questionnaires etc., while providing useful and valid statistical results on overall environmental behaviours (see for example the 2010 Green Light Report, Sustainability Victoria, 2011), do not fully capture these non-quantifiable elements of adaptive capacity¹. For this reason, qualitative social research, as it was undertaken in this project, plays a crucial, complementary role in local adaptation planning. It enables Government to better understand local contexts and needs, and therefore deliver specifically tailored programs and policies that enhance the potential of local initiative and participation in decision-making processes and government activities.

This research project involved two Victorian case studies: one urban and one rural. The urban case study was located in the City of Melbourne municipality. The central city area of Melbourne has just under 100,000 residents. The rural case study was situated in Port Fairy, 290 kilometres south west of Melbourne along Victoria's coastline with approximately 2,600 residents. The selection of case study sites aimed to represent the demographic diversity found in Victorian communities and the range of community attitudes and knowledge about climate change and adaptation.

In detail, this social research project pursued the following objectives:

- To describe the cultural contexts, demographics, risk perceptions, awareness of municipal service availability and existing adaptive behaviours in regard to urban heatwaves and flooding in the two case study areas in Port Fairy and the City of Melbourne (Carlton and Docklands);
- To test resonance of terms such as adaptation and resilience, and understand what matters most to people who live and work in the case study sites in regards to their environment.
- To draw out and map the determinants of adaptive capacity, including an exploration of barriers and enablers (i.e. the role of governance and social structures, socio-economic and emotional factors and other variables underlying personal accounts of climate change) that constrain or enhance climate change adaptation;
- To explore the role of social research in climate change adaptation planning;

¹ The Intergovernmental Panel on Climate Change (IPCC) defines adaptive capacity in relation to climate change impacts as the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (Adger et al. 2007).

- To communicate research outcomes to the community research participants, inviting input and feedback from a diverse range of stakeholders;
- To translate the findings into policy-relevant understandings of what makes people vulnerable, adaptive and resilient.

2.2 Theoretical framework and methods

2.2.1 Why narrative?

In addition to techno-scientific information and solutions, researchers, planners and policy makers now acknowledge the importance of the social-cultural, subjective-emotional, institutional and other human and societal dimensions of successful climate change adaptation. In particular, it is understood that adaptive responses must be context-specific, that is, they should be place-based, grounded in local structures and situations and involve a variety of actors on all levels of society (McEvoy et al., 2010). For this reason, many researchers and practitioners emphasise bottom-up approaches built on an understanding of how communities experience change. The local focus employs diverse community experiences to identify specific variables of vulnerability and adaptive capacity rather than operate with externally derived data and preconceived assumptions.

Narrative is central to human communication and meaning-making. It can in fact be claimed that it is in the act of story-telling that social relationships are formed, which are the basis of community. Narrative studies utilise and provide a language capable of including a range of local knowledge(s) and experiences that would otherwise be excluded by expert languages. Designing the interview process as a conversation additionally minimises the risk that a catalogue of pre-designed questions zooms in on the researcher's or the discipline's preconceived assumptions about a specific issue. Implicit framings of questions, it has also been shown, may lead to divergent responses and thus skew the research outcome (Reser, 2011a). Instead, narrative social research is a communicational approach, aimed at listening to and understanding what is important to the respondents. In this way, it can contribute to the identification of additional factors influencing community needs and actions that may be overlooked by more conventional qualitative approaches. Research shows that humans communicate in the main through story-telling. Information presented in story form is more easily understood and retained than scientific or statistical data. Stories are often suspected of not being 'objective', for example, when media stories influence public opinion. However, social science methods, surveys or questionnaires, may similarly 'lead' responses inadvertently (Reser, 2011a; 2011b). Narrative research takes this into account and encourages story-telling. It is based on the view that the complex meanings of human experience are better captured by paying attention to the nuances of what is being said, how it is said and what is said inexplicitly, or 'between the lines'. The narrative methodology is based in an understanding of the research situation as a dialogical, social interaction. Using everyday conversational language, narrative research gives a language to local experiential, emotional and non-expert forms of knowledge, providing a context-specific, bottom-up methodology that offers a more holistic picture of local issues and concerns.

2.2.2 Methodological implications and material

Narrative research is based on a number of assumptions that we outline here very briefly to provide a theoretical context to our methodological approach. In the social sciences, the 'narrative turn' is a development occurring with broader epistemological shifts in the 1970s and '80s that conceptualise social reality as a cultural construct (Czarniawska, 2004). According to this constructivist perspective, social reality can be analysed as a culturally specific 'text'. A culture or society is defined by its foundational stories that explain and order the world for human experience and create clearly demarcated value systems. The concepts of religion, history and science, for example, have been identified as such 'meta-narratives' that regulate how a society operates and what it considers as relevant knowledge or objective truth (Lyotard, 1984). On an individual level, too, experience is cognitively organised and made sense of along collectively shared storylines but, importantly, individual story-telling is also an autonomous meaning-making process that is always uniquely different from person to person (Labov and Waletzky, 2003).

Experience is based in the body and the imagination as well as in collective and historical experiences, cultural texts and signifying systems. The analytical challenge for the narrative researcher, then, is to avoid a too subjectivist lens onto social reality while not reducing individual experience to a mere “effect of external discourses and practices” (Conradson, 2005, 5). Based on these considerations, our selection of research materials paid attention to both public and policy discourses as well as individual perceptions of climate change and adaptive measures. However, in defining narrative as more than simply a method for the extraction of qualitative data, we were interested in the social processes of narratives that incorporate and surpass the interaction between researcher and respondent in the research situation.

3 PORT FAIRY CASE STUDY

3.1 Selection of the case study area

The coastal community of Port Fairy in Victoria's Western District was chosen as a case study for this social research (See Appendix 1 for Location Map). The township has a permanent population of around 2,600 residents. Due to rapidly progressing beach and dune erosion on its East Beach, Port Fairy is recognised as a high risk location under the projected impacts of climate change, such as sea level rise, coastal inundation and increased storm surges (McInnes et al., 2009). As these projections will likely exacerbate currently observable environmental changes, they pose considerable threats to the town's important recreational and tourist industries, its environment and wildlife as found on Griffiths Island, in the South Beach Wetlands and in the Moyne River, as well as real estate and public lands on the East Beach dune, along the river and on the floodplains surrounding the Belfast Lough. This assessment is based in a number of previous studies related to the state of the East Beach, including some project learnings as to how the issue of future erosion could be addressed. The most recent of these studies are listed in Appendix 1. It should be noted that in determining the geographical boundaries of the case study area, we were primarily guided by our interest in the factors influencing the Port Fairy community's adaptive capacity from a social science perspective. In terms of thinking of the community as a local component of a coupled society-environment system that extends well beyond the geographical boundaries of the town, our selection necessarily provides a segmental, locally specific snapshot of this system.

3.1.1 Stakeholder mapping and participant recruitment

In selecting participants for the research, we aimed for a sample composition that reflected the diversity of the community in Port Fairy and the range of different experiences in our case study area. A preliminary analysis of stakeholders and other potentially concerned or interested parties in Port Fairy was provided to the social researcher by the Port Fairy Working Group (PFWG)². During several visits to Port Fairy, the researcher established a number of personal contacts, in particular at the Port Fairy Open House Event on coastal issues that was organised by the PFWG in June 2011, and at the inaugural meeting of the Port Fairy Community Coastal Challenge group, which coincided with the commencement of the field research. As a result, the participant pool included members of local sporting and environmental clubs, property owners with houses on the banks of the Moyne River and on the beach dunes, as well as a selection of long-term locals and more recently arrived 'new-comers' to the community (for participant characteristics see Appendix 2).

Having identified key contacts from this preliminary participant pool, the researcher initiated contact via e-mail or telephone, explained the project's research objectives and started interviewing. We then used a snowball sampling method, which means that we asked participants to nominate others, friends, colleagues, acquaintances, for further enquiry. The variety of key contacts we approached initially was aimed at ascertaining that we arrived at a sufficiently diverse sample that reflected the diverse perspectives and experiences in relation to climate change and adaptive capacity in Port Fairy.

3.1.2 Narrative interviews and participant observation

The researcher spent two weeks in Port Fairy in August 2011 conducting 22 in-depth interviews with local residents and other users of the town's facilities. This sample size, aimed to reflect Port Fairy's diversity, is not statistically representative nor was this intended. The narrative methodology acknowledges the fact that there will be as many different stories and perspectives as there are people and diverse experiences (see Text Box 1 below). However, for the purpose of this study,

² The PFWG is an interagency body established in partnership between Moyne Shire Council and the DSE in 2010 for the purpose of coordinating the timing and delivery of projects related to environmental issues in Port Fairy and particularly the coast, including flood and coastal erosion risk assessment in Port Fairy, coastal hazards reduction and adaptation to rising sea-levels, increases in storm surges and flood events. The PFWG key member is Moyne Shire with supporting partners: Glenelg Hopkins Catchment Management Authority; Department of Planning and Community Development (DPCD) and Department of Sustainability and Environment (DSE).

the sample size was capped once thematic saturation was achieved³. The interviews were conducted at a time and place convenient to the participants, often in their homes or at a local café, and digitally recorded to be transcribed at a later date.

The semi-structured, in-depth interviews lasted on average about 30-45 and sometime 60 minutes. The researcher encouraged conversational story-telling by asking general, small-talk and biographical questions. This helped to create an atmosphere, in which the participants could talk about themselves and 'forget' that they were being recorded. In accordance with Monash University's formal ethics regulations, all participants had been issued with an Explanatory Statement about the objectives of the research and the usage of the data prior to the interview. This meant that all participants had some understanding that the interview was geared towards their experience of environmental change. In some cases, this led to the participants directly opening the conversation on the topic of climate change. Generally, the researcher asked open questions pertaining to the participant's experiences and observations of environmental change, local weather memories and personal impacts of change, how they felt about an increase in extreme weather events and what they thought they could, or would like to do to cope with the effects of climate change and what adaptation meant to them. As the field research progressed, the researcher's learnings from previous interviews informed subsequent conversations. The interview process thus contributed to the identification of issues surrounding perceptions of local change and related questions of community action and local governance. Secondly, the researcher participated in the aforementioned PFWG led Open House Event and in two meetings of the Port Fairy Community Coastal Challenge Group, gaining a deeper understanding of the town's predominant issues through participant observation and note-taking. All participant details are kept strictly confidential and no names will be used when quoting from interview responses in this report and in the future.

3.1.3 Consultation and feedback on research findings

Following the preliminary analysis of the narrative interviews according to emerging key themes, research participants in Port Fairy were invited to a workshop style follow-up event. Every participant received a copy of the draft report detailing the findings prior to the meeting. The participants were then asked to provide their feedback on the draft, validate the findings, and comment on their experience of both the narrative interview and the workshop. Creating the space for participant feedback acknowledges the fact that the researcher's analysis can only be an interpretation of what people said during the interviews. Reflecting the findings back to the participants ensures that misinterpretations of data or gaps in the report are revealed and can be amended by the researcher. This collaborative work on the research findings with the participants is an important ethical component of our research methodology. As the workshop set-up allowed time and space for a more focussed discussion of some of the key issues arising from the report, it deepened and furthered the insights of the report. The workshop intended to initiate networks and relationships between actors who would normally not engage with each other. By inviting reflection on the project and its conduct as well as encouraging participants to make recommendations for similar projects and workshops, another intention was to help instigate the development of innovative local communication and governance structures.

3.2 Port Fairy: A description of the local context

3.2.1 Port Fairy, its community, culture and environment.

Port Fairy's settlement history begins in the 1830s, following the establishment of whaling stations in the Port Fairy Bay. Originally named Belfast until 1887, the town has a distinctive Irish heritage character. Port Fairy's distance to Melbourne means that the town has to date maintained much of this historic character. As this is also one of the town's major attractions, tourism and residential development, especially holiday houses and retirement property on the East Beach dunes and along the so-called South Beach or Pea Soup coastline, has increased dramatically over the last 20 years. The annual Port Fairy Folk Festival, running successfully since 1977, has also put Port Fairy 'on the map' of a wider tourist audience. The early and mid-1990s saw an influx of retirees

³ This means that the underlying patterns and concepts in the different stories in each additional interview were not sufficiently different to justify further interviews.

and 'sea changers' – many of whom were additionally attracted by Port Fairy's excellent health facilities – and young families, as well as the growth of a different kind of tourism, now concentrating on luxury bed and breakfast or self-contained accommodation.

Development is of some concern for many residents and relevant in regard to its environmental, planning and social effects as the attraction of beach-side living has resulted in densely developed dune areas. An application for a private residential development on the East Beach dune led to a number of coastal engineering and feasibility studies in the years 2005-2010. The application was met with significant local resistance and was finally rejected (see Appendix 1).

Some local families have long, intergenerational ties to Port Fairy and its more traditional industries, such as fishing and farming. The town and surrounds have also become a popular place for various artists and for a thriving café and food culture that bring, as one participant said, a sense of 'cosmopolitanism' to this small country town (Interview, 12). Another described Port Fairy as 'the left bank' of the Western District to express the sense of progressive, 'bohemian' culture that has taken root in this part of the traditionally politically more conservative district (Interview, 14). Arguably, individual perspectives may differ according to a person's level of involvement in the 'mainstream' community culture. However, this only demonstrates that Port Fairy, like any community, is constituted by a range of diverse people and experiences.

A number of long-running festivals involve many community members in their planning. A lively and involved club culture is driven by locals all year round and Port Fairy residents maintain a high level of participation in groups with environmental concerns. Generally interview participants, long-term local or not, expressed the sense that Port Fairy residents 'work together and cooperate', that they could rely on the community to help out and support each other in times of crisis (Interview, 16+17).

Current, potentially divisive issues facing the town are town planning, particularly the ongoing residential development, the erosion on the East Beach and the question of the causeway that closes off the so-called South-West passage. The debate over whether the causeway wall should be removed, thus opening the passage and allowing the sea to flow into the Moyne's estuary; whether it should be retained; or whether additional engineering solutions should be considered to solve the problem, is charged with a variety of cultural, historical, and individual factors and influenced by several economic and recreational interests. There is also grave concern about the possible exposure of toxic waste, embedded in the dune at the far end of the East Beach since the time when this area was used as a public landfill tip. The debate is further intensified by the urgency for action as the dramatically progressing erosion is being observed by many local residents.

3.2.2 Industry and employment

Despite losing importance as a whaling port in the 1840s, Port Fairy continued to be an important regional hub for the Western District's agriculture, forestry and fishing industries. While commercial fishing has declined in recent decades, tourism and recreational activities, such as walking, yachting, fishing and surfing, have been growing steadily, making accommodation and food services, and the retail trade, the main industries in Port Fairy. In 2006, there was an unemployment rate of 4.1% of the town's 2,631 residents (DPCD: Towns in Time, 2006; Whiting and Bayne, 2009)⁴. In addition to the traditional agricultural and forestry businesses, other major industries include the Bamstone bluestone and granite quarry and processing plant and the GlaxoSmithKline alkaloid extraction plant. Both companies are located in close proximity to the town and employ workers in Port Fairy and from the region.

In other employment areas, Health Care and Social Assistance are followed closely by Manufacturing, Construction, Public Administration and Education. The importance of these sectors explains – and is explained by – the more recent dynamics that have shaped the town over the last 10 to 15 years. With the Moyne Health Services located in Port Fairy, and expanding since

⁴ Data from the Australian Bureau of Statistics 2011 census were not yet available at the time of writing.

the year 2000, the town is now well serviced with a local hospital, up to 10 resident doctors, and two aged care facilities whose catchment area extends well into the region. The availability of health care was named by many of the project participants as an important factor for their decision to retire in Port Fairy. Furthermore, the Moyne Shire offices, the region's public administration, are located in town.

The commutable distance to Warrnambool and the presence of two local schools in Port Fairy make the town attractive to young families, accounting for the boom in construction works on residential dwellings in the town and immediate surrounds. Other construction projects that bring workers into the area include the Yambuck and Codrington wind farms (operating), the Willatook wind turbines and the Santos and AGL gas-fired power stations in Orford and Tarrone (currently in the planning or construction phase) (see Appendix 1 and Pendergast, 2011a).

3.2.3 Local governance

Port Fairy lies in the federal division of Wannon, the state electoral district of South-West Coast. It is the largest town in the Moyne Shire and the Shire Council's offices are located in the township. Cr Jim Doukas is currently the shire mayor and there are seven councillors. The current CEO of the Council was officially appointed in early 2011 and with three directors, makes up the head of the organisational structure. These include a Director of Corporate and Community Support, a Director of Physical Science and a Director of Sustainable Development. As outlined earlier a recent partnership between Moyne Shire Council and the DSE has been established through the Port Fairy Working Group (PFWG).

Waterways in the Port Fairy area are managed by the Glenelg Hopkins Catchment Management Authority (GHCMA). The GHCMA has produced several documents of interest to the PFWG, such as the Port Fairy Regional Flood Study.

3.2.4 Port Fairy's environment

[T]he key for the town is the water. It's the river and the sea, that's why everyone is here. And it's just the way that we want to interact with that... (Interview, 2).

The environment in and around Port Fairy is one of the most valuable assets of the town and a major attraction for both local residents and visitors. Coastal spaces include East Beach and South Beach and provide a great variation in topography, from sand dunes to craggy reefs within short distance of the township. The Moyne River provides a safe harbour for recreational yachting and the commercial fishing industry. The river, the Belfast Lough, Powling Street Wetlands and Griffiths Island are major environmental components of the town, attracting bird and plant life. The nesting of the Shearwater (Mutton Bird) is a significant annual event drawing large numbers of tourists. Port Fairy and surrounds is also home to many rare and endangered plant and animal species, which are further threatened by a number of factors, such as encroachment by development, erosion and coastal inundation.

Current environmental concerns in Port Fairy and related planning issues include coastal and beach erosion, particularly on the East Beach, where there is also some concern about the condition of the coastal defences, such as the timber groynes on the beach and a rock wall along the foot of the primary dune. Inappropriate development along the beach has compounded existing erosion problems, which are likely to be exacerbated with the anticipated impacts of climate change, such as sea-level rise and increased storm surges. The issue of uncertainty regarding what counter-measures are appropriate to future environmental impacts, alongside current funding limitations for large scale coastal measures means that the proposed works (Aurecon, 2010) on the East Beach have not been addressed so far (see Appendix 1 for more detail).

3.3 The perspective of the community

3.3.1 Local knowledge(s)

The language used to communicate climate knowledge, adaptation measures and underlying concepts plays a vital part in influencing decision-making. The researchers were therefore interested in finding out what members of the community thought about the concepts of 'climate change' and 'adaptation' and how this relates to how people perceive changes in their local environment. Other questions that were considered relevant to mapping Port Fairy's 'adaptive capacity' included how the participants think and feel about their place and their community, what they consider as relevant adaptive actions and what helped or hindered such actions.⁵ The focus on local knowledge informs the research methodology of using story-telling and conversational interviews. This methodology aims to produce a more inclusive picture of human-environment relationships on the ground. Narrative interviews, by using everyday language and concepts, provide a language for the expression of the manifold dimensions of human-environment relationships, diverse experiences and local knowledge(s).

3.3.2 Perceptions of global climate change in Port Fairy

Regardless of where they stood personally on climate change, all interview participants in Port Fairy were well aware of the current state of public debates around the issue. The recent national debate over the introduction of a federal carbon tax under the current government in 2012 has put the issue at the forefront of domestic politics and public attention. The debate's economic focus has intensified its divisive force and introduced 'a political flavour' (Interview, 14), causing concerns about the quality of the debate and the reliability of the information on climate change among the interview respondents in Port Fairy:

I understand, I believe that the climate is changing. My fear is that we have now a political flavour coming into the debate [...] and therefore, my scientists are better than your scientists, my lawyers are better than yours. So the actual facts that we're talking about become lost in the morass. What we're missing in the overall climate change debate is a good discussion of the known facts. So that people can then make up their own minds, rather than be instructed by some scientist, this is what you should believe and if you believe this then you should do that. That's the thing that worries me a lot about the whole debate we're having at the moment (Interview, 14).

I think it's got too political and it's actually moved away from the science. If anyone was really serious about climate change, you'd really want to drive the changes in petrochemical use and for Victoria, brown coal, and no politician's got the guts to really do it. And for all sorts of reasons, viable alternatives aren't really presenting (Interview, 2).

[The discussion] gets very extreme, so rationality is just not there, it's now become highly emotional and subjective and a nonsense, because people are just arguing because another person holds a different point of view, not the substance of what the argument is about.

Researcher: Hm, yeah, so there are polarised viewpoints...?

Oh, terribly, terribly... I mean, I have a view of some of these characters in this debate but I really have no particular credibility in what individuals might say because I just think their performance in the past has just been too extreme...

Researcher: In either camp, would you say?

Oh yeah! Oh yes. But I'd have to say I'm more on the side of the, uhm, how would we describe... well, the popular term of course is 'the deniers' (Interview, 9).

⁵ The Intergovernmental Panel on Climate Change (IPCC) defines adaptive capacity in relation to climate change impacts as the ability of a system [such as society] to adjust to climate change to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (Adger et al. 2007).

Despite this scepticism in the face of public debates on climate change – or because of it – most respondents continued to actively seek out information in an effort to gain an understanding of the meaning of climate change on their own terms. In the majority, climate and other scientists appearing in documentaries or discussion forums on public sector television channels ABC or SBS were considered relatively trustworthy sources, alongside newspaper articles (The Age, The Australian) and books on the topic. Among the self-proclaimed climate change sceptics, some respondents explicitly said they did not want to be seen as ‘deniers’ but felt they needed more evidence to be able to make up their minds. Simultaneously, they acknowledged the general uncertainty and complexity of climate related issues, and observed that climate language and concepts were often too abstract and exclusive of non-experts. Climate science information alone, as many respondents agreed, provides an insufficient basis for informed decision-making. Climate change predictions in particular were experienced as too abstract and outside individual capacity to comprehend, whereas simple and tangible examples, storylines and scenarios seemed to facilitate understanding.

I do listen a lot about it and the science keeps on, like, I'm not scared, I don't wanna be thought of as a climate change denier, but the more I hear about it, it's a very, very complex system and just to say that everything, that sea levels rise, [...] there may be some other factor that we haven't worked out. That what's gonna happen due to the climate change. [...] Yeah, no, I believe that the CO2 levels are higher... I think it's probably at a point... where, you know, the fact that people call other people climate change deniers, it's sort of like everyone has to agree, you can't ... You know, I'm probably more like a sceptic that is happy to have someone there who's got a different opinion, I'm happy to listen to both opinions and make up my own mind and not be like "This is what's happening" because it's not always like "this is what's happening" (Interview, 8).

[T]here's sides to every argument, I guess, some people are over the top but if you listen to the climate scientists and the majority of those are fairly sure that something is happening and that something should be done. [...] so it's about choosing where you believe how far it is but I prefer to listen to the scientists on that rather than the propagandists...

Researcher: But there you have two, both sides have their scientists...

Yeah, but about 95% of them say that there's climate impact, so I'm more inclined to go with the climate scientists [...]

[T]here was a show on the ABC or SBS where a well-known climate scientist came on and he was very good at putting the points across. You don't always get that, he was fantastic [...] And he had some very good analogies about climate science, about filling up a barrel and you get to a certain level and the barrel starts to overflow, so you don't see the effects, you know, until the tip over the edge sort of thing, and quite a good thing about filling up, if you got water filling up here and coming out here, eventually it will overflow, this was talking about the temperature of things... (Interview, 12).

Most of the people interviewed were inclined to accept scientific predictions of climate change. While generally all respondents agreed that human activity does have negative impacts on the environment, a minority was more inclined to believe that changes in climate were part of naturally occurring cycles. People's acceptance or scepticism around the question of climate change may be influenced by several factors. First, the polarising climate change debate, as described above, can lead to a sense of confusion and frustration. The debate loses its credibility or produces a sense of individual powerlessness. Second, different political, social or environmental theories connected to the concept of climate change 'represent struggles of social beliefs and meanings' (O'Neill and Boykoff, 2011, p. 247). This means that if a 'belief' in climate change challenges a political creed or party alliance, this may lead into a personal dilemma, or even be perceived as a threat to the identity and security provided by political or ideological frameworks. Coverage on climate change issues is often perceived as politically motivated 'scare tactics' or 'fear mongering' (Interview, 1, 6+7) and this perception may result in reactions as described by one respondent: I suppose, I'm an ostrich, I've got my head in the sand (Interview, 6 + 7).

Feeling secure within a belief system and comfortable with a lifestyle is an emotional priority for most people. The psychological tendency to protect this feeling needs to be considered in climate adaptation communication, as it can result in maladaptive responses, a state of inaction or even denial (Cass and Walker, 2009; Harries, 2008; O'Neill and Nicholson-Cole, 2009). A third, large group among respondents was made up of those who were confident that the climate and the environment are changing but said that this might be due to the combined influences of human activity and natural change patterns.

M: I believe the scientists. Of which there are 99%, which believe that anthropogenic climate change is happening. If I don't believe them who do I believe, you know? The bird in the tree? You've gotta believe learned people. And so that leaves you a bit concerned, F: Oh, yes! And not enough is being done...

M: And in particular, with small town political gain, and I don't wanna get on a soap box here but this is bloody serious. If we take at face value what we're being told by the scientists (Interview, 16 + 17).

I've got friends who are water scientists who are sort of going down to the Antarctic and looking at the changes in the sea water and carbon dioxide saturations. You look at the things, yeah, I think, I'm quite comfortable with the science of the climate change (Interview, 2).

I do believe in global warming and I do believe that there has been a very severe drought the last, say, roughly ten years. And I think that the weather is different to what it used to be. Some of that, I'm sure is probably on a four years cycle or whatever, but I do definitely believe in global warming. In the last 24 months it's been extraordinary – [we had] bushfires, floods... rising sea levels... (Interview, 5).

I think there are too many emissions, I do. [...] I don't know that it's changing climate, but I don't think it's a healthy thing, regardless. Especially, as I said, when you go to countries where you see this incredible pollution! Can't be good for anyone (Interview, 6+7).

Talking about what adapting to climate change means to them, most respondents associated mitigating responses, such as reducing carbon emissions, and committing to sustainable lifestyles, installing water tanks and solar panels, shopping locally, growing their own food, or driving less. The mitigating response as one approach to adaptation was shared by most respondents, regardless of whether they subscribed to climate change theory or not:

So it [climate] is a cyclic thing and it's gone on for thousands of years. I know, man is adaptable and has got a brain and we decided CO₂ is a bad gas. I mean it's important to ease up on its production... certainly (Interview, 1).

Local Government's ('Council's') role in educating people and providing incentives for sustainable lifestyles was valued highly, in addition to financial considerations of saving energy.

I suppose, when we did our renovation 18 months ago we had to do certain things for environmental reasons to satisfy the council.

Researcher: Would you have done it otherwise?

Yes, we would have. It was our plan to have solar and to have water tanks and to design the house in a way that we wouldn't need to have the lights on during the day and things – that was our idea. But we were definitely also motivated by the council. Electricity saving measures... (Interview, 5).

However, there was some doubt as to the extent of people's readiness to change their habits without being forced to change by external events. Individual and community adaptation was

considered a reactive response to tangible impacts, unless helped by policies that contributed to environmental education and the provision of sustainable infrastructures.

[Y]ou don't change unless your pants are on fire, unless you're uncomfortable, so I think that will be the driver probably, that people will be uncomfortable and say, oh my goodness, we've got to do it (Interview, 3).

Adaptation... I suppose essentially it's being smart... As things change that we modify what we do to fit in with those, within those changes.

Researcher: More reactive adapting...?

Yeah, adapting is always gonna be about a reaction – it's very, very rare that you get pre-emptive adaptation. You gotta have a reason to change, so you either see the wall of water coming ... I think it's incredibly rare that you would make a change without recognising that something needs to be changed. [...] If anyone was really serious about climate change, you'd really want to drive the changes in petrochemical use and for Victoria, brown coal, and no politician's got the guts to really do it. And for all sorts of reasons, viable alternatives aren't really presenting (Interview, 2).

Some respondents expressed frustration over the cultural and political complexities that inhibit the social change needed for mitigating responses to environmental change.

M: Yeah, yeah, and I'm pleased to see that's [the ozone layer] being repaired since we've stopped use of CFC, was it? I feel like shaking something and saying, look, here here's ...

F: ...the evidence...

M: ... the science and we did something about it! (Interview, 16+17)

Aesthetic values, such as maintaining the 'pristine' environment locally, also ranged highly and could pose potential local barriers to large scale 'green' infrastructure projects, such as wind farms.

I'm not terribly worried about it [climate change]. I think, being an Australian, we've gone through cycles, some dreadful cycles and we're going through one now, almost certainly. I'm not convinced, I mean Co2 is not the only gas which is causing the green...thing... [...] I'm quite sure we have to reduce our Co2 production – I'm sure it's not good for the environment. But certainly wind farms are not the answer. I mean I'm quite involved, I'm terribly anti- wind power.

Researcher: Why?

Why am I... because it's an absolute sham that's gone on... governments like them because they're visible. And anything they do that's visible, the public see and perceive that the incumbent government is doing something for the environment. [...]

They spoil the landscape totally, they turn the landscape into an industrial sight [site?] far as I'm concerned, I mean I like our country, our farm is nice undulating country and these ruddy great towers sticking up just over the way (Interview, 1).

The majority of the interviewees were inclined to 'believe' the science of present climate change, citing media reports of Pacific Islands communities threatened by sea-level rise, as well as their own observations of changing weather patterns. In regard to environmental changes that people observed locally, however, there was a shift in how they thought and felt about the effects of global climate change in Port Fairy. As the next section outlines, this was particularly noticeable in how they thought about the issue of the East Beach erosion and in their attitudes towards knowledge authorities, i.e. the scientists, and personal and government actions.

Summary 1: Most respondents recognised that human activity poses a threat to the environment. Yet, opinions were divided as to whether a changing climate was due to human activity or to naturally occurring weather cycles. While community trust in scientific climate predictions was broad, abstract concepts and exclusionary language prevents people from forming informed opinions about climate change. In absence of easily comprehensible, accessible information, the current climate change debate was considered as too politicised and polarising. As a result, the debate has lost credibility and can lead to reactions of

3.3.3 Perceptions of local environmental change and adaptation in Port Fairy

The seasons now seem to be, they're not consistent. [...] And I'm very, have always been very fond of autumn and spring, particularly the changes in weather. They're not as in your face anymore. It's very subtle to the point that it seems to blend a bit. It's not like here's autumn or here's spring. We're kind of feeling spring a little bit now [mid-July] you know, and I see blossoms starting to come out the trees and I think, oh, hang on a minute, that's a bit early... (Interview, 11).

When asked about their personal experience of change in Port Fairy, respondents offered very detailed observations of the changing environment from their experiences of walking on the beach and the surrounds, and other physical interactions such as fishing, boating, surfing and gardening. General observations on environmental changes included an increasing 'inconsistency' of the seasons, and extreme weather events like droughts, storms and heavy rainfall, that some of the respondents linked to what they knew about global climate change, while others put it down to the usual variability of climate and weather patterns in Australia and in the Western District's coastal region in particular.

The erosion of the sand dunes at East Beach – in the last 4 years there's been a real change at East Beach. And indeed in the 6 and half years that we've been here, the beach is very different. I used to jog on the beach and now there's often not enough sand almost to jog on the beach. So that's definitely changed (Interview, 5).

[I]t's happening and it's happening quite quickly, same as it is along here, it's happening at the Craggs themselves at Yambuk, it's happening to the West of Yambuk, it's happening everywhere. And it's happening at a faster rate. Now some people call it global warming, some people call it climate change, and some say it's nature. I'm inclined to think that there's a bit of human intervention in there, I think we're not doing the right thing, I know we're not doing the right thing by the planet. Really doesn't matter in terms of this here – what causes it, in my view. What it's about here is about solving what can be a potentially disastrous problem. And we need to do that.

Despite their high levels of awareness and information on the issues of climate change, most respondents were less inclined to attribute the local erosion issue to existent global climate change impacts – at least not solely. For example, the existence of human-made structures was considered by many the main cause of the local erosion problem. The removal of structures, many hope, could return the sea- and sand flow to its more 'natural' state and replenish the beach. Others felt that the question of whether or not climate change was a proven fact was irrelevant in the face of urgently needed, immediate action. This is significant not only because it can inform the choice of adaptive policy and community engagement terminology. It also sheds light on a number of other factors affecting adaptive capacity, such as how the community reflectively constructs the meaning of local environmental issues and what kind of solutions they think necessary, feasible and desirable. Local perceptions of the erosion as a natural phenomenon, or as caused by human-made structures, affect factors such as risk awareness and reliance on engineering solutions. Differing perceptions are often linked to socio-cultural tensions, not least as they exist between locals and holiday house owners on the dune, those with primarily economic interests and those who believe that the existing building structures are the root cause of the problem, interfering with 'nature do[ing] its thing' (Interview, 8).

In discussing the range of opinions on the East Beach erosion issue currently existing in Port Fairy, the following analysis draws out underlying beliefs as revealed through the interviews.

When I was boy [in the 1950s] the only access to the East Beach was close to the little East Beach store. The Surf Club was adjacent to where the toilet block is now, at the car park. There were dunes to the south of that which rolled onto the water's edge. There was a lot of sand drift in places and drifted over the car park – there were less buildings there.[...]. There were very few houses there and the dunes moved, as all dunes do, the wind blew from the west, pushed them down, blew from the east, pushed them back. That can't happen now because the dunes are bound because of the houses there and bound by the big bitumen car park there. So it no longer happens (Interview, 13).

3.3.4 The erosion on East Beach and the South-West passage-debate

Now, I'm a bit of a sceptic where the weather is changing. I mean it changes all the time, you know, it's cyclic. And whether Co2 and all those things are really causing it, I actually question that. But certainly, we're in a cycle which doesn't lend itself to East Beach, you know, obviously, East Beach is getting eroded away. We've noticed that particularly in the last 10 years, the locals say the sand comes back – and it does come back but I reckon it doesn't come back quite as much each year in winter as it did in the previous year. While rocks are a short term solution – I'm just talking off the top of my head, really, if we don't do anything around there at that sand dune, I reckon it will cut through to the Lough up there. If it does that, God knows what will happen to this river (Interview, 1).

By far the most dominating concern among the respondents was the ongoing and dramatic erosion of the East Beach and particularly the coastal dunes, which many respondents had been observing for years, some of them since their childhood. Local intergenerational knowledge furthermore reports that there used to be up to three consecutive dunes on the East Beach where today only one coastal dune row exists, most of which has been built on, from Battery Hill to the dune adjacent to the undeveloped crown land at the east end of the beach. One resident witnessed a light plane landing on the East Beach in the 1950s and estimated that since then the beach had lost about 150 metres of sand in width (Interview, 16+17). The erosion issue was covered by state wide media particularly in relation to the contested 22-lot subdivision application on the East Beach Dune since 2005, but local concern, as testified by continued coverage in the Moyne Gazette, has not eased after the development application has been rejected (Pendergast, 2011b).

The progressive erosion is being monitored very closely by Port Fairy residents and was described to the researcher in much detail by almost every single respondent. The interviews, as well as the PFWG led Changing Coastlines Open Day in Port Fairy in June 2011, showed that residents are generally well informed on the number and, in some instances, the contents of the existing coastal studies into this matter. A wealth of material collected by residents exists in the form of photographic and experiential evidence of the eroding beach and dunes.

I think it was in 2005 from recollection, the whole face of the dune just sort of slipped down into the sea and nothing had happened. And from that time, there has been, I would say, metres lost every year. This year it's been, 8 to 10 metres of dune depth... [...] So I went out there regularly and we took a lot of photographs and I observed that carefully (Interview, 9).

Well, I've observed the sand dunes washing down, which was just after the last big storm that we've had, which is after you guys were here [the Coastal Change Open Day in June]. There were big waves that we had and we got some video footage of the sand falling down. On the far east, sort of heading down towards Killarney. Or what they call the tip area (Interview, 8).

When talking about the possible causes of the East Beach erosion, the interview participants often drew comparisons to the building of the port of Portland, about 80 kilometres west of Port Fairy. In

the 1960s, Portland extended its existing harbour structures to open its port to commercial shipping, but, as a result of changed ocean currents, lost its surrounding beaches and the coastline of the Dutton Way to rapid erosion.

[T]here's lots of houses along that stretch of coastline [Dutton Way], well, used to be and there was a lovely beach there and it was a really popular holiday destination for people [...] But what happened when that port was built, was that Dutton Way started collapsing, and they had to line it with rocks on the edge of the coast. So the people who now live there look onto rock and sea and there's no beach. And there's no doubt that happened because they built the port of Portland. So some people think that the reason we've got the causeway here is the reason East Beach is eroding (Interview, 20)

I don't think they [Department of Sustainability and Environment (DSE) and Moyne Shire Council] understand why the causeway was put there and the man-made intrusion has disrupted the natural balance in Port Fairy (local historian Marten Syme, cited in The Standard, 1 October 2010, Pendergast, 2011b).

Some Port Fairy residents suspect the so-called river training walls (built in 1873 according to a local source) at the Moyne's estuary of having a similar effect on the East Beach and dunes. A particular point of contention is the causeway closing off the South-West passage between Griffiths Island and the estuary. One faction in the community argues that the building of the causeway affected the original engineering design of the harbour walls, which reportedly used the natural longshore drift to prevent silting up of the river mouth while simultaneously transporting sands that replenished the East Beach. These sands, it is believed, are now deposited around the island and further prevented from reaching the beach by the training walls. There is passionate support in this faction, particularly represented by the Friends of Griffiths Island, to open the passage in order to restore the 'natural' drift of sands around the island.

While local fishermen were originally proponents of opening the passage (it was indeed opened partially for a brief period post World War II when unknown locals detonated a hole into the causeway under the cover of night), most people living on the river and those using it commercially or recreationally today, strongly oppose an opening for its unpredictable impacts on the river, such as silting up, reduced navigability and increased risk of flooding during high tides and storm surges. To date, this faction argues, no convincing evidence of the benefits an opening would have for East Beach has been presented. Both factions agree that the long-term effects of an opening are highly uncertain. Proponents of the opening, however, consider it a cost-effective and practical experiment that could be relatively easily reversed if it produced undesired outcomes. They agree that close and ongoing monitoring of the sand flow and beach development would be required, perhaps over a decade or longer. Others still remain unconvinced of the benefits of either opening or closing the passage. The debate is of central importance in town. During the conversations with Port Fairy residents the social researcher was presented with many thoughtful suggestions on how this issue could be resolved, including the construction of a bridge allowing underway water flow, and that of a weir or lock, which could be closed according to circumstances to prevent river flooding.

In relation to the East Beach erosion, suggestions included the immediate restoration and extension of the rock wall at the foot of the dune – a solution geared primarily at protecting the houses – or the construction of an artificial reef in the bay to dissipate wave power. Previous suggestions, made in the East Beach Coastal Erosion, Engineering and Feasibility Study (Aurecon, 2010), to deposit sand dredged from Lighthouse Beach on Griffiths Island and the Pudney Grounds met with scepticism as to their replenishing effect on the East Beach and were opposed by the Friends of Griffiths Island as dredging would destroy the bird habitat established on Lighthouse Beach. While they are united by their concern for the disappearing beach and eroding dunes, Port Fairy residents are also divided by their passionate views and opinions in regard to possible solutions to the problem.

So there are two schools of thought in terms of how we solve the problem: there's open the passage, it'll be panacea and it'll solve everything and there's another one which I think is a bit more pragmatic and it's the one that I subscribe to: put some bloody rocks down there –

it's ugly, in an ideal world you wouldn't do that. [...] [At Dutton Way] they put in this rock wall, which is ugly, absolutely ugly, but it solved the problem. That would be the evidence that I would suggest. It bears an example of something that works but it's not pretty. The concern with the passage and look, there's a couple of agendas running with the passage, be aware of it. There are people who philosophically want it opened (Interview, 13).

Another point to be made here is the fact that there seems to be an emphasis on the importance of human-made structures, in particular the hope some community members invest in a protective rock seawall along the foot of the East Beach dunes. The community perception of being protected by the seawall, however, as it was pointed out in the East Beach Coastal Erosion Engineering and Feasibility Study Peer Review (Aurecon, 2010), is unfounded. By contrast, other community responses reflected a belief that adapting to environmental changes implies a more responsive, pragmatic and respectful interaction with nature's forces, as they believed that ultimately 'nature will override what we do anyway' (Interview, 14), and that 'adapting' essentially meant 'to be smart' and 'work with' nature (Interview, 2). Ultimately, nature cannot be controlled by human beings, as one respondent expressed:

Yeah, no good being like King Canute, commanding it [the sea] to go back... (Interview, 16+17) ⁶

The extensive debate around the passage and the wealth of ideas relating to it can only be touched upon here. However, it illustrates a number of issues relevant to the purpose of this study to inform local adaptation and community engagement strategies. Both sides of the debate are founded on individual and collective observations, knowledge(s) and alliances, a fact that needs to be acknowledged for successful government communication with the community. Similarly, the opposing factions are suspicious of each other's hidden agendas, believing that individual vested interests may stand in the way of the common good and considerations for the future of Port Fairy.

In light of these complexities, the situation could be understood as a 'wicked problem' (Ison, 2008; Rittel and Webber, 1973). Wicked problems are 'situations that are contested, difficult to bound [i.e. on geographical, temporal and impact scales], involving many stakeholders with socio-technical features' (Ison et al., 2012). It is unlikely that a wicked problem such as the passage debate can be resolved by simply obtaining more information, especially as reliable information may not be available under the conditions of uncertainty in regard to future climate change impacts. Social learning approaches and purposefully designed deliberative processes, as Ison et al. (2007) suggest, can facilitate approaches that involve experimenting and learning together.

Summary 2: Port Fairy residents are acutely aware of local environmental changes, in particular the eroding beaches and dunes. There is a tendency to believe that this is caused by human-made structures, such as the South-West causeway and the river training walls. Local opinion on how to address the issue is divided into several conflicting factions, including those favouring or opposing an opening of the passage and those trusting in engineering solutions such as a protective seawall. The situation can be described as a 'wicked problem' whereby social, environmental and techno-structural factors interact, producing a potentially difficult situation.

⁶ "Let all men know how empty and worthless is the power of kings. For there is none worthy of the name but God, whom heaven, earth and sea obey". So spoke King Canute the Great [†1035], the legend says, seated on his throne on the seashore, waves lapping round his feet. Canute had learned that his flattering courtiers claimed he was "So great, he could command the tides of the sea to go back". Now Canute was not only a religious man, but also a clever politician. He knew his limitations - even if his courtiers did not - so he had his throne carried to the seashore and sat on it as the tide came in, commanding the waves to advance no further. When they didn't, he had made his point that, though the deeds of kings might appear 'great' in the minds of men, they were as nothing in the face of God's power.' (Written for The Viking Network by Barrie Markham Rhodes, <http://www.viking.no/e/people/e-knud.htm>, accessed 16 September 2011).

3.3.5 Knowledge and local identity

I went back to Cornwall, which is where my father's family is from and my mother's family as well, further back, and I remember feeling like, a sense, and I know it sounds romantic, but a sense of coming home. There was a real familiarity with the land. And I think what it was, was the harshness of the coastline and I could understand now when my grandfather came here, how he must have felt a sense of familiarity, that this is an ok place to settle because it's very rugged. And I suppose, having grown up in a fishing environment, you know, my husband being a fisherman and my mother's family, you grow to have a real respect for the sea. I just think we're at the mercy of – so there is that real respect. And I mean, personally [...] I have a real pull to the sea and a lot of my writing that I do [...] has a real sea sense to it. Not that you would see that immediately, but even the way, the rhythm that I would write in, it seems to have this kind of, I don't know, it's like a lulling, it's just that movement that I associate with the ocean and that's not something that I do, [or] I know I'm doing, it's just something that seems to happen (Interview, 11).

Their environment is of central importance to the residents of Port Fairy. The intimate knowledge of the land- and seascapes are an essential part of the local identity. This sense of belonging has a strong emotional force and is the source of both a belief in the deep value of local knowledge and a sense of responsibility for the land and future generations in Port Fairy.

When we live here, in a sense, we're the custodians of this land. We need to play an informed part in the future of this land and in the future of this village. And if we don't get it right, then that's on our shoulders. In history to come we will be the ones responsible for the damage or responsible for maintaining a beautiful place (Interview, 11).

In keeping with a more general national narrative of place, whereby living with extreme events is perceived as part of being Australian, living with the ocean and its potential dangers is perceived as part of a pragmatic local identity and survival technique in Port Fairy. Over the past generations, this practical interaction with nature meant that the people of Port Fairy adapted to the givens of the local physical geography, as expressed by one respondent who was born in Port Fairy around 1920:

Well, I wouldn't approve of them building out on the beaches. I would've never ever thought that they'd build houses over there [...] Over there, [our?] old house is still there but there was nothing up on the hammocks. At the South Beach, it was never thought that there would be houses but there they built as far out as they possibly can now.

Researcher: So back in the day they wouldn't have thought of building even on the South Beach?

Nah, no. It'd be cold down there! The water – the wind is straight off the water (Interview, 15).

Changes in culture and technology are certainly the reasons for changing settlement patterns in Port Fairy. Better insulation and heating systems allow people to build at sites that used to be avoided for their exposure to the elements. One respondent suggested that the East Beach was originally avoided by white settlers as the whale hunters pulled up the carcasses of the whales here. Local Aboriginal people camping on the dunes were another factor of Port Fairy's early cultural geography.

F: But before that [the 1970s?], the locals wouldn't think of buying property over there [on the dunes].

M: And also they didn't build to the river, they built to the road. And all on the river the backyards of houses between here and the mouth [laughs].

F: Yes, it's only in more recent years that people have started to look at the river as something attractive (Interview, 6+7).

While the river and the ocean used to be the often dangerous, daily work environments, or in the case of the river, were used for fishing waste disposal (Interview, 21 and 1), the focus today, and for many more recently arrived residents, is on leisure and recreation. River and ocean are now mainly perceived as something to look at and enjoy. It can be suggested that these different perceptions, too, are what separates the locals from the non-locals and for some, acceptance of the local environmental conditions is just a matter of a place-based 'common sense'. The kind of knowledge described here has been called 'situated knowledge' by science philosophers who place it alongside traditional notions of scientific objectivity (Haraway, 1991). The term expresses the contextual, embodied, physically involved nature of local experience and knowledge, which is shaped by specific technological and social environments. As this kind of knowledge is based in experience, it is never 'finished', but ongoing, flexibly reacting to changed circumstances.

[T]here's one camp that'll say, well, they should never have built on the dunes in the first place, and perhaps they should never have built on the dunes in the first place [...] and if you think about it, common sense says, how could you even think about building a structure on a dune (Interview, 11)

F: I don't wanna live on the beach. And I think it's only become a trendy thing. I mean no-one, when my grandmother lived over there, no-one wanted to live on the East Beach...this coastal thing's just become a...

M: Yeah, it was considered unstable...

F: This coastal living has just become the trend in the last 20 years ... [...] Yeah, we worry about that. But, uh, we don't live there – in my young days all my family came from the East Beach. [But] they certainly didn't live on the dunes like they do now, they lived on the roadway area (Interview, 16+17).

Would I wanna live there [on the East Beach]? Or would I buy a property there? No, I wouldn't. But not just because [I can't afford it]. I just don't like the idea, living on a sand dune, just right next to the beach, even if humans hadn't changed the Co2 levels, there would be like, to me those sand dunes would sort of move and change naturally anyway over years. So I would be a bit dubious about being, building on there... for that reason (Interview, 8).

Researcher: Would you want to live or build there on the dune?

M: Not especially, I don't think.

F: Mainly because [he's] a great gardener and the sand isn't a great...

M: I knew a chap who had a house up there, between, say Battery Hill and the car bridge for quite a number of years and he said, at various times of the year, mostly during the summer, you get South-East storms that blow in and burnt the leaves of the [...] it's a coastal plant that runs right across, so it burnt that with the salt and the wind you couldn't see in it, caked with salt. So why would you want to live there for a couple of million when you can drive up and 'ah, isn't it lovely today!' And you don't have to put up with all of that (Interview, 16+17).

In the past, observing the coast for most of my life – because I have always been a coastal person, and a beach person – what dunes do, and I can show you right around the coastline, the sea will come in and you get that drop off and it'll collapse and then, if you don't get a lot of high seas the wind slowly softens it down (Interview, 13).

Summary 3: Intimate knowledge of Port Fairy and surrounds is an important part of local and individual identity. It was not considered an entirely 'rational' knowledge by respondents, yet it was trusted for its foundations in experience and 'common sense'. Local knowledge is situated knowledge and can therefore be considered 'adaptive' to place. Local adaptation options considered by respondents ranged from a variety of engineering solutions, to 'working with nature' and the retreat from potentially hazardous sites.

3.3.6 Knowledge and trust

Before we came here, we went and we checked out our block of land and it was on Model Lane and it was in the middle of winter and there'd been a big fall of rain and we saw that the Moyne River had come about three quarters of the way up the paddock that we now own. [...]

And so I actually counted the wooden fence posts down the paddock to see where the water had come to and then enquired with the neighbours next door. In fact the neighbour the next door was the fella who'd built it. So he's been living there forever and was very aware of the rise and fall and the drought and all sorts of things [...] (Interview, 4).

Well, I think when you live in a place, you get a feel for the environment, the place, a sense of the place you live in. You feel it in your gut, you know some things, without understanding why you know. And it takes, you have to live in a place or spend a lot of time there before you get that. You can't come to a place, look at it and go away and have an understanding (Interview, 10).

The pro-active involvement of local residents in monitoring the beach and its changes certainly arises from their concern over what seems to be an irreversibly receding beach and dune area. Being personally involved in observing and potentially preventing damaging change locally, for example through assisting the Friends of Griffiths Island revegetation efforts (Interview, 5), helped to counteract the sense of abstractness and powerlessness people often describe in the face of global climate change debates. While this local commitment is certainly part of people's identification with 'their place' in Port Fairy, it is also driven by a lack of trust in studies conducted by external consultancies as well as by delayed implementation of subsequent actions. While a trust in scientists could be observed in regard to the general discussion on climate change, this trust did not wholly apply in the context of local changes and potential solutions.

[T]he other thing that I'm concerned with and that I hope they're doing, although we don't have too many old folk left in this area, are they consulting the people who've lived here the longest? Are they consulting the fishermen who've worked these waters for years and years, if not generations of..? They're the people they need to be talking to as well. These are the people who are hands-on, you know, they're there. I don't know, are they talking to those people? (Interview, 11)

Local and intergenerational knowledge is valued very highly by Port Fairy residents as it is an important expression of their belonging to place. In some instances its authority may be perceived as higher and more reliable, or at least as indispensable in complementing scientific and engineering assessments conducted by 'outsiders' lacking intimate knowledge of Port Fairy's environment. Issues of trust and local knowledge authority may be linked to a suspicion of 'outsiders' working in the interest of an external developer or that external experts may not understand local conditions, due to not spending enough time in Port Fairy or ignoring local expertise. For example, some community members at the Port Fairy Community Coastal Challenge meeting claimed that vital information pertaining to the East Beach, and related issues, was being withheld from them (Participant observation notes, 2011).

Local knowledge, the sense of belonging and the community's perceived responsibility for the locality of Port Fairy are of central importance for the sense of an enfranchised local identity. This importance must be emphasised for policy and practice considerations, particularly when engaging the community around adaptation measures.

[T]he DSE did what they could but [...] they finally finished up with a coastal engineer from Queensland. And I just don't think that that fellow had the expertise for the local environment and the understanding for the local environment. [...] I mean, there's no particular perception that the sand, for instance, in Port Fairy, is quite exceptional in that it's very, very fine sand. And highly likely to be mobile in water. Therefore you haven't got the resistance of heavy silicate sands that actually sort of sit together and hold or bind [...] this stuff just gets carried away... (Interview, 9)

But hang on a minute, you know, everybody is entitled to an opinion and as I said to you, I hope we don't just listen to the opinion of somebody who has so many letters after their name that we go, this is it. No offense to that person who has all those letters after their name... [laughs] Yeah, you need to have been here and lived here to be a part of it as well. I mean, not that that doesn't make (sic) you the expert but it gives you some right to be part of the decision-making (Interview, 11).

You know, it is dramatic out there, though. I've spent a lot of time out there, both because I presented evidence at this panel and did a lot of work because what worried me was that again, it was being dominated by, naturally, QCs from Melbourne and experts who lived in Melbourne, who'd come down and spend a couple of days down here and take their evidence back and then spout this, and to me, I thought, we were just gonna be steamrolled by all these so-called experts, who were there, theoretically to help the panel but in most cases they were arguing the book of the developer... (Interview, 9).

Another related concern is that local and state government authorities may not have sufficient capacity to appropriately interpret scientific information and that decisions are therefore delayed or based on the misinterpretation of data.

The tendency, I think, of people is to take it at face value, the advice that the experts give. That puts the experts in a very difficult position because they understand that they're being wholly relied upon and they have to have huge amounts of insurance, they have to word their reporting cleverly so if there is any mistake and it falls back on them, they can go, ah, it was said like this, which can be interpreted in this or in that way and we can get out of it that way. So you know, the lack of government expertise to interpret the information they're given by their expert advisers, paid expert advisers who have a vested interest in the information they're producing and they have a reputation to safeguard and that sort of thing, the whole situation is compromised (Interview, 10).

Finally, considerable and mounting frustration that this knowledge is not feeding directly into urgently needed action on the beach speaks through the following quotes:

All this money has been spent on studies and reports and all but nothing has happened, we still have no answers! (Participant observation notes, 2011)

We don't need a study to tell us that unless something is done about one particular section of the beach adjacent to the old tip site there could be a catastrophe of monumental proportions. All we have to do is walk along the beach with our eyes open (Editorial, The Standard, 29 January 2011, Pendergast, 2011b).

Summary 4: Trust in local knowledge is strong. External knowledge may be distrusted, in particular where local knowledge is not consulted. While there is some local consensus that more data are needed to effectively address the erosion, lack of direct action following previous studies has led to a community perception that money has been wasted on inaccurate or irrelevant studies and a loss of trust in governing institutions.

3.3.7 Knowledge and communication

We need to sit down and have a good discussion, I feel that people haven't had enough time to air their opinions (Participant observation notes, 2011).

The erosion at East Beach is the 'talk of the town' and the reason for the recent establishment of the Port Fairy Community Coastal Challenge group, which brings together those concerned about the issue, regardless of their standpoint in the passage debate. The group endeavours to be a

forum for the exchange of different knowledge(s) and opinions in order to present the community's perspective and signal their readiness for action to local and state governments. The importance of this and similar groups for local dynamics and morale is significant and should not be underestimated. Community debate is one of the central drivers of local decision-making processes and many community members feel that the opportunity for exchange and discussion as the basis of informed opinions has been missing to date.

[I]t's about having that discussion. [...] We gotta sit down and say, ok, what is the risk? The risk is East Beach. Is the risk purely a cosmetic risk, is it an economic risk, is it an ecological risk. How do we actually assess that? And then once it's assessed, what do we do emotionally, economically, environmentally, to address that risk. I honestly believe we haven't done that kind of thinking or discussing here. With all due respect for the science and a whole lot of work is going on, and a hell of lot been done, there's no doubt about that. But what's the outcome that we want? (Interview, 14)

Some respondents also expressed the hope that improved communication structures and knowledge exchange may enable existing factions in the community to better understand and reconcile opposing standpoints. This was further emphasised in the follow-up workshop with participants. However, the inaugural meeting of the Port Fairy Community Coastal Challenge group (PFCCC) demonstrated the importance of leadership providing structures that facilitate such complex and potentially conflict-laden discussions. Attendees the researcher spoke to after the meeting felt that valuable momentum had been lost due to the meeting's lack of planning and structure. This first meeting, some also felt, was dominated by spokespeople of one particular faction. This, and the sense expressed by some respondents that 'another committee' (Interview, 3, 16+17) would have to face similar institutional challenges as already existing community groups dedicated to instigating change seemed to discourage further involvement for some participants and led to a much lower attendance rate in the following meeting.

Aspiring to be the 'ears and eyes' (Workshop participant notes, 2011) and perhaps the voice of the community, the PFCCC strives for neutrality on particular issues such as the passage debate. Rather, the group aims to consolidate community based views about best coastal and river management options to facilitate community interaction with government authorities, to open and maintain lines of discussion for informed participation in decision-making. Being 'part of the solution' is the group's central aim (PFCCC Statement of Purpose, 2011).

So I think from the groups in town here, there's two minorities, one for and one against or whatever. And I think that each has got deeply credible positions but not convincing positions, if you know what I mean. So that's where I think that the community, or the communities, need to have time to sit down and just talk it through. [...] [L]et's put all the cards on the table and have a good talk about it. But accepting that if I can't accept your position, then I'm not an idiot... [laughs]. Because that's not the case, there are some very intelligent, non-idiotic people around who might have a different view to me. And my concern is that we haven't had... and the display we had at Seacombe House [the Port Fairy Open Day] – well, that's not a discussion, that's a demonstration, that's information. And I actually looked around all the data there and thought it was interesting and I'd like to see some more. [...] I think it's important that we are allowed to have the discussion as a – I say community – but also as a culture. Because the culture we're having now is driven by media [...] and we don't have the time to think things through. And that's detrimental to our culture, and detrimental to our communities. That's where I'm at with this issue around here (Interview, 14).

3.3.8 Knowledge and the role of local government

When asked about their expectations of local government, respondents generally acknowledged that,

[T]here is 'only a certain amount [of things] that councils can literally do' (Interview, 2).

I think in principal the Shire aren't too bad, I mean there are certain things that I like that they don't do or that they do do, but by and large I think they're really governed by grants they can get, again, it's political. There's a group that lobbies harder than some others (Interview, 1).

Most respondents saw the role of Moyne Shire Council in facilitating knowledge-making, communication and action through the provision of necessary structures. For example, one respondent told of a regular, now discontinued, meeting organised by the Council.

I used to attend meetings which the Shire arranged for skippers of boats. Now, they don't do it anymore for some reason... and we could go along and air our grievances if we had any or any suggestions we might have. It was quite a good meeting. That's stopped. But there used to be an old chap, he was an engineer, I think, he used to come to all meetings, and he used to tell us, we talked about all kinds of things, he'd tell us, "The problem with Port Fairy is the passage. The passage should be opened" (Interview, 1).

Among the things residents expected from Council were the provision of sustainable infrastructures, such as recycling bins, water tanks and insulation, and education and information on environmental risks and corresponding regulations. Governments, as one respondent said, needed to protect people against buying real estate on potentially unsafe land.

And that's where councils and governments, I think, have a role in... protecting people against opportunism. And for these guys here, who might have properties worth 2 or 3 million dollars, that, if you have a real sea height change, aren't gonna be worth that. That's true all around coastal Australia, people have been opportunistic and have lovely places on the edge of the sea... (Interview, 2).

On the other hand, respondents also saw a danger in encouraging an overly paternalistic, top-down view of government as this would lead to a number of problems, including an 'over-the-top bureaucracy' (Interview, 21) and the deferral of private risk.

I think [...] in protecting a community from the effects of changes, everyone's gotta take a role in it. These houses along the river front are very pretty, they're nice to be in. At the time the houses were built, they knew that it was on the edge of the river, and you know, at times you've only 50 centimetres above the river height. So there's sort of gotta be a bit of an individual responsibility in it (Interview, 2).

The tendency to rely on engineering solutions and government interventions, some of the interview responses seemed to suggest, is interlinked with a view of nature as ultimately controllable by human activity. By contrast, long-term locals or respondents who used the river and ocean professionally or recreationally and therefore had physically experienced the ocean's forces, seemed more ready to accept a level of unpredictability of natural events. Because 'nature changes all the time' (Interview, 2, 5, 13 and others), there was also an understanding that adapting and protecting cannot produce final outcome solutions but need to be thought of in terms of process.

For me, the quickest and probably the cheapest solution is to put a decent rock wall in there. Along the beach edge itself. They need to be put down probably, now they look like they've just been tipped off the backs of a truck by the look of it. I think they need to be placed and to be monitored. It will require ongoing work, for as long as there's human existence, I suspect.[...] And forces of nature, the amount of swell that, it's more dissipated waves, that surge in the passage, well, they'll lift rocks up and put them on the road there. There are instances of that all the time. So the forces of the ocean are just enormous (Interview, 13).

Talking about the Port Fairy floods of 1946, which inundated large parts of the town for many days and claimed several lives (Interview, 15), one respondent pointed out that there was a tendency for people to 'look at bigger things [the flood/ climate change] and forget the little things [causes of disaster in the immediate environment]' (Interview, 21). In the case of the 1946 floods, local story

has it that in addition to poor drainage and the unfortunate concurrence of heavy rainfalls and high tides, vital drainages were, by local oversight, blocked by tree debris. In this context, the respondent warned against a false sense of security and complacency:

It's gonna happen again, it could happen anywhere, we can't protect ourselves from everything. [...] Government regulation can just be too much, I mean, fires and floods, they just happen. It's a Mother Nature thing. [...] The East Beachers tend to defer responsibility to Council – they knew the risk when they built on the dunes but what can the Council do? [...] People should respect nature more, you never know what's gonna happen (Interview, 21).

We're on the edge of the Southern Ocean, we're gonna get storms and they can be absolutely fantastic! [...] [B]eing on the edge of the Southern Ocean when a good storm comes through, it's humbling (Interview, 2).

Nature, this understanding speaks through many of the interviews, cannot be controlled. Long-term government planning, while necessary, does not replace the local perspective and alertness of people on the ground. Responses gathered by the researcher from interviews with locals and at the Port Fairy Community Coastal Challenge meeting suggest that there is some frustration over the fact that people built on the East Beach dunes against better common sense and 'now expect Council and State Government to take care of it' (Participant observation notes, 2011). Several respondents expressed a frustration about the 'nanny state' (Interview, 16+17) – as represented by government regulations designed to prevent potential liability and litigation issues, and which they felt unduly relieved people of their responsibilities, preventing them from 'owning' risks. The discussion between some of the interview participants at the follow-up meeting organised by the researchers brought another the insight to the fore: taking individual and collective responsibility for actions or lack of actions was seen as a way of proactive self-empowerment (Workshop participant notes, 2011).

I would love for governments to legislate that you're responsible for own self and you can't sue someone if you tripped on something. You know YOU tripped! (Interview, 16+17)

And very few people put their hands up and say, look, we've got this wrong. Not just with climate but with anything. Most people look at who they can blame. And that's across the board – look at public liability and the ridiculous state that's in. Surely it's your own responsibility if you trip over a rock or something...well, anyway (Interview, 13).

The question of how to foster 'private ownership of risk' in local communities, on the other hand, is also an important question for community planners and policy makers, revealing a complex dynamic between individual, collective and governmental understandings of roles and responsibilities. This complexity may be based in mutually generated expectations. For example, members of the community articulated their frustration about the sense that local and state governments underestimate the local capacity to understand and act on changes and for this and other political reasons act as self-appointed 'gate keepers' of information.

In relation to this, another important point brought up at the follow-up workshop pertained to the loss of information in the hands of state and local government due to changes in staff and departmental responsibilities (Workshop participant notes, 2011). In some cases, as several workshop participants said, years of data collection were lost and had to be regained leading to a sense of powerlessness and frustration in the community. How such knowledge was used; 'where it goes' and how it could be better preserved and 'localised', for example, by sharing it with the community so that it could become part of existing local knowledge; and how it could be used to 'better educate ourselves and government' (Workshop participant notes, 2011) were central questions of this discussion. In particular, the researcher's interpretation of interview responses that 'local knowledge was considered adaptive' resonated strongly with some of the participants. Expanding and preserving this knowledge in the community and towards urgently needed action was one of the central concerns surfaced by discussions in this follow-up event.

I suppose, to a large extent, it's knowing what's going on and making our voices heard and if some really dumb ideas come along, of making sure that you can try [to] bring some sense... [to it] (Interview, 2).

M: [I] feel a bit powerless... It's a bit like [inaudible]. We can just see this process before our eyes and...

F: And nobody seems to... We've been going to meetings probably for twenty years! And nobody seems to want to bite the bullet and do anything about it, I think (Interview, 16+17).

And government's assumption that [...] as a community we're not intelligent enough to understand the difficult things. We just don't have the intelligence. I so much object to that. Okay, some people are less clever than other people. But everybody has a fantastic brain in their head. Even the [...] least bright among us is capable of understanding very, very complex issues in their own unique way. And yes, and that needs to be recognised in the way that communities are managed. We have to acknowledge the intelligence of the community rather than assume the lack of it (Interview, 10).

Practices of adaptation to environmental change and associated decision-making processes begin with the making of knowledge but also involve a number of other, socio-cultural and individual issues, such as the question of who or what is the source of knowledge and how this knowledge is communicated. For example, in climate change and adaptation contexts to date, scientific environmental knowledge has tended to be prioritised over local or so-called non-expert knowledge. This is problematic in a number of ways because it:

- Leaves untapped valuable local, long-term observational and traditional knowledge(s);
- Creates a language and concepts that are exclusive of lay or non-expert knowledge(s);
- Creates issues of trust and credibility due to who the 'carriers' of knowledge are, such as the media, outside scientific or engineering experts or consultancies with little understanding of local socio-environmental contexts, and their actual or suspected, underlying economic or political agendas;
- Has a tendency to take away local authority and diminishes opportunities of local participation in decision-making.

Due to their high level of involvement in local issues, the community is well informed about most environmental and planning issues in Port Fairy. However, the complexity of interactions between human-made structures and the physical environment means that new information alone is not a sufficient recipe for action. It involves a number of communication and decision-making processes, shaped by opposing opinions and factions in the community, as well as by a variety of organisational structures and institutional players. Decision-making for adaptive behaviour will depend on a number of factors, including whether changes are viewed as effects of so-called natural cycles, assuming a certain predictability of their scale (i.e. local, temporal, expected level of severity) or whether they are seen as influenced by global climatic changes, which produce an amount of uncertainty in regards to how predictable they are. Other, related factors might include whether an adaptive solution is seen as a final outcome or whether it is understood as a process of ongoing adapting. From an adaptation point of view, these factors can potentially aid or constrain the community's ability to act in adaptive ways.

This chapter focused on perceptions of local environmental changes in Port Fairy and what the community in Port Fairy considers as their particular needs and issues in regard to these changes and corresponding actions. Understanding the community's point of view is an important policy-relevant element of engaging communities with current or projected environmental impacts, and in order to build and strengthen their capacity to adapt to change. In particular, it is suggested that such an understanding can inform locally meaningful policies and social and organisational structures.

Summary 5: Good communication between factions of the community and government authorities is central to knowledge exchange, learning and the building of mutual trust.

Underlying beliefs and socio-cultural perceptions need to be discussed, reflected and tested in regards to their viability. For example, this includes potentially accepting the limits of human control over natural processes. Clarification of mutual expectations, roles and responsibilities between members of the community and government authorities is needed. Significantly, there was a view that community voices were not given enough space for their articulation. Deliberative processes and local influence on decision making and implementation were experienced as

3.4 Determinants of adaptive capacity in Port Fairy

3.4.1 What is adaptive capacity?

Adaptive capacity is an important concept for adaptation planning. Alternative terms used in the adaptation literature are ‘coping capacity’ (Turner et al., 2003) and ‘capacity of response’ (Gallopín, 2003). Adaptive capacity is strongly related to the concepts of vulnerability and resilience. However, the meanings and foci of these three concepts differ greatly across common parlance, the social and natural science disciplines and in policy and adaptation planning, frequently hindering productive collaboration and communication (Fünfgeld and McEvoy, 2011; Gallopín, 2006). In any such collaboration it is therefore imperative that all members reflect upon the diverse meanings given to operative concepts.

In the following, definitions of vulnerability, resilience and adaptive capacity commonly used in climate adaptation contexts will be introduced briefly. They are then discussed in relation to local perceptions and conditions in Port Fairy, with the aim of contributing to policy-relevant understandings of what makes people on the ground vulnerable, adaptive and resilient.

Vulnerability

[L]ovely homes have been built there [on the dunes] but they're not homes that can be shifted (Interview, 15).

For the context of climate change adaptation in coupled human-environment systems, the Intergovernmental Panel on Climate Change (IPCC) definition of vulnerability is the most commonly applied:

[Vulnerability is] the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (McCarthy et al., 2001).

In practical terms, the actual aspects of vulnerability differ according to the nature of the system at hand, or as Fünfgeld and McEvoy (2011, p. 28) explain it, according to the practical interests and needs as constructed by its users:

For example, a local public health care system may be described as ‘vulnerable’ to the climate change impact of heat waves due to the large proportion of elderly people with limited mobility; urban parks, gardens and green space corridors may be described as a system with limited adaptive capacity to a reduction in average rainfall and more frequent extreme temperatures, and so on.

In defining social vulnerability, the emphasis has mostly been on socio-economic perspectives throughout the adaptation literatures, to determine which population groups are most vulnerable to climate change impacts (Adger, 2006). Although it is commonly assumed that social vulnerability is

an effect of geographical and socio-economic inequalities, Waters et al.'s (2010) recent study of a Victorian community shows that the specific assumption, 'low socio-economic status equals high social and biophysical vulnerability', is not necessarily applicable in the same way and in all contexts in Australia.

Similarly in Port Fairy, dune living is affordable to the affluent. High real estate values and the fact that many residents are retirees make this group potentially more vulnerable (in an economic sense) than other town residents. However, in addition to age and socio-economic status, this geographical distribution of vulnerability is influenced by individual and cultural factors as well.

So flooding all along there [the Belfast Lough] from the river is already a big problem and with the breaching of the dune, this was identified as a possible disaster scenario, how are you gonna get off East Beach and of course a lot of the people that live there are ... people that would need some help. [...] Because they're elderly and infirm, so a lot of sea-changers... So we have a vulnerable community over there (Interview, 10).

Aw, low lying areas like this, I'd be like, whoa, just have to build somewhere else. That's, you know, depending on how much money people want to spend on trying to keep something. And I know a lot of people [who] would want to but it might be just, you might find that it's not viable. [...] Well, I'm renting this anyway, I'm not a landowner, so...so that's probably why I'm probably less concerned about it. Than other people might be... (Interview, 8).

It is suggested that exposure to risk in Port Fairy is also connected to factors such as intergenerational connection to place and local, or situated knowledge. For example, some long-term locals inherited family property located within the boundaries of Port Fairy's previous 'cultural geography', i.e. not too close to the ocean or the river. Having experienced the potential dangers of river and ocean, or knowing of them via earlier generations, may lead people to interact more cautiously with the 'forces of nature'. By contrast, unless they experience them personally, such dangers may appear as theoretical and intangible to holiday-makers and sea-changers attracted by Port Fairy's recreational values. As many respondents expressed, it can be hard to fully comprehend the implications of merely abstract, intangible information.

You know, I can't imagine that the sea, the beach coming up to here (Interview, 8).

And the roar! [of the 1946 floods] Oh, the roar I could never forget (Interview, 15).

Local perceptions of vulnerability may differ from more conventional definitions involving hazard exposure and the concept of sensitivity. Existing coping mechanisms may further modify individual perceptions of vulnerability. The majority of respondents felt safe from flooding, irrespective of where they lived in Port Fairy. While it was not within the scope of this social research to make vulnerability assessments of individual properties in Port Fairy, local flood studies confirm that parts of the town would be isolated in the case of a flood and have in fact often been in the recent past (Glenelg-Hopkins CMA, 2010). Individual perceptions in the community of their vulnerability to environmental impacts should therefore be tested for their validity as these perceptions can be based in self-protective psychological mechanisms such as denying or simply ignoring a threat and therefore lead to increased vulnerability (Harries, 2008).

There'd been a bit of a flood study happen before the flood that happened the year before, so that was probably 2009. And the results of the flood study had been that we're all fine and safe on Model Lane [land along the Lough], our envelopes are all ok, we shouldn't get flooded, so then all the blocks of land went for sale and they'd been selling up but it was very interesting to see when the flood came, the swelling of the river at the Moyne near the bridge at Killarney, there's a house that's down on Lydia street that was just inundated with water! And I thought, God Almighty! That house has been there for, I don't know, maybe 60, 70 years or something. I spoke to the people, and they said, yeah, it was a big flood and la-di-da... I'd spoken to people who had gone to school, they're like in their, maybe sixties, and they had gone to school past that house and they remembered seeing people

coming out like on a boat from that house to get a bus on the road and if it was too flooded, they just didn't go to school. And that was regular occurrence.

Researcher: So that house got flooded...

...all the time! And yet still people kept buying and living there. I don't know, how old, I don't know how long that family that's living there has been living there, whether it's a generational thing and the house gets passed on, I don't know. But it was an amazing story to hear (Interview, 4).

Resilience

The concept of resilience and its meaning, usefulness and relevance for policy and practice are possibly even more contested in the literature than that of vulnerability (Fünfgeld and McEvoy, 2011; Gallopin, 2006). Similarly, popular understandings, particularly in the context of rural Australian cultural identity narratives, may equate 'resilience' with 'endurance of' or 'resistance to' environmental stresses (Anderson, 2008; 2009). Thus, the meaning of 'resilience' varies according to the context of the concept's usage and can refer to psychological, social, physical or economic resilience etc. In adaptation policy discourse the notion of resilience is often taken to mean the opposite of vulnerability and used as an affirmative term towards actions such as in the building of 'climate resilient communities'.

Some theorists see a fundamental distinction between vulnerability and resilience, wherein 'vulnerability refers to the capacity to preserve the structure of the system while resilience refers to its capacity to recover from non-structural changes' (Gallopin, 2006, p. 295, emphasis added). Other definitions show further variations in their focus, describing resilience as,

...the ability of a community to resist, absorb, and recover from the effects of hazards in a timely and efficient manner, preserving or restoring its essential basic structures, functions and identity (Dazé et al., 2009, p. 6).

When relating the resilience concept to social processes of climate change adaptation, Fünfgeld and McEvoy (2011) distinguish at least three different meanings as found in the literature:

- Resilience understood as response to disturbance;
- Resilience understood as a system's capacity to self-organise;
- Resilience as the capacity to learn and adapt.

Resilience thinking has its roots in ecology (Holling, 1973). However, in human-environment systems, the key component of resilience, as the discussion shows, is described as the human capacity to respond to change. In this context, resilience approaches generally involve learning from experience, and a community's capacity to self-organise. In light of the present findings and as the quote below illustrates, this socio-cultural perspective on resilience approaches can be expanded by suggesting the importance of psychological and motivational factors, such a sense of belonging, personal responsibility and the ability to act collectively and autonomously if this is needed.

So if we're gonna have a resilient community that means we have to be able to look after ourselves, because everybody is going to be in deep water, so to speak, everyone is going to be in trouble, everything is going to become urgent. And when things are urgent, they're expensive, there isn't any money. Yeah, so, the local knowledge is incredibly valuable, it isn't, it hasn't yet been tapped as a resource and also if people don't engage in trying to solve the problem, they're just going to be frightened and they're going to leave. Whereas if they're a part of the solution, then they will feel more attached to their place. And they'll want to stay and fight it out and make it work. And that's what it's going to take. And we don't want people to leave and we can look after each other. I believe that (Interview, 10).

Adaptive capacity

[Adaptive capacity is] the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (McCarthy et al., 2001).

Gallopín (2006, p. 300), in declaring resilience an important subset of adaptive capacity, summarises two central components of adaptive capacity:

1. [adaptive capacity is] the capacity of coupled human-environment systems to be able to maintain or even improve its condition in the face of changes in its environment(s)
2. the capacity to improve its condition in relation to its environments even if the latter does not change.

Both components of adaptive capacity stated by Gallopín (2006) imply the principle of improvement of a system relative to its environment or, in coupled society-environment systems, the capacity to learn and adjust components of the societal system to its environment. It is important to emphasise in this context that the state of 'being adapted' to a stable environment is not the same as the 'capacity to adapt' to changes in that environment (Gallopín, 2006). Collins and Ison (2009) accordingly define adaptation to climate change as 'co-evolutionary social learning', whereby a society's knowledge and skill set evolves, in both reactive and anticipatory ways, with changes in the environment. These processes include, but are not limited to, practical local knowledge(s).

My background is farming and to survive in that you have to be fairly pragmatic (Interview, 13).

He [my son] runs the farm now, running cattle and sheep [...] He had a lot of feed but eventually, he ran out and had to buy in feed [during the drought]. Some years are good and some are not...so he stores feed for bad years... (Interview, 15).

Various forms of knowledge (including experiential, situated and practical knowledge, or skills) and knowledge exchange are central to the understanding of place and of ongoing learning processes. Yet, as Chapter 3 has demonstrated, a number of additional factors determine knowledge-action trajectories and are therefore important components of adaptive capacity. Adaptive capacity, in simple terms, necessarily involves the capacity to act upon existing and emerging knowledge capital, or as Dazé et al. (2009) summarise:

One of the most important factors shaping the adaptive capacity of individuals, households and communities is their access to and control over natural, human, social, physical, and financial resources' (Dazé et al., 2009, p.5).

Adaptive capacity comprises the capacity to act autonomously, individually as well as collectively, and spontaneously as well as planned. It is therefore linked to a society's institutional arrangements, such as the laws, customs, norms and associated organisations that regulate that society. This includes (a) policies and regulations, (b) commonly accepted but not legally binding rules, and (c) organisations, such as levels of government but also community organisations. Institutional arrangements in turn are based on customs and traditions, and are influenced by prevailing belief and value systems. Such institutional arrangements bear on other aspects of adaptive capacity, including political will, the availability of time, financial and human resources, the as well as structures that allow for or hinder the collective sharing of individual expertise, knowledge and experience (Fünfgeld and McEvoy, 2011).

3.4.2 Barriers to and enablers of local adaptive capacity in Port Fairy

I'd help pull rocks out. If you get people physically and morally behind something you can do a lot, I think. Rather than leave it to politicians to procrastinate – if they think there's a will there, they will then act upon it, I believe. God knows, there's been enough will here but they haven't done that... [laughs] other than have report after report (Interview, 16+17).

Based on the interviews with local residents, this section identifies what may potentially help or hinder the community in Port Fairy to adapt to environmental changes. ‘Barriers’ and ‘enablers’ of adaptive capacity have been broadly categorised and tabled to facilitate readability. It is important to note that categorisations, by definition, simplify complexity. This means that the categories of enablers or barriers of adaptive capacity listed below may often overlap. We do not subscribe to a strict separation of so-called purely ‘rational’ or ‘irrational’ (i.e. subjective, emotional) foundations of decision-making. For example, as changes to the town-scape may affect lifestyles or disrupt individual memories and identity narratives, these aspects will have an influence on decision-making, to an equal or lesser extent as other, economic or safety considerations. As constituents of the community and its interactions with the local environment, individual and collective relationships to place are valid and important factors of adaptive behaviour.

The following sections list barriers and drivers of adaptive capacity in Port Fairy as they emerged from the preliminary analysis. Four broad categories have been established:

- Socio-cultural Factors
- Economic Factors
- Individual, psychological and emotional factors
- Institutional factors (both formal and informal)

The tables list barriers and enablers according to their categorisation. The columns on the left names what has been identified as a barrier, moving to an explanation of why it is considered to be a barrier. The columns on the right list corresponding or relevant enablers that may help to address existing barriers as well as drive adaptive capacity. The chapter closes with a summary of what has been identified as existing community strengths that can enable adaptive capacity.

What is the barrier?	Why is it a barrier?	Enablers
<p>Language/ concepts: Perception of climate change as ‘expert field’</p> <p>The language around climate change is scientific, abstract and exclusive</p> <p>‘Climate change’ is a politically charged concept that polarises people along value and belief systems</p> <p>‘Language of doom’ around environmental changes (global and local)</p>	<p>Diminishes people’s ability to form informed opinions and participate in climate debates and actions</p> <p>Leaves untapped so-called ‘non-expert’ knowledge(s)</p> <p>Weakens credibility of the concept and associated scientific and political debates</p> <p>May lead to feeling of powerless, and react with resignation, denial or fatigue</p>	<p>Strong commitment to local environment/ sustainable practices</p> <p>Good local knowledge base:</p> <p>Observational knowledge, practical, historical and intergenerational experience</p> <p>Local knowledge carriers / ‘community champions’ speak ‘local language’, i.e. practical, non-scientific</p> <p>Pragmatic, ‘hands on’ community attitudes</p>
<p>Conflicting factions in the community (political economic/ identity factors) For example, the passage debate; ‘Irish identity:’ Buildings unsuitable for Australian</p>	<p>Polarise and hamper decision-making processes</p> <p>May lead to resistance against</p>	<p>Diversity of interests, values, knowledge and skills in the community can be utilised for innovative adaptive actions.</p>

climatic conditions;	adaptive change such as planting trees	
Cultural expectation that positions governments as 'paternal authority' – both community members and levels of government	Deferral of risk and responsibility (community) Caution/ long and bureaucratic decision-making processes (government), which are experienced as inaction by the community.	
Culturally entrenched belief that humans can control nature through engineering solutions Reliance on human built structures for protection	Engineering solutions are often cost intensive May not be reliably safe, or produce unpredictable long-term effects under the conditions of uncertainty in climate change contexts, i.e. produce maladaptive responses	Wealth of historical local traditions/cultures/experiences of living 'at place' and dealing with extremes

Table 1: Socio-cultural factors (including language, values and beliefs)

What is the barrier?	Why is it a barrier?	Enablers
Individual and municipal economic interests Heritage character as tourist drawcard	Conflict with adaptive measures, environmental or safety concerns, for example, unsafe/unsustainable development May prevent planting trees/ retrofitting of buildings	Economic concerns can also be environmental concerns (loss of beach; ocean pollution) and can therefore act to galvanise community factions towards adaptive actions.
Town growth and related planning issues	May increase vulnerability of people and buildings Different interests and concerns can further entrench factions	
Limited financial resources/ autonomy in local government	Long funding application processes delay action Increase work load for local government and hinder decision-making Slow implementation of necessary actions	
Liability issues/ high insurance premiums	Get in the way of smaller community organisations/ volunteer action	Well functioning, community based organisational structures (Community House)

Table 2: Economic Factors

What is the barrier?	Why is it a barrier?	Enablers
Lack of trust in external experts and government agencies	Low level acceptance of external expert knowledge and resulting adaptation measures	Broad knowledge and skill base in the community (i.e. resident engineers, flood planners etc.) who know local culture and issues/ speak 'local language'
Lack of belief in personal influence/ community impact on decision-making and action, sense of powerlessness	Deferral of risk and responsibility to governments No motivation to act	Strong culture of volunteerism and personal commitment to local, social and environmental causes Good social and organisational networks
Low level credibility of government action: consultation fatigue, no perceived results, lack of cooperative knowledge exchange between community and government	Creates lack of trust and 'us versus them' mentality (Interview, 10), whereby factions between community and government are potentially entrenched at the cost of	

	collaborative action	
Reluctance to accept changes that may disrupt personal memories and identity narratives	Reluctance to accept adaptive measures with high visibility impact on the town	Strong sense of belonging to place and dedication to preserve Port Fairy and its environment for future generations
Need for feeling secure may lead to denial/ ignoring issues	Belief in human-made/engineering structures – techno-scientific solutions can lead to a false sense of security and low risk perception	
Different perceptions of priorities (i.e. the problem of the landfill site needs to be addressed urgently)	Entrenches factions and delay actions	

Table 3: Individual/psychological/ emotional factors

What is the barrier?	Why is it a barrier?	Enablers
Lack of facilitated communication/ knowledge exchange in the community Community sense of 'not being heard' by government authorities	Entrenches local factions and perpetuates misunderstandings Leaves local knowledge and skills resources untapped Engenders community frustration, sense of powerlessness, weakening community initiative	Diversity of knowledge(s), experiences and value systems can contribute to the development of innovative responses Existing local skill sets/ community leaders with leader qualities can help facilitate communication
Loss of / lack of access to information held by government	Diminishes sense of individual risk and responsibility Prevents knowledge and skill innovations	
Lack of transparency of information/ communication between governments and community creates 'us versus them' mentality	Leads to a lack of trust in government authorities Hinders productive collaboration	Existing social and knowledge networks can combine expert and non-expert local knowledge(s) towards innovative solutions/learning processes
Lack of direct community impact on decisions/actions	Creates sense of powerlessness, deferral of responsibility, denial, fatigue, stifles local initiative	Strong local culture of volunteerism/ commitment to local, social and environmental causes
Local government lacks financial and decision-making autonomy from state government	Inflexibility, slow decision-making and implementation processes	
Long, bureaucratic decision-making processes on all levels of Government	Inflexibility, inhibits spontaneous action	
Liability/litigation issues	Hamper volunteer action Diminish sense of individual risk and responsibility	

Table 4: Institutional factors (both formal and informal)

3.4.3 Existing enablers of adaptive capacity in Port Fairy

The analysis of local narratives identified the following socio-cultural and institutional characteristics of the Port Fairy community as enablers of local adaptive capacity.

- Good social networks and high level commitment to community action

- Strong sense of place, belonging and responsibility for the local environment
- Strong commitment to contributing local expertise, skills and labour to actions that have been determined as viable solutions
- Good local, experientially based understanding of socio-ecological systems
- Existing organisational structures and experiences that facilitate community action
- Broad and diverse local knowledge and skill base, including professional (engineers, environmental planners), situated knowledge and skills (farmers, fishermen), organisational, activist experiences (festival committees, transition towns and other local groups)
- Strong historical memory/knowledge of past events and responses
- Understanding of systemic complexity of human-environment interactions, i.e. willingness to consider different aspects of an environmental issue and related expertise.
- Understanding of the process-character of adaptive responses.
- Diversity of experiences and value systems facilitates interactive and mutual learning that can lead to the development of innovative adaptation responses.
- Existing expertise in deliberative techniques and process designs, as well as broad practical skills basis is well represented and can be expanded.

The above is a good basis for the improved design of local participatory processes for governance and practice.

4 CITY OF MELBOURNE CASE STUDY

4.1 Selection of the case study area

Given our collaboration with the City of Melbourne Council, our case study areas were selected according to the administrative boundaries of this municipality. Within this area, we decided on the suburbs of Carlton and Docklands for a variety of reasons (See Appendix 1 for Location Map). As Council had established two community development projects, 'Opportunities for Carlton' and 'Docklands – The Second Decade', we benefited from Council's initial demographic mapping and existing networks with local community agencies, as well as some contacts with residents and business owners. Additional factors for our selection included the diverse histories, geographies and demographics of Carlton and Docklands.

It should be noted that in determining the geographical boundaries of the case study areas, we were primarily guided by our interest in the factors influencing the communities' adaptive capacity from a social science perspective. In terms of thinking of local communities as components of a coupled society-environment systems that extend well beyond municipal boundaries, our selection necessarily provides a segmental, locally specific snapshot of this system.

4.1.1 Stakeholder mapping and participant recruitment

In selecting participants for our research, our aim was for a sample composition that reflected the ethnic, cultural, political and socio-economic diversity of the communities and the range of different experiences in our three case study areas. In particular, we were interested in engaging people who are not regularly active in local community activities and decision-making processes. In our urban recruitment was based on demographic data as supplied by the City of Melbourne Research Section and the Department of Planning and Community Development.

Initiating our recruitment in the City of Melbourne case study, we utilised Council's existing contacts into the community, which in the majority consisted of contacts within local community agencies, such as the Docklands learning hub, North Yarra Community Health and Carlton Neighbourhood Learning Centre, local business and residents associations; the 'Couch', a CBD based meeting place for international students, church initiatives like those run by the Church of All Nations in Carlton as well as community initiatives such as the community garden in Docklands.

Having identified key contacts from these preliminary participant pools, we initiated contact via e-mail or telephone, explained our research objectives and started interviewing. We then used a snowball sampling method, which means that we asked participants to nominate others, friends, colleagues, acquaintances, for further enquiry. While this method does not provide a method to create a statistically or numerically representative sample, it reflects the existing social relationships in a given community. Moreover, the variety of key contacts we approached initially was aimed at ascertaining that we arrived at a sufficiently diverse sample that reflected the diverse perspectives and experiences in relation to climate change and adaptive capacity in our case study areas.

This social research combined desk studies with in depth interviews with a total of 28 participants, residents, workers, community agencies and business owners in Carlton, Docklands and the CBD, who were interviewed on their usage of different urban spaces, their knowledge and perception of climate change, their experiences of and behaviour in extreme weather events, such as heatwaves and flooding, and their thoughts on how the community in the City of Melbourne can or should adapt to a changing climate. The interviews were conducted in a manner that encouraged storytelling through the use of open-ended questions. Using everyday language, narrative research gives a language to local experiential, emotional and non-expert forms of knowledge. It pays attention to the nuances of what is being said, how it is said and what is said 'between the lines'. Interviews have been coded I1-28 and according to the suburb where they were conducted, to maintain anonymity.

In a second research step, preliminary findings were presented back to the participants in a workshop setting that invited feedback and general discussion on the analysis, with the aim to identify drivers of decision-making and behaviours and other factors of local adaptive capacity.

4.1.2 Consultation and feedback on research findings

Following the preliminary analysis of the narrative interviews according to emerging key themes, research participants were invited to a workshop style follow-up event. The participants were then asked to provide their feedback on and validate the findings, as well as comment on their experience of both the narrative interview and the workshop. Creating the space for participant feedback acknowledges the fact that the researcher's analysis can only be an interpretation of what people said during the interviews. Reflecting the findings back to the participants ensures that misinterpretations of data or gaps in the report are revealed and can be amended by the researcher. This collaborative work on the research findings with the participants is an important ethical component of our research methodology. As the workshop set-up allowed time and space for a more focussed discussion of some of the key issues arising from the report, it deepened and furthered the insights of the report.

The workshop intended to initiate networks and relationships between actors who would normally not engage with each other. By inviting reflection on the project and its conduct as well as encouraging participants to make recommendations for similar projects and workshops, another intention was to help instigate the development of innovative local communication and governance structures.

4.2 Exploring Narratives of Climate Change and Adaptation in the City of Melbourne

4.2.1 Project context

As part of its climate adaptation strategy, the City of Melbourne Council wanted to utilise the narrative data to improve and expand Council's existing community engagement strategies and programs, such as online community forums, the Eco-City Sustainability Campaign, the Sustainability Streets initiatives etc. Understanding and translating into policy the community's needs and concerns related to extreme events is part of the 'two-way' dialogue embraced by the City of Melbourne Council, and as a basis for the design of adaptation strategies and policies that encourage active participation and input from the community. Questions of interest to the Council officers pertained to the community's risk perceptions, existing adaptive knowledges and behaviours, and levels of awareness of available services in regard to urban heatwaves and flooding due to sea-level rise.

The stories elicited by the research provide insights into the values and perceptions, practices and knowledge(s) in regard to past experiences of extreme weather as well as the anticipated impacts of climate change in the urban context. Producing a more holistic picture of urban communities, qualitative social research can enable Government to better understand the diversity of needs and levels of awareness, and therefore deliver specifically tailored programs and policies that are more 'fit for purpose'. The research approach taken is also one that can inform practices designed to enhance community engagement and information strategies, tap into the potential of community initiative and participation in decision-making processes and add community-based leverage to government activities.

4.2.2 City of Melbourne: A description of the local context.

The suburbs of Carlton and Docklands were selected as case study areas in order to reflect the cultural, linguistic and socio-economic diversity of the municipality. Demographic groups identified as particularly vulnerable in the case of heat waves and other weather-related emergencies by Council included transient populations such as international students, tourists and commuters, in addition to the age group between 20-30 years and elderly citizens. On average, approximately one million people visit the Central Business District and adjoining areas in Carlton and Docklands

daily. Sporting or entertainment events at Etihad Stadium can occasionally draw crowds of 50,000 or more people. Participant recruitment was based on demographic data as supplied by the City of Melbourne Research section.

Carlton, with a population of around 14,090,⁷ is located just north of Melbourne's Central Business District. It is one of the city's oldest suburbs, dominated by Victorian and Edwardian era brick or bluestone cottages and two-storey terrace houses. Since the 1960s, public housing estates accommodate low-income residents and recent immigrants in high-rise buildings of up to 22 storeys, some of which are currently being retro-fitted according to new environmental standards or replaced by modern apartment buildings. New developments include a large number of privately owned apartments alongside public and commission housing. Since the early 2000s, large-scale student apartment blocks close to the University of Melbourne offer higher-end accommodation to mainly international students. Due to its diverse demographics and architectural substance, Carlton was considered a good case study for urban heatwave behaviour.

Docklands is the City's most recent and ongoing urban development complex. It is situated adjacent to the western end of the Central Business District, on the site of Victoria Harbour, Melbourne's former key port on Port Philip Bay with access to the Yarra River. Following subdivision in 1996, seven separate precincts were sold to private developers by the state's urban development agency, Vic Urban. Completion of the site is expected by 2020. High-rise commercial and residential buildings dominate, with the exception of some refurbished historical buildings. According to Vic Urban's strategy, there is a design emphasis on environmentally sustainable building elements such as natural light, using space for ventilation and cooling, water recycling facilities and some solar and wind power (Vic Urban, 2011). In 2008, the population in Docklands had reached 6,160 (Casey, 2010). Projections for 2020 expect up to 17,000 residents and 40,000 commuting workers (Vic Urban, 2011). Docklands is popular with affluent 'empty-nesters', who often purchase an apartment to be close to the city's services as they age. Due to its smaller population, ethnic diversity is represented in much smaller numbers in Docklands. According to the 2006 census, the ratio of Australian born to overseas born residents was significantly higher than in Carlton. For the same year, more than a third of Docklands residents belonged to the income bracket of \$800-\$1600 per week or more. More recent census data for this rapidly growing suburb are not available yet, but locals had observed an increase in a more transient and international renter population, such as overseas workers and some international students. Given Docklands' location on the river and the bay, the interview focus was on residents' risk perceptions in regard to flooding and storm surges, in addition to heatwaves.

4.3 Findings and key themes

4.3.1 Global climate change and adaptation responses

The majority of respondents were confident that they were already witnessing the effects of global climate change in Australia and overseas. While opinions were divided on whether climate change was due to exclusively human causes or part of natural cycles, there was general agreement that human activity negatively impacts the planet and the climate. Accordingly, most respondents were of the opinion that adaptation measures should include mitigating responses. Saving water and energy, recycling and consuming in environmentally sensitive ways were mentioned as their existing everyday practices by almost all participants. However, in this context participants expressed the need for improved infrastructures allowing adaptive as well as mitigating behaviour, such as recycling; cycling; public transport; retrofitted buildings; access to alternative energy sources and the expansion and improved accessibility of urban green spaces.

Awareness of adaptive and mitigating technological and design features was high across all demographic groups. In particular, the existence and expansion of green spaces and self-organised community gardens were rated highly in their importance for the sense of community and well-being, mental health, sustainable living, reconnecting with nature and improving the sense of personal agency, such as taking responsibility and achieving the sense of doing something positive. There are a number of community initiatives and projects dedicated to green living but the

⁷ Data from 2008 were provided by the City of Melbourne research department.

sense that independent and innovative community action was inhibited by bureaucratic regulations, complex departmental structures and unclear responsibilities between levels of government dominated participant responses in both the interviews and the community workshop. Campaigns such as Yarra Valley Water's 'Target 155' and the global 'Earth Hour' were valued as having a positive impact on environmental awareness, individual action and sustainable consumption levels. However, the general sense amongst respondents was that there is 'too much talk and not enough action' (Interview, 2011, 4D, 2C + 5C) in regard to environmental action.

4.3.2 Risk awareness of climate-based disasters

Risk awareness in regard to bush fires, floods and sea-level rise was low due to the general sense of safety in the city. However, most respondents were aware that their low risk perception was linked to the perceived abstractness of these threats in combination with a sense that city dwellers had 'lost touch with nature' (Interview, 2011, 7D + 1D) to the detriment of risk awareness and responsive, and responsible, environmental behaviour. Urban heatwaves were experienced as the greatest risk factor affecting the elderly, people of low socio-economic status and businesses. Decreased levels of alertness and high levels of tiredness and aggressive behaviour during heatwave periods were the main impacts described. Increased reliance on air-conditioning in urban work and living environments was a concern in regard to its effects on energy usage, its vulnerability in the case of power failures and its overall impact on lowering physical tolerability of heat. Inadequate building structures and public spaces lacking greenery were described as the main issues in regard to heatwaves. Public housing residents in particular criticised the lack of insulation and airflow through their apartments, a condition that potentially disadvantages this demographic further, as they cannot sleep inside their homes during hot nights.

4.3.3 Environmental education

Environmental education was of central concern amongst the respondents. In general, there was little trust in current scientific and political information around climate change due to the use of elitist and exclusive language and concepts, as well as extremist and polarising media and political debates. A particular conceptual problem was surfaced in the context of relaying adaptation information to CALD communities, where low command of the English language in combination with different cultural concepts and customs exacerbates communication problems. Overall, respondents emphasised the need for more immediately relevant information on local and household levels to enable people to understand their individual impacts and change their consumption behaviours (for example participants suggested the installation of eco-meters in individual households and rental accommodation). Further, participants noted that opportunities to learn from different and past experiences were not utilised sufficiently and encouraged more local debate, snowballing the message of sustainable living and education through school and neighbourhood programs. Not all of the participants had private internet access; others were not familiar with how to use the internet, or felt that other more tangible education and engagement methods, such as community-environment events, might be more appealing to residents. Contrary to the initial assumption expressed by our City of Melbourne partners, interest in facilitated discussions and learning programs around climate change and adaptation was pronounced among the research demographic of international students.

4.3.4 Resonance with resilience

Testing the resonance of 'resilience' as a key concept of current adaptation policy discourse surfaced a number of values that suggest a focus on social policy components when thinking about adaptation. Respondents listed as components of personal resilience the sense of integration and belonging to the community, interpersonal responsibility and care, i.e. 'looking after each other' (Interview, 2011, 2C + 4D), knowing where to turn to for help, education and the belief in the personal capacity to influence change. These factors reflect issues which the participants felt hindered effective community and climate action, i.e. the sense of fragmented communities (on the basis of socio-economic and educational status alongside other factors), unclear structures for communication with government agencies, lack of information, and the inability to influence change in the immediate environment due to regulations and slow bureaucratic turnaround that stifles community action.

Insights into differing definitions of operational terms, such as resilience, can help to sharpen the focus on actual community needs even if they do not seem directly related to climate impact issues.

4.3.5 Community-based suggestions to local and state policy/decision-makers

In summary, the following suggestions to state and local policy- and decision-makers were made by the interview and workshop participants in order to improve community well-being and adaptive capacity in a changing urban climate:

- Create meeting spaces/ Help to organise social networks for continued exchange and community action
- Connect the wider community for two-way conversations (i.e. Carlton Housing Estate and wider Carlton community; community and local government; involve large organisations, industry, corporate).
- Allow for more community creativity and involvement of implementing their ideas.
- Government incentives (greening houses and offices), rewards and environmental campaigns can assist in changing our environment and cultural values.
- Demonstration sites where people can learn about alternative energy/ recycling/greening houses will improve uptake and get people together for learning.
- Think long term.
- Thinking about community well-being will feed into mitigation/adaptation measures
- Improve access to more sustainable transport and mitigating infrastructures (recycling, bike lanes + stations, public transport, car sharing schemes).
- Clarify the language around climate change, mitigation and adaptation
- Clarify responsibilities and lines of communication
- Clarify the diverse needs and wishes in different sections of the community
- Encourage the exchange of ideas
- Utilise existing knowledges and skills in the community.

4.3.6 Implications for policy and practice

This study delivered data and methods relevant to future policy and practice considerations for climate change adaptation. While the context-specific perspective is valuable for both environmental and social vulnerability assessments, as well as community information and engagement strategies, it also provides insights on what makes the diverse communities living in the City of Melbourne adaptive and resilient.

Based in an understanding of dialogical, social interaction, the narrative methodology used in this study was successfully tested as a method for community engagement. It can inform the design of tailored programs that can build and conserve local adaptive capacity and collaborative adaptation planning. Climate change adaptation and risk reduction policies and practices, as is revealed by this study, need to also consider social policy elements to work towards community coherence and equity. The analysis presented in this report leads to the following tentative project learnings relevant to policy and practice:

- Broad and in-depth community consultation and two-way conversations should be continued and extended, particularly through using different media and information events;
- Government and other administrative agencies require the skills and capabilities to provide people with the experience of being genuinely listened to;
- Knowledge exchange and learning together between government authorities and the community, as well as between culturally and socio-economically diverse community sections, can strengthen the community's ability to form informed opinions, take responsibility and build the capacity to act. Communicative structures and spaces that aid such exchange are as yet underdeveloped.

- There is a significant opportunity for co-developing strategies for community engagement and maintenance of knowledge/information standards on adaptive behaviour in conjunction with already existing social and environmental community initiatives.
- Structures for discussion and knowledge exchange need to be built and strengthened.
- Credible information and accessible, salient language, storylines, ‘tangible’ examples, and scenarios are needed to better engage the community with adaptive actions in the face of possible climate change impacts;
- Facilitate exchange and mutual understanding between community sections and government authorities and other administrative agencies to avoid community confusion and frustration;
- Build and strengthen structures of deliberative decision-making and participatory action.

4.3.7 Implications for framing future climate change adaptation policy

To date, climate change adaptation policy in Australia relies on definitions of vulnerability, resilience and adaptive capacity as provided by the Intergovernmental Panel on Climate Change (IPCC). However, this study reveals that the use and interpretation of these and other key concepts need to be reflected upon in a local context by all actors involved. In particular, a good understanding of local communities’ everyday lives, needs and concerns must be the basis of a critical and responsive reframing of climate change adaptation concepts for successful policy and practice. For example, in adaptation policy discourse the notion of resilience is often used as an affirmative term towards actions such as in the building of ‘climate resilient communities’. When relating the resilience concept to social processes of climate change adaptation, Fünfgeld and McEvoy (2011) distinguish at least three different meanings as found in the literature:

- Resilience understood as response to disturbance;
- Resilience understood as a system’s capacity to self-organise;
- Resilience as the capacity to learn and adapt.

The findings from the case studies suggest that, in order to be able to capture the manifold factors influencing individual and collective resilience in urban communities, operative definitions of the concept may need to be reviewed within the local and demographically diverse contexts of its application. In light of the present findings, socio-cultural perspectives on resilience approaches can be expanded by focussing on the importance of a number of factors, including, but not limited to, socio-economic and socio-psychological factors, access to education and information particularly in CALD communities, and other motivational factors, such as the sense of belonging to place, personal responsibility and the ability to act collectively and autonomously if this is needed. Urban climate change adaptation policy, as is one of the key learnings emerging from this case study, will greatly benefit from emphasising social policy elements and working closely with a number of community agencies in order to identify and reduce social vulnerabilities.

4.4 City of Melbourne Workshop Report

‘Exploring local stories of environmental change and adaptation’ - continuing the conversation

Monday, 18 July 2011 at The City of Melbourne’s Multicultural Hub, 506 Elizabeth St.

4.4.1 Participants

- Invited residents and interview partners from the suburbs Carlton and Docklands
- City of Melbourne representatives: Beth McLachlan (Sustainability); Michelle Isles (Sustainability); Anton Griffith (Research, demographics).
- VCCCAR project team: Jana-Axinja Paschen (primary researcher), Ray Ison, Philip Wallis (Monash University); Hartmut Fuenfgeld (RMIT)

4.4.2 Introduction

This report summarises key aspects of discussions held during a three hour workshop conducted as part of work package 4 of the VCCCAR funded research project ‘Framing multi-level and multi-actor adaptation responses in the Victorian context’ (‘the Framing Adaptation project’), ‘Exploring local stories of environmental change and adaptation’ (‘the Narratives work package’). For this workshop, the project team invited residents and interview partners from the suburbs Carlton and Docklands in Melbourne and representatives from the City of Melbourne council.



Images 1 and 2: Scenes from the workshop with City of Melbourne Cast Study interviewees.

4.4.3 Workshop objectives

This workshop was designed with several objectives in mind:

1. To present key findings from the narrative research on local perceptions of climate change and adaptation measures, which was conducted in early 2011 with residents, business owners and other community stakeholders in the City of Melbourne municipality.
2. To invite feedback on the findings from the interview participants.
3. To surface further local issues of concern, needs, wishes and creative ideas through the workshop interaction.
4. To provide an opportunity for reflection, discussion and exchange between interview participants and City of Melbourne representatives.
5. To test the resonance of the workshop methodology with both community and government participants to inform the development of community engagement strategies.

4.4.4 Presentation of the main findings of the research project

Key themes that emerged from the conversational interviews and were presented to participants at the workshop are summarised below under the relevant headings:

Climate Change	It is happening – extreme weather events are increasing in Australia and overseas
	Unsure whether it is human-made, part of a natural cycle or both
	We have an impact on the planet and the climate
Adaptation/Mitigation	Regardless of the origins of climate change, we need to address it
	Adaptation and mitigation should go hand in hand
	Education is important
	Need for better infrastructures that allow mitigating behaviour
	There are many good ideas for mitigating/adaptive measures but too much red-tape inhibits community action
	We are relying too much on air-conditioning and have grown less tolerant towards the heat
	We have forgotten the ‘old ways’ of cooling down
	Reliance on a/c means that there are no alternatives when it fails
Impacts/	Mental and other health issues (People are tired, less alert,

risk awareness	impatient, aggressive)
	Increased air-conditioning leads to power failures
	Businesses suffer
	Old building structures/ lack of airflow make buildings unliveable
	Feeling of safety from bush fires, floods and sea-level rise in the city
	Climate change is too abstract – we won't act before we have experienced something bad ourselves
Green spaces	Need for more green spaces
	Physically cooling (shade/ less hard or concrete surfaces)
	Emotionally/psychologically calming
	Physical contact with nature is important to remain responsive
	Need to improve access to parks and gardens
Community gardens	As meeting places for the community
	Connect with nature
	Growing your own food means taking responsibility
	Food swaps improve neighbourhood relationships
	Give you the sense of doing something positive
Education/ knowledge	Scientific and policy language around climate change is elitist and exclusive
	But do scientists and politicians know everything? Do they tell us everything they know?
	Media and political debate is extreme and polarising
	People need to be educated – school/neighbourhood programs
	Need more immediately relevant information (local + household) in order to understand individual impacts and change behaviour (eco-meters)
Communication	Agency or departmental responsibilities are not always clear: We don't know who to contact
	Need more local debate
	Need to snowball the message of sustainable living
Action	There is a lot of talk and not enough action
	Campaigns such as 'Target 155' or 'Earth Hour' are good because they make a difference/ change habits
	Need to create more demand for green products and services to make them more affordable
Resilience What makes us resilient?	The feeling of belonging (family, friends, community)
	Encouragement and hope
	That someone believes in me and my abilities
	Being healthy
	Being educated
	Knowing where to turn to for help
	Believing in my own ability to act to change things

Table 5: Key themes from conversational interviews

4.4.5 Workshop methodology

Following the presentation of the main findings from the individual interviews, participants were given the opportunity to provide feedback and ask questions. As the workshop's main objectives were to provide an opportunity to deepen discussion of the key issues and to encourage exchange among participants, the second phase of the workshop consisted of group activity in the form of conversation mapping, a technique successfully used in previous VCCCAR workshops. In groups of up to six people each, the participants were given 30 minutes for discussion around the trigger question chosen by the VCCCAR project team: *How can we live with climate change in the city?* The benefit of the conversation mapping technique is that it records an evolving conversation by capturing individual contributions on paper, using pens of different colours (one colour per participant). In a second step, each group was asked to reflect on the conversations held and identify issues and opportunities that emerged during the discussion. These were then reported back to the plenary and opened further discussion.

4.4.6 Summary of the conversation mapping and discussion

In response to the trigger question, *'How can we live with climate change in the city?'* the discussants identified the following issues, challenges and opportunities and suggested some action points:

Issues and challenges	↔	Opportunities
Particular experiences/ contexts create particular needs		Exchange and mutual learning can help us adapt
Office of Housing/ government agencies tend to be top-down		We can tap into the diversity of community experiences (living extreme climates in other countries) to learn how to adapt.
Too much red-tape inhibits creative community action		
Climate Change debate is about politics and money		Seeing more value in 'old technologies' can save money
		Recycling, re-using, re-imagining saves resources and fosters creativity
We tend to ignore past experiences		People can educate each other
		We can learn from recent and historical experiences
Old buildings often not designed appropriately		Design new buildings more sustainably
We live in culture of cars		Think out of the box: Use existing buildings, promote greening of old buildings,
		Greening buildings/ balcony and roof-top gardens insulates makes us more self-sufficient cuts down on transport of produce
		Better design better prepares us for extreme events and shortages of water/electricity
Loss of green spaces/ lack of access		Plant more green spaces with edible plants (i.e. olive trees). Parks/ community gardens are beneficial for mental and physical health community spirit
		Reducing sealed surfaces lowers temperatures by reducing heat reflection
Loss of contact with nature leads to sense		Behaviour change (dressing more

of detachment and lower tolerance of extremes	appropriately, avoiding extreme temperature changes from a/c to outside etc) will help mitigate climate change impacts
Lack of information/ extreme debates lead to resignation	Educating people about their impact on the environment leads to reduction of impact and creates more personal responsibility/involvement in positive change
Floods and droughts will increase	Use/ creation of wetlands for stormwater and flood management improves storage capacity and the enjoyment of the city

Table 6: Conversational mapping themes: issues, challenges and opportunities

4.4.7 Actions suggested by the participants

- Create meeting spaces
- Connect the wider community for two-way conversations (i.e. Carlton Housing Estate and wider Carlton community; community and local government; involve large organisations, industry, corporate).
- Allow for more community creativity and involvement of implementing their ideas.
- Government incentives (greening houses and offices), rewards and environmental campaigns can assist in changing our environment and cultural values.
- Demonstration sites where people can learn about alternative energy/ recycling/greening houses will improve uptake and get people together for learning.
- Think long term.
- Think about comfort and enjoyment as this will feed into mitigation/adaptation measures
Improve access to more sustainable transport and mitigating infrastructures (recycling, bike lanes + stations, public transport, car sharing schemes).

4.4.8 Summary of the workshop

In addition to the key points listed above, the discussion surfaced the participants' keen awareness that a degree of cultural and communicational change is needed in order to effectively address climate change. This observation was applied to both mitigating climate change and adaptive measures. It should be emphasised here that the interviewees viewed mitigation and adaptation as two equally important aspects of appropriate climate change response. This was reinforced in the conversation maps developed during the workshop. In many instances, adaptive strategies, such as expanding green spaces, were also directly linked to what the participants felt would improve people's general, mental and physical well-being.

Education and information were ranked as highly important throughout both the interviews and the workshop discussion, alongside the participants' pronounced interest in improving communication structures to enable exchange within the community and with community agencies and government representatives.

This workshop initiated one such conversation by bringing together residents from two very different suburbs in the City of Melbourne municipality, Carlton and Docklands. This meant that the participants represented diverse demographics and a variety of personal, cultural and social experiences. This exchange led to the realisation that successful climate change adaptation cannot be talked about unless aspects such as social equality and the attendant opportunities (or lack thereof) of accessing information, resources and infrastructures that enable more sustainable lifestyles is considered. The experience of the residents at the Carlton housing Estate is particularly pertinent in this context as it exemplifies how unclear communication structures in combination with a high level of externally determined decision-making (i.e. the Office of Housing was considered as 'unresponsive' by several participants) constrains autonomous and community-led adaptive action.

In relation to the overall objectives of the VCCCAR Framing Adaptation project of gaining a better understanding of good adaptation practice, the conversational interviews and the workshop interaction itself revealed the centrality of language for such practice and the diversity of conceptual approaches. Examples include the observation made by participants that the use of

highly scientific or jargonistic language in current climate and climate policy debates are unhelpful and exclusionary as it – wrongly – implies that climate change adaptation is solely an expert field. A resultant sense of inadequate knowledge in the community, as it speaks through the conversations, can lead to resignation, distrust and a perceived lack of agency. Facilitated conversations can be used to overcome such misconceptions and build stakeholding in the issue of concern. What is more, interactions such as these may offer a constructively corrective function as they provide the opportunity to test increasingly specialised adaptation language and concepts and capture what full richness of meaning they possess in ‘everyday’ language. The idea of ‘resilience’ (see above) demonstrates an interesting case in point: it is somewhat ironic that the so-called intangible and affective values listed by respondents as the basis of personal resilience are remarkably congruent with what they perceived as constraints to effective community and climate action yet they were also the very things missing.

5 CONCLUSIONS AND PROJECT LEARNINGS

This project explores the values and perceptions, practices and knowledge(s) of the communities in Port Fairy and the City of Melbourne (that is, individuals and groups outside government structures) in regard to local environmental change and adaptation in the context of projected climate change. In consultation with policy and community engagement professionals from the Port Fairy Working Group (PFWG), CoM Council, DSE and the DPCD, the specific interests in this research were identified as going beyond the reach of conventional quantitative and qualitative approaches in order to understand previously underrepresented drivers of adaptive processes.

This study illustrates the role of narrative methodology in climate change adaptation planning and how it can be utilised beyond its function of producing qualitative data, as a promising and valuable driver for building adaptive capacity in communities. By contributing to the identification of local knowledge(s), skills, and champions of action, the methodology can aid communication and mediation by bringing people together and talk. Helping to raise mutual awareness for shared issues and needs, it has the potential to make a contribution to enabling different community factions to find consensus on some of these issues and needs. This dynamic can help to start up new, informal local governance structures or involve previously not unengaged community members in debates and governance structures. The focus on the bottom-up approach allows people to step out of their prescribed passive role as recipients of scientific and political decision-making processes. Improving structures for communication, the approach can facilitate trust-building processes between local communities and Government. A community aware of their rights, the value of their knowledge(s), skills and experiences, as well as the relevance of their voice for decision-making processes, is empowered to contribute to change necessary for successful adaptive processes. An empowered community will be motivated to make decisions together, feed them into actions and therefore own rights, risks and responsibilities in climate change contexts. However, as many of the responses quoted above reveal, community motivation for action alone is not sufficient in itself. Social learning processes and resultant actions are dependent on a range of other factors, particularly the provision of conducive institutional settings and policies (i.e. Ison et al., 2007).

This study delivered data and methods relevant to future policy and practice considerations for climate change adaptation. While the context-specific perspective is valuable for both environmental and social vulnerability assessments, it also provides insights on what makes specific local communities in Port Fairy and the City of Melbourne, adaptive and resilient. This includes that conventional understandings of vulnerability as solely influenced by socio-economic or exposure factors may have to be challenged and critically reflected upon. The case studies for example show that community vulnerability is influenced by a perceived lack of governmental engagement and lack of locally meaningful information. The results of the research suggest that adaptive actions may need to involve different actors from the community, science and policy arenas experimenting and learning together. Based in an understanding of dialogical, social interaction, the narrative methodology used in this study was successfully tested as a possible future method for community engagement and also highlighted the benefits of social research in adaptation planning. Several recent studies have been devoted to this subject and are worthy of consideration for policy development in Victoria (O'Brien 2011; Pelling 2010). The use of conversational, story-telling interviews aimed to capture the community's perspectives on their social and natural environments, drivers of decision-making and behaviours and other factors of local adaptive capacity. The research produced an holistic picture of the local community and their relationship to the locality of Port Fairy and the City of Melbourne. In addition to this research's theoretical premises, the research experience surfaced the following benefits of narrative research:

- Surfaces diverse local perceptions, experiences, knowledge(s), expectations and risk attitudes;
- delivers context-specific data highly relevant to local knowledge exchange, community engagement and policies in adaptation contexts;
- Broadens a society's collective knowledge capital and can potentially expand adaptation knowledge that is useful for policy and practice;
- Makes light of 'non-traditional data' such as hard-to-articulate experiential content, individual, affective motivators and constraints of adaptive capacity;

- Accesses and interprets symbolic ways of speaking and therefore aids understanding of local knowledge(s), concepts, and perspectives. The reflective use of language and subsequent agreement on terms and concepts can greatly benefit communication between different actors in adaptation policy and practice contexts.
- Delivers data that help reflect a diverse and holistic picture of the community;
- Identifies how people 'make sense of' climate change, where they get information, how they perceive the roles of government and other agencies/organizations;
- Can inform policy and communication and engagement strategies (i.e. by aiding understanding of local languages, concepts and perceptions);
- As mediator between research and policy practice, narrative research already forms part of the process of enabling adaptive capacity because it:
 - *raises awareness, encourages reflection, and produces knowledge as part of the research interaction;*
 - *helps identify existing social capital and knowledge networks;*
 - *includes previously disconnected, excluded and marginalised members of the community;*
 - *and therefore helps to create new social and knowledge networks;*
 - *already constitutes a form of community engagement;*
 - *is an important driver for the development of further communication, engagement and participatory planning processes by government;*
 - *provides a method for ongoing and participatory adaptation planning processes that the community can utilise autonomously to increase adaptive capacity*

Narrative social research delivers very detailed, personalised and context-specific data on local community perceptions of environmental change and what communities experience as drivers and inhibitors of adaptive capacity. This strength of the approach is arguably also one of its greatest challenges within the institutional requirements and financial and time constraints of government and policy practice. In particular, as the narrative approach is built on the personal space and social interaction between researcher and participant, it is time and resource intensive. However, in community engagement policy contexts, the approach can inform such policies and can be integrated as community engagement method into local structures for communication and participatory governance.

The perceived need to ground policy making processes in quantifiable numerical data sets perpetuates a cultural tendency to distinguish between what appears as rational facts (i.e. numbers) opposite the seemingly non-rational, subjective character of narrative data (local stories). In other words, so-called hard data are often considered more reliable and actionable than the 'soft data' produced by interpretative qualitative approaches. On the other hand, the complexity of human experience as it speaks through local stories is irreducible. The challenge here is how 'soft data' can be effectively communicated across different disciplinary knowledge backgrounds and institutional languages.

In addition to the benefits of narrative social research, the following challenges for the successful application of the approach in adaptation policy and practice contexts can be anticipated:

- Time intensive processes: selection of participant pool representative community, collation of data and analysis;
- Maintenance of communicative relationships between communities and government representatives (e.g. continuity);
- Processes are subject to individual and local learning curves (i.e. leadership, deliberative techniques and participatory processes);
- Institutional constraints within government (bureaucratic processes, changing responsibilities and staff within relevant departments).

The narrative approach has the potential to inform the design of tailored programs that can build and conserve local adaptive capacity and collaborative adaptation planning. Specifically the research achieved the following:

- delivered a context-specific perspective valuable to assessments of both environmental and social vulnerability (including detailed observations of changes in the environment and individual perceptions of risk);
- tested previous assumptions held by government representatives of climate change impacts on the community, including what makes them vulnerable, adaptive and resilient – or what factors limit their adaptive capacity, such as the perceived lack of information provision and government engagement.
- therefore delivered information that enable governments to actively contribute to building, harnessing and or conserving local adaptive capacity;
- provided a broad range of information that can inform the design of specifically tailored programs for community engagement and communication, raising awareness of risk, roles and responsibilities, as well as incorporating local knowledge into adaptive measures and physical solutions to environmental problems in Port Fairy and the City of Melbourne;
- provided data and insights that the communities can employ themselves, should they wish, to work collaboratively towards adaptation planning.

The study provides evidence based learnings that are relevant to future policy and local planning practice for climate change adaptation and include:

- community consultation that is based on surfacing difference followed by well-facilitated explorations of these differences in community settings, which has the potential to break through conflict and create a basis for evolving co-delivery policy models;
- for adaptation planning to be trusted, agencies and outside experts require the skills and capabilities to provide people with the experience of being genuinely listened to;
- while overall community coherence differs in the rural and urban contexts, well-functioning community groups and initiatives exist in all three case study areas. This experience can be used by agencies working collaboratively to deliver effective Local Adaptation Planning through knowledge exchange and learning together with the community;
- a key action to reduce vulnerability is to work to strengthen the community's ability to form informed opinions, take responsibility and build the capacity to act but this is, as yet, underdeveloped in terms of local adaptation planning and attendant governance arrangements;
- there is a significant opportunity for developing co-management strategies by instigating and coordinating processes of measuring and interpreting impact data involving members of the community and providing training to community members to ensure maintenance of knowledge/information standards.
- structures for discussion and knowledge exchange need to be built and strengthened (i.e. new institutions need to be imagined and co-developed with the community).
- credible information and accessible, salient language, storylines, 'tangible' examples, and scenarios are needed to better engage the community with adaptive actions in the face of possible climate change impacts;
- the provision of transparent timely and ongoing information, i.e. inform community of plans, delays and reasons for delays – the timing of providing information seems essential to retaining community trust as is the maintenance of strong interpersonal relationships;
- the use of workshop techniques such as a 'conversation mapping' were experienced by interviewees as helpful and useful; similar techniques could be used in future to build and strengthen structures of deliberative decision-making and participatory action within communities.

Appreciating how communities understand and manage change either individually or collectively is strategically important in the Victorian and Australian context. It is important that governance arrangements, including relevant policies, can accommodate rainfall variability, fire events, temperature extremes, coastal erosion and human-induced 'surprises', such as pollution events. In policy development, communities can be seen as part of the problem or part of the solution, or both. To do this requires policy developers to give consideration to how and by whom particular issues or problems are framed. If this framing is carried out by a small group of experts from a single discipline, or by only urban-based bureaucrats, then there is a chance that the situations of concern may be framed in ways that lead to unexpected systemic failures in the longer term (RCEP, 2010). To date, climate change adaptation policy in Australia relies on definitions of

vulnerability, resilience and adaptive capacity as provided by the Intergovernmental Panel on Climate Change (IPCC). However, this study reveals that the use and interpretation of these and other key concepts need to be reflected upon in a local context by all actors involved. In particular, a good understanding of local communities' everyday lives, needs and concerns is desirable as the basis of a critical and responsive reframing of climate change adaptation concepts for successful policy and practice.

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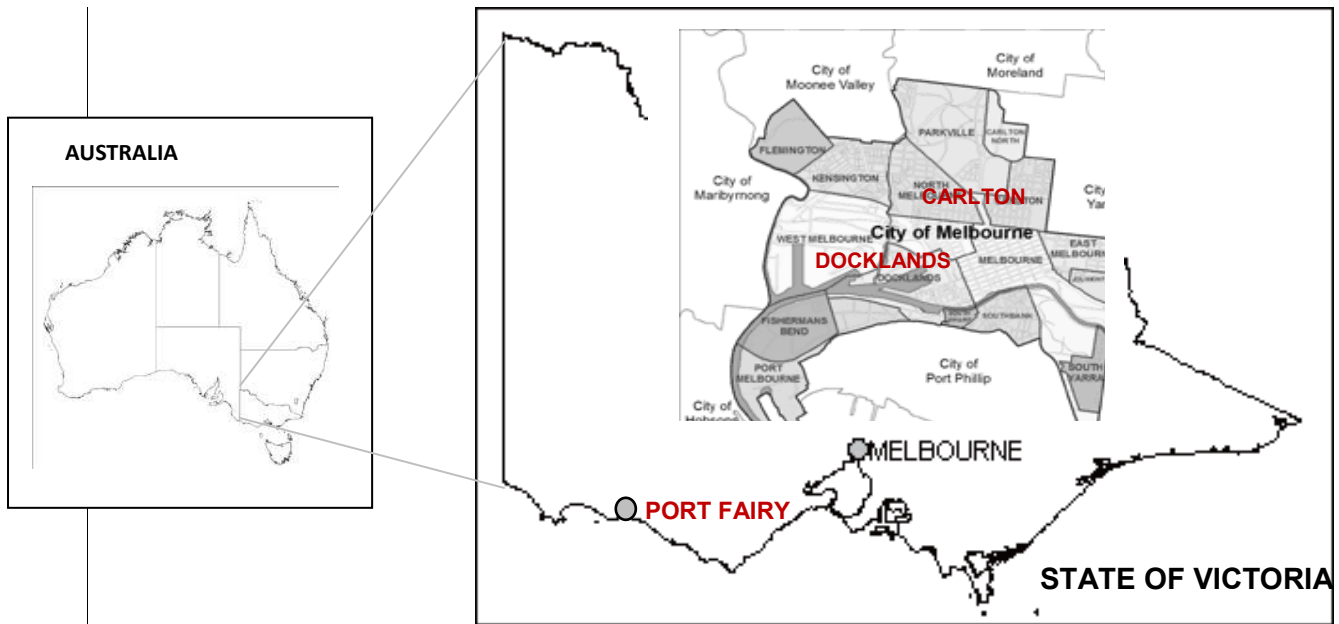
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Appendix 1 – Location map of case studies



Source: University of Melbourne
Source: <http://www.melbourne.vic.gov.au/AboutMelbourne/CityMaps/Pages/Suburbmaps.aspx>

Appendix 2 – Port Fairy’s environment and planning issues

(Pendergast, 2011a)

Recently completed coastal studies in Port Fairy include:

- The 2010 ‘Port Fairy East Beach – Coastal Erosion, engineering and Feasibility Study Peer Review’, prepared by Aurecon Australia Pty Ltd for the Department of Sustainability and Environment
- The 2007 ‘Port Fairy East Beach – Coastal Erosion, engineering and Feasibility Study’, prepared by BTM WBM Pty Ltd for Moyne Shire
- The 2007 Port Fairy flood study, conducted by the Glenelg-Hopkins Catchment Management Authority for Moyne Shire.
- The 2006 ‘Port Fairy Shoreline Stability Study – Draft Report’, prepared by Coastal Engineering Solutions Pty Ltd for Marcson Pty Ltd.
- The 2005 study ‘Griffiths Street, Port Fairy – Geomorphology and Coastal Processes in Relation to a Proposed Subdivision’, conducted by Environmental GeoSurveys Pty Ltd for Paul Crowe.

Coastal erosion and planning issues

- As identified in the East Beach Coastal Erosion Engineering Study ‘Peer Review’ (Aurecon, 2010), various key issues have arisen in regards to the physical state of East Beach and its future management. Public facilities and private dwellings on East Beach are taken to be under threat due to coastal inundation, erosion and storm surges. The following have been identified as key issues at East Beach by the Peer Review:
- *Quality of the Beach Asset:* East Beach is of local significance for residents and visitors alike. Currently, access to the beach is restricted and the beach provides only a limited function as a buffer to coastal erosion.
- *Coastal Erosion:* Erosion is occurring at East Beach, while sand is building up at Griffiths Island.
- *Coastal Defences in Poor Condition:* The rock seawall and groynes are in poor condition. These structures do not offer the same level of protection that they were originally designed to do.
- *Inadequate design of Coastal Defences:* The design of the rock seawall is no longer consistent with current engineering practice.
- *Inappropriate Development:* Development along East Beach has not allowed the beach and dune system to follow natural coastal processes.
- *Climate Change:* Rising sea levels, increased storms, changes to wind and wave patterns are anticipated consequences of climate change. With a changing climate, existing coastal hazards are likely to increase over time and additional hazards may evolve. A sustainable adaptive approach to managing coastal risks at East Beach is required
- *Funding constraints:* Funding will be sourced by Council as Committee of Management. There is no guarantee of funding for the works proposed for East Beach. Undertaking works in the coastal zone is typically expensive and the current funding available in state-wide funding programs is limited.
- With the above issues in mind the Peer Review (Aurecon, 2010) has made a series of recommendations for action assigning each recommendation a level of priority from tier one to tier four. Below is a list of the recommended approaches.

Tier 1 Priorities

- *Emergency Works:* Undertake repairs to the northern section of seawall and restore the dune.
- *Investigations:* Undertake a detailed inspection to better understand the condition of the seawall.
- Undertake an investigation into the options to source sand for sand bypassing activities.
- Examine the costs to install or upgrade equipment to bypass more sand onto East Beach.

- Depending on the outcomes of the above investigations, it may be appropriate to install a sand bypass system or improve the sand movement regime to restore the natural movement of sand onto East Beach.

Tier 2 Priorities

- Undertake consultation with community to inform and explore collaborative options for the future management of East Beach.

Tier 3 Priorities

- Dependent upon the outcomes of the investigation, undertake major works to upgrade and repair the seawall. Undertake beach restoration works by supplying a bulk supply of sand to East Beach (focussed on the Beach St area).

Tier 4 Priorities (low priority)

- Undertake further dune rehabilitation works and if determined to be important, restore or remove timber groynes.

The East Beach Rock Seawall

- The current state of the rock wall on East Beach has raised concern as it is beginning to deteriorate and fail to fulfil its intended purpose. The seawall has been progressively constructed since the 1950's and according to the East Beach Coastal Engineering and Feasibility Study extensions of the wall have been installed without adherence to best engineering practice. The southern end of the seawall is well protected and exposed to very little wave activity while the northern end is under almost constant wave impact. Proposals for seawall development include the upgrade of deteriorating segments of the wall, extension of the wall in a northerly direction, removal of the wall at the southern end and shifting the wall landward in order to strengthen its foundations and increase beach width.
- Proposed Development and Subdivision at Northern End of East Beach
- Immediately to the north-east of the existing developments on East Beach, a proposed subdivision which has since been scrapped has provoked extensive research and surveillance of the dune area. In 2005 the land was sold and a 35 lot sub-division application was submitted to Moyne Shire Council, the application was amended in 2007 to a 28 lot subdivision. The DPCD appointed a panel and advisory committee on the 26th of March 2008 to preside over the decision to grant permission to develop. The Panel decided the permit could not be granted due to the following factors among others:
 - It would be foolhardy to allow further development on an already eroded dune.
 - The only road access to the land is susceptible to flooding by even moderate flooding events.
 - Earthworks required to build on the land would undesirably fill the floodplain.
 - The proposal is contrary to planning policy.
 - The committee recommended the land should be back zoned to a rural conservation zone (Pendergast, 2011a).

Appendix 3 – Overview of Participant characteristics

- The interviews were undertaken between 8 and 19 August 2011. Each interview lasted between 30 and 60 minutes.

Total number of interviews	22
Total number of participants	23
Interview type	
Couple	3
Single	19
Age Structure	
25-40 years	3
40-60 years	9
60 years +	11
Gender	
Male	13
Female	10
Location of residence/ interest	
East Beach dune	2
Town	5
River	5
Other	10

Appendix 4 - demographic data Port Fairy

Labour force	1986	1996	2001	2006
Employed	780	872	1,003	1,134
Unemployed	82	100	67	48
TOTAL LABOUR FORCE	862	972	1,070	1,182
Not in labour force	979	902	865	928
Labour force status not-stated	29	41	105	92
Unemployment rate	9.5%	10.3%	6.2%	4.1%
Participation rate	46.8%	51.8%	55.3%	56.0%

Industry of employment	1986	1996	2001	2006
Agriculture, Forestry and Fishing	82	69	64	74
Mining	5	0	4	0
Manufacturing	84	95	101	121
Electricity, Gas, Water and Waste Services	7	5	3	10
Construction	61	69	82	109
Wholesale Trade	37	25	35	29
Retail Trade	89	88	116	127
Accommodation and Food Services	41	87	111	136
Transport, Postal and Warehousing	30	22	40	27
Information Media and Telecommunications	13	16	20	12
Financial and Insurance Services	17	19	16	19
Rental, Hiring and Real Estate Services	14	27	34	3
Professional, Scientific and Tech. Services	19	30	40	53
Administrative and Support Services	12	17	23	27
Public Administration and Safety	67	43	37	84
Education and Training	57	79	69	81
Health Care and Social Assistance	65	86	110	161
Arts and Recreation Services	8	14	19	10
Other Services	43	49	58	35
Inadequately described/Not stated	28	32	22	15
TOTAL	780	872	1,003	

(DPCD: Towns in Time, 2006)

Appendix 5 – Port Fairy and Bay aerial shots

Port Fairy



Port Fairy



Appendix 6 - Conferences

Four conference papers have been presented and another accepted for presentation in 2012, viz:

Paschen, J. & Ison, R.L. (2011) Narrative research for climate change adaptation policy and practice: opportunities and challenges. Proc. Resilient Cities 2011: 2nd World Congress on Cities and Adaptation to Climate Change, 3 - 5 June 2011, Bonn, Germany.

Paschen, J.-A. (2011) 'Using Spiritual Imagery in Climate Change Communication and Research', abstract accepted for the Symposium 'Climate Change – Cultural Change: Religious Responses and Responsibilities', The University of Melbourne, October 29, 2011.

Paschen, J.-A. (2011) 'Thinking about belonging in current climate change research', 'The Belonging Project Symposium', The Australian Centre, The University of Melbourne, December 9, 2011.

Paschen, J.-A. & Ison, R.L.(2011) 'Exploring the potential of story-telling in climate change adaptation', The Institute of Australian Geographers conference, University of Wollongong, NSW, Australia, July 3 – 6, 2011

Paschen, J.-A. & Ison, R.L. (2012) Marrying the flows of water and story: a narrative approach to water policy and implementation. In Proc. Water and Climate: Policy Implementation Challenges. Practical Response to Climate Change, Canberra, May 1-3, (accepted).

These papers are not included in this report. In addition WP4 staff helped design and run, or participated in the following workshops:

Climate Justice Roundtable. What does the 'climate-just' Australian city look like? Inaugural meeting of the Australian Climate Justice Research Network (ACJRN) jointly hosted by the Victorian Local Governance Association (VLGA) and Griffith University, Curtin University, Macquarie University, Monash University and RMIT and organised in collaboration with Dr Heinz-Josef Kreutz, Dr Diana MacCallum, Dr Wendy Steele, Dr Jana-Axinja Paschen, Dr Hartmut Fünfgeld, 29 November 2011, RMIT, Melbourne.

Jana-Axinja Paschen and Ray Ison: 'Exploring local stories of environmental change and adaptation in Port Fairy - continuing the conversation', community engagement workshop, 16 November 2011, Port Fairy, Victoria.

Jana-Axinja Paschen and Philip Wallis: 'Exploring local stories of environmental change and adaptation - continuing the conversation', community engagement workshop 18 July 2011, Melbourne.

Workshop on the 'Framing Adaptation project', presented with Dr Hartmut Fünfgeld at the VCCCAR Annual Forum, 1-3 May, 2011 in Bendigo, Victoria.

Workshop presented with the Framing Adaptation Project team: 'Approaches to climate change adaptation in policy and practice – Stakeholder Workshop', 16 February 2011, Melbourne, Australia.