



THE UNIVERSITY OF  
MELBOURNE



## *Equitable Local Outcomes in Adaptation to Sea-Level Rise*

Year 2 Project Report 2012

Project Team

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## Equitable Local Outcomes in Adaptation to Sea-Level Rise

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## Introduction

This report documents progress and interim findings after the second year of the Australian Research Council Linkage project on Equitable Local Outcomes in Adaptation to Sea-Level Rise. The report is a scheduled milestone in the project.

The report explains the problem that the project addresses, which is that sea-level rise and strategies to adapt to sea-level rise in the Gippsland East area of Victoria will affect the people that live there, but in different ways. It then explains how the project seeks to increase understanding of this issue. The report explains the research that has been done thus far, the interim findings to emerge from this research, and plans for the next year.



*Historic house on the dunes of Ninety Mile Beach, Lakes Entrance*

## The Problem

The Gippsland East coast stretches between Port Albert in the west to Victoria's border with New South Wales in the east. The coast is low lying and largely comprised of erodible sediments, raising concerns about the impact of sea-level rise and extreme events on the long narrow barrier of dunes that separate the lakes from the ocean.

There are few coastal regions in the world that have been as intensively researched with the aim of understanding the impacts of climate change. In Gippsland East, the effect of these studies has been to build awareness and a degree of consensus among the policy community about the problem of sea-level rise. Indeed the region is now characterized by the Australian Government as "one of the most vulnerable coastal areas in Australia", where sea-level rise is "likely to lead to collapse of existing lake ecosystems and changes to land use in east Gippsland" (DCC 2009, p.93). It has created an imperative for adaptation to avoid or manage these risks, which has resulted in a number of decisions about planning for sea-level rise in Gippsland East. Indeed, most of the decisions that have established precedents for planning for sea-level rise in the State of Victoria have come through cases from Gippsland East. These decisions have inevitably been controversial, and have forced local governments to plan for sea-level rise to an unprecedented degree and pace.

Yet planning for sea-level rise is not easy. None of the research thus far has considered what it is about this coastal area and its settlements that people value (for example their homes, communities, jobs, and lifestyles), and how these valued things may be at risk from sea-level rise. Nor has it suggested what adaptations could be taken to avoid sea-level rise having significant social impacts (but see GCB 2008). Further still, there has been no analysis in Gippsland East (or anywhere else in the world), of what the effects of potential actions to adapt to sea-level rise might be on the things that are important to people, and on social justice. In short, little is known about strategies to adapt to sea-level rise that will be fair, affordable, and equitable.

The absence of this information means that in Gippsland East (as is the case everywhere else in the world), it is difficult to develop coherent and detailed adaptation strategies that are legitimate and sustainable, and which set goals over time, establish plans for implementation of these goals, identify those responsible for implementation, and allocate resources to support implementation.

Therefore, the aim of this project is to develop an approach for identifying the social and equity outcomes of strategies to adapt to sea-level rise in Gippsland East. It will apply and refine this approach through an examination of the likely social outcomes of a range of adaptation strategies in five coastal communities in Gippsland East: Lakes Entrance, Manns Beach, McLoughlins Beach, Port Albert, and Seaspray.



*Fishing off the jetty, McLoughlins Beach*



*Fishing on the beach, Seaspray*

## The Project

The aim of this project is to develop an approach for identifying the social and equity outcomes of various strategies to adapt to sea-level rise. This will be achieved on two levels: first, identification of social and equity outcomes specific to the case study communities in Gippsland East; and second, the development of a general process and principles that non-research intensive institutions, such as local governments, can follow when faced with making difficult choices about adaptation.

In meeting the first aim, the project will provide a detailed understanding of the likely social outcomes of various adaptation strategies that could be implemented in Gippsland East. This will assist state and local government in developing adaptation policies specific to the needs and sensitivities of the region. Given the lack of empirical studies of this nature in adaptation research, the findings will also contribute to emerging theory on the social and equity dimensions of adaptation.

The project, in meeting the second aim, will develop a guide for policy makers in how to address social and equity needs in adaptation policy. Throughout this study we will reflect on what kinds of information, and which processes, matter most, so that we can make recommendations about how governments might go about conducting an effective and efficient self-administered process for making decisions about adaptation with affected communities. We will prepare guidelines that government institutions can follow, highlighting key information needs, important concepts, principles, and useful processes. This will assist future research by providing a methodology for assessing the equity outcomes of adaptation strategies.

The project is being conducted through a series of steps, explained below.

1. An understanding of the exposure and sensitivity to sea-level rise and related climate risks. This has been synthesized from existing studies.
2. Understanding the study areas, including their capacity to adapt to climate change, demographic characteristics, cultures, economies, histories, and values. This has been done through various means, including analysis of data from the Australian Bureau of Statistics (ABS), review of documents such as community plans and reports from planning panel hearings, analysis of local media, attendance at relevant meetings and community events, and informal interviews with key service providers and community leaders.
3. Understanding the preferences, attitudes and values of people exposed to sea-level rise in order to assess the outcomes of adaptation actions for their well-being, and the likely distribution of outcomes within and between affected communities. This is being guided by a theoretical framework of 'lived values at risk' (see below), and data is being collected through an initial scoping of community values (36 interviews have been completed), observations of practices in each community (ongoing place-based observations), and a large phone and mail survey (to be conducted shortly).

4. Development of a set of adaptation strategies relevant to this context, based on information collected through steps 1-3, advice from technical experts, and stakeholder consultations.
5. Individual and community evaluation of the likely social and equity outcomes of various hypothetical adaptation strategies. This is particularly important given that fitting judges of the success or otherwise of an adaptation strategy are the people who will be affected by it. This will be done through workshops in each community involving a subset of participants engaged in step 3 (in order to ensure rapport, and to ensure that all participants understand that this is a University-led research project to explore hypothetical adaptation strategies).
6. Finally, there will be a stage of synthesis and publication, involving an extensive review of evidence and findings among the project team and partners, the publication of guidelines for assessing the social and equity dimensions of adaptation decisions, and the preparation of papers for peer reviewed journals.

### ***The Study Areas***

The specific areas of study are the towns of Lakes Entrance, Port Albert, Seaspray, Manns Beach and McLoughlins Beach (see Table 1). These study sites were chosen in consultation with the partner organizations for the project, based on:

- i. the partner organisations' identification of these as important places for key learning about social vulnerability and adaptation;
- ii. knowledge of the towns' physical vulnerability to sea-level rise;
- iii. the potential contrast offered between a larger rural town (Lakes Entrance) and smaller settlements, and between places in different shires; and
- iv. the assumption, based on information provided by the partner organisations and also by our preliminary investigation, that the smaller communities may have lower adaptive capacity, at least as indicated by housing quality and access to community facilities.

**Table 1: Information about study locations**

Town	Local Government area	No. of occupied (and additional unoccupied) dwellings	Population
Lakes Entrance (and Lake Bunga not Kalimna)*	EGSC	1,991 (720)	5,020
Port Albert*	WSC	119 (111)	247
Seaspray*	WSC	112 (214)	316
McLoughlins Beach/ Manns Beach**	WSC	62 (60)	255

Sources: \*ABS (2011) QuickStats for state suburbs and\*\* DPCD (2009)



## Activities to Date

The project began in June 2010. During this time the original project team of Professor Jon Barnett, Dr Anna Hurlimann and Professor Ruth Fincher has worked to the schedule outlined in the original research proposal submitted to the Australian Research Council. This has included administrative tasks, such as appointing research staff, finalizing contracts and budgets, and applying for and receiving approval from the University's Human Research Ethics Committee for each data collection activity.

In the second year of the project the research team has consolidated its working relationship with the project partners, gained an increasingly detailed understanding of the study areas, and learned more about the broader policy and social trends that have bearing on vulnerability and adaptation to sea-level rise in the study areas.

The Postdoctoral Research Fellow initially working on the project (Dr Nick Osbaldiston) has taken up a continuing academic position at Monash University. Dr Sonia Graham now fills this position, and she has been very active since commencing in February 2012.

In the last year we have:

- conducted informal interviews with 17 key informants in order to better understand the nature and causes of social exclusion in the five study areas, and to seek sources of data about these issues;
- conducted an extensive review of scientific research on climate risks to the Gippsland East coast, which is presently being peer-reviewed;
- developed an innovative method for understanding the value of entities at risk from sea-level rise (and adaptation strategies), and the differences among members of coastal communities with respect to what they value;
- developed a framework of 'lived values at risk from sea-level rise', to guide data collection and analysis, based on reviews of research in the fields of climate change, economics, human geography, social impact assessment, planning, and psychology;
- conducted 36 interviews (with 43 people) across the study areas in order to refine the framework of lived values that has been developed, learn what people value about living on the coast in Gippsland East, and develop a survey to collect data from a larger population in the study areas. The diverse characteristics of the people interviewed is shown in Table 2;
- developed a typology of barriers to adaptation to sea-level rise, which will be used to examine barriers to adaptation in Gippsland East;
- drafted a paper on values at risk from sea-level rise;
- submitted for peer-review a paper titled: 'The institutional drivers of adaptation to sea-level rise: evidence from Lakes Entrance, Australia';

- continued to participate in community meetings in the study areas, including study tours, forums, and workshops; and participated in numerous community events;
- updated searches of media reports about sea-level rise and related issues in Gippsland East; and
- presented interim findings of the research at the Saltwater Wedge forum (Paynesville, July 19-20 2011) and at the Brotherhood of St Laurence seminar series (Melbourne, May 24 2012).

**Table 2: Socio-demographic characteristics of the people interviewed about values at risk from sea-level rise**

Characteristic	Range among interviewees	Average of all interviewees
Age (years)	18-75	50.7
Length of residence (years)	0.5-43	13.3
Education	Year 8 - Masters	Year 12/TAFE
Household size	1-6	2.5

The presentation of emerging findings in the following section is based on the results from these activities.



*Tractors being used to launch boats, Manns Beach*

## Emerging Findings

In this section we present findings that have emerged in the last year, and which are in addition to those identified in the year 1 report (Barnett et al. 2011). The findings are 'emerging' in the sense that they arise from our data collection activities to date, noting that they will be refined and revisited in light of subsequent evidence that we collect, and further analysis. Therefore these findings should be read as preliminary: this should be taken into account when reading them, and they should not be treated as providing robust information for the purposes of making decisions.

We categorise the findings as being of four kinds, relating to: the nature of evidence about climate risks in Gippsland East; the nature of social disadvantage in the study areas; the kinds of 'lived values' that might be at risk from sea-level rise (and adaptation responses); and evidence from interviews about which of these values matter most (and so need to be considered when developing adaptation strategies).

### ***1. The nature of evidence about climate risks in Gippsland East***

Since the mid 1980's there has been growing recognition that climate change may exacerbate many of the environmental and flooding problems in Gippsland East (e.g. Bird 1985, Vanderzee 1988). Since 1995 there has been an increasing number of studies investigating the effects of sea-level rise, changes in wind and waves, and subsidence on extreme sea-levels in Gippsland East; there have also been studies on the effects of these changes on some aspects of coastal morphology; and there have been studies on climate change and aspects of flood risk (e.g. McInnes et al. 2005a and 2005b, McInnes et al. 2006, Sjerp and Charteris 2007 and 2008, Water Technology 2008, Wheeler et al. 2007, 2008 and 2010). The following tables summarise the findings of this research, and offer some insights into the nature of the evidence about climate risks in Gippsland East.

Perhaps the most influential of all the research on climate change in the Gippsland coast is the sequence of three studies led by Kathleen McInnes from CSIRO and commissioned by the Gippsland Coastal Board. These are focused on understanding changes in extreme sea-levels along the Gippsland coast, and within Corner Inlet and the eastern end of the Lakes themselves. The overall goal of these studies was to produce "spatial maps of storm surge return periods ...for the eastern Victorian coast from about Inverloch to the NSW border" (McInnes et al 2005a, p.7). Their results are summarized in Table 3.

It is important to recognise that these studies show the risks associated with only some of the likely biophysical effects of climate change (changes in mean and extreme sea-levels) to only one aspect of the problem of flooding in Gippsland East (the magnitude and frequency of storm tide heights on the coast), under different climate change scenarios. They do not capture all the drivers of flooding in the Lakes environment (for example, they exclude the effects of extreme rainfall, which are a significant cause of flood heights inside the Lakes). Further, their spatial resolution is too broad for the purposes of town planning. Thus, these are by no means a full assessment of vulnerability to flooding (which would include, for example, assessments of shoreline

responses, and assessments of the scope for adaptation to manage these risks). A complete assessment of vulnerability would also include knowledge about the risks that sea-level rise (and responses to manage sea-level rise) poses to things that people value. In this study we seek to produce this knowledge about social vulnerability in Gippsland East.

**Table 3: Aims, methods, and results of the CSIRO analysis of extreme sea-levels studies**

<b>Stage 1:</b>	<i>The effect of climate change on coastal wind and weather patterns.</i>
<b>Aim:</b>	to assess changes to wind conditions and the synoptic weather events that are conducive to storm surge formation.
<b>Method:</b>	a) Scenarios of mean and extreme near-surface winds are based on thirteen climate model simulations; and b) Future changes in the frequencies of synoptic weather patterns associated with storm surges were examined using two high resolution regional climate model simulations performed using the CSIRO Cubic Conformal model.
<b>Findings:</b>	In Gippsland East extreme winds are likely to change by between -32% and +32%, depending on the season and the model used. There is likely to be a slight increase in the number of days under which extreme winds can be generated.
<b>Stage 2:</b>	<i>The effect of climate change on storm surges</i>
<b>Aim:</b>	to assess the impact of future wind speed changes on storm surges along the coast, with a focus on return levels for storm tide heights.
<b>Method:</b>	Hydrodynamic modelling, atmospheric data from a “simple parametric storm model” and statistical analysis of extreme sea-level events.
<b>Findings:</b>	For the coast at Lakes Entrance: by 2030 the 100 year storm surge height coupled with mean sea-level rise will range from 1cm higher than at present through to 21 cms higher than at present; by 2070 the 100 year storm surge height coupled with mean sea-level rise will range from 1cm higher than at present through to 66 cms higher than at present (the highest value is an increase of 47% above present).
<b>Stage 3:</b>	<i>The effect of climate change on extreme sea-levels in Corner Inlet and the Gippsland Lakes</i>
<b>Aim:</b>	to determine the impact of climate change on sea-level heights and inundation around Corner Inlet and the Gippsland lakes
<b>Method:</b>	Downscaled results using the GCOM2D hydrodynamic model.
<b>Findings:</b>	For Port Albert, an increase of the 100 year flood level by between 2 and 22cms in 2030 relative to present levels, and by between 4 and 63 cms by 2070. The worst case by 2070 it is an increase of 36% above present levels.  For Lakes Entrance, an increase of the 100 year flood level by between 2 and 20cms in 2030 relative to present levels, and by between 4 and 59 cms by 2070. Relative to Grayson et al’s (2004) 1:100 year flood height of 1.8 meters, the worst case by 2030 is therefore an increase in flood height of 33% by 2070.

## 2. The nature of social disadvantage and vulnerability in the study areas

Analysis of ABS data revealed that the study sites are in a position of socio-economic disadvantage relative to the Australian population (Table 4). The median weekly household income was 24-51% lower than the Australian median (\$1234) and the index of relative socio-economic disadvantage in all five sites was lower than the mean for Australia (1000). In addition, the populations in the study sites are 11-20 years older than the Australian average (37 years).

**Table 4: Indicators of social disadvantage for the study sites**

Towns	Median household income (weekly)	Index of relative socio-economic disadvantage*	Median age
Lakes Entrance	\$694	846-953	49
Port Albert	\$608	902	57
Seaspray	\$933	933	48
McLoughlins Beach **	\$773	994	51
Manns Beach **	\$635	937	53

Source: ABS (2011)

\*The Index of Relative Socio-economic Disadvantage is derived from Census variables related to disadvantage, such as low income, low educational attainment, unemployment, and dwellings without motor vehicles. The lower the score the greater the disadvantage. Source: ABS (2006). New data will not be released by the ABS until 2013.

\*\* McLoughlins Beach and Manns Beach are contained within larger collection districts and therefore the numbers presented here may not accurately reflect the populations of these small communities.

Information obtained through informal interviews with members of key community groups and service providers gave a more nuanced understanding of how this disadvantage is distributed within the study sites and its relation to flooding vulnerability.

In Lakes Entrance, the people who are vulnerable to flooding are: tourists and newcomers; people on low-incomes; and the elderly.

During key holiday periods, the population of Lakes Entrance increases tenfold, significantly increasing the number of people at risk. Much tourist infrastructure is located in the low-lying parts of Lakes Entrance and the people who visit the town are likely to have never experienced flooding before. The growing numbers of sea-changers may also be less prepared for flooding than long-term residents, although some of the wealthier sea-changers are choosing to live in the hills.

Some of the highest concentrations of residents on low incomes occur along the foreshore. This is partly due to the location of public housing, but also because the highest concentrations of elderly residents are along the foreshore and North Arm. These observations made by key informants are confirmed by ABS data.

One section of the community that may be less affected by flooding is the Indigenous population. This is because the homes of most Indigenous people are in more elevated parts of the town.

Key informants indicated that flooding in the smaller communities of Seaspray, Port Albert, Manns Beach and McLoughlins Beach does not exacerbate existing patterns of social disadvantage within the communities. Nevertheless, they identified that some people are more vulnerable to flooding than others because their houses are not as elevated as others in these settlements.

### ***3. The kinds of ‘lived values’ that might be at risk from sea-level rise (and adaptation responses)***

There is limited information available about the likely social impacts of sea-level rise (and climate change impacts more broadly), particularly in developed nations. This is despite the acknowledgement that there are important social and cultural elements at risk from climate change, which will be particular to localities and people within them (Adger et al. 2011). One reason for this gap may be that approaches for conducting such research are not well established.

In reviewing the climate change and social impact assessment literature, we established that in order to understand the potential social impacts of sea-level rise (but also of adaptation policies) it is useful to identify prevailing community values (Canan and Hennessy 1982, Córdova 2011). In order to address this gap we reviewed literature on the concept of values from diverse disciplines. From this we propose a useful definition to describe these values as ‘lived values’ which are “the actual practices and engagement” people have with places (Kleinman 2011, p.804). We then used the social impact assessment literature to identify a range of values that we believe may be impacted by sea-level rise. From this we developed a framework for categorizing these values. We present this framework in Figure 1. We have used this to guide our empirical research.



*A busy time at the boat ramp, Port Albert*

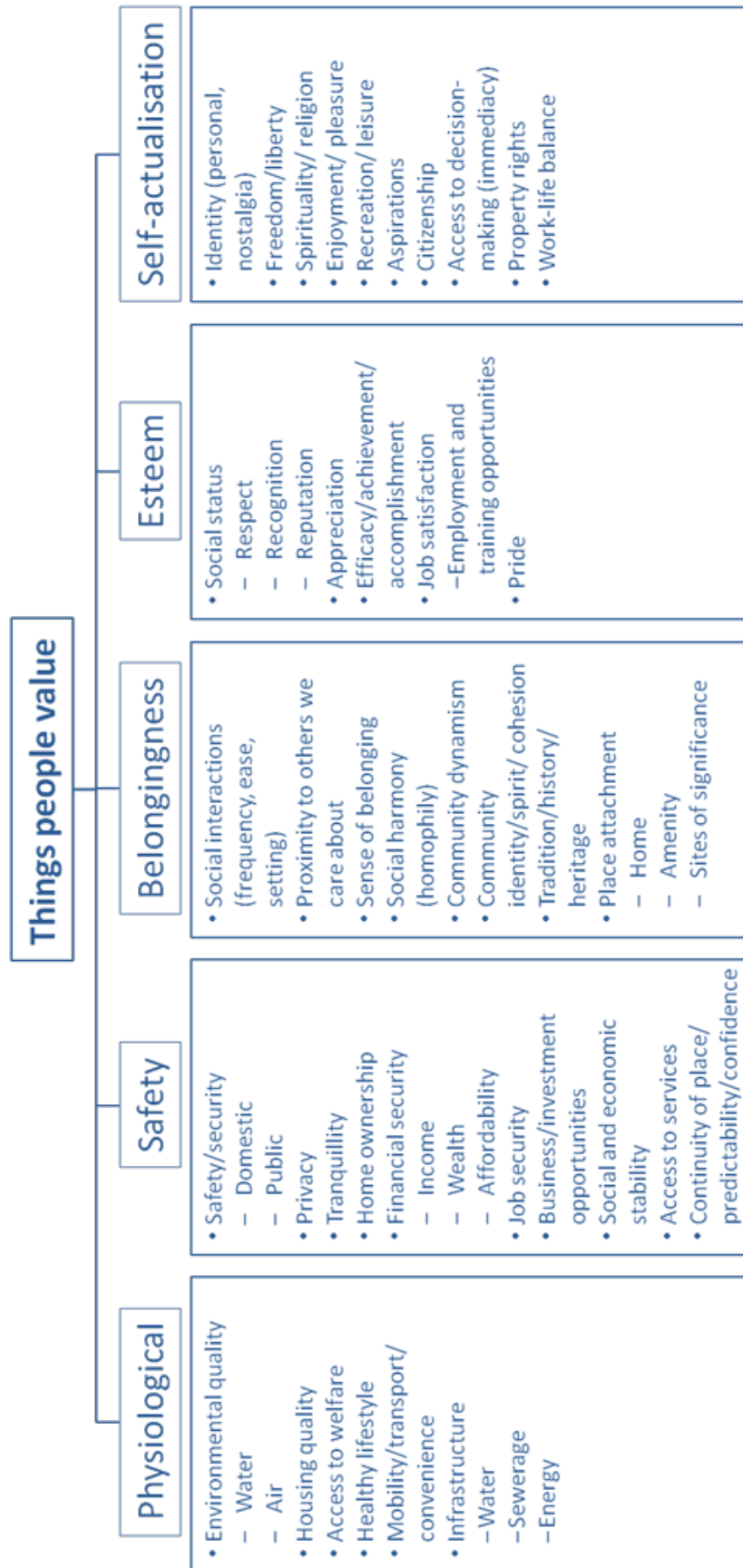


Figure 1: A Framework of 'lived values' at risk from sea-level rise

#### ***4. The things that matter***

Based on our notion of lived values, our interviews with community members were designed to understand what they value about their everyday lives—what activities they participate in, who they interact with and the places that they spend their time. We were also interested in learning about the reasons why they chose to live in these towns, why they continue to live there and how they compare these places with others that they have spent time in. The interim findings give a preliminary overview of the answers to these general questions.

##### ***Everyday activities***

One of the key activities that interviewees engaged in, with the exception of retirees, was paid work. For these interviewees, it was important to feel a sense of job satisfaction—to be supported and appreciated by the people they work with as well as pride in their own work—and the security of a steady flow of income. In Lakes Entrance, interviewees also mentioned that they placed value on being able to achieve a good work-life balance; their short travel times to and from work mean that they have more time for other recreational activities, such as going to the beach, the gym or participating in team sports.

In their home lives, interviewees valued spending time with their families or relaxing by working in the garden, reading, watching television or using the computer. In the smaller communities, interviewees frequently socialised with other members of the community in their homes; it was a place to catch up for tea or coffee during the day or a cold drink at the end of the day.

Outside of work and home there were a large range of activities that interviewees participated in. The most commonly mentioned was going for walks, which was followed by fishing, boating and socializing with family, friends, neighbours or other community members. Going shopping and participating in volunteer work were also commonly mentioned activities.

Other activities that interviewees valued being able to do in these localities were: walking; swimming; water skiing; knee boarding; jet skiing; beach combing; or simply watching changes in the natural environment, such as the beach, the ocean, the sky.

Observing people's everyday lives in the five study sites confirmed that the outdoor activities people mentioned in interviews were some of the most common activities observable in these communities (besides paid work and being at home). The most common activity observed were people walking, alone, with others or with dogs. In most cases, people were walking near water. The next most commonly observed activity was people fishing, followed by boating. There was much activity around the boat ramps in each community, especially during holiday weekends like Easter. Other activities that appeared to be popular were socialising, bike riding, picnicking and playing with children.



In making these observations it was apparent that participation in these activities is highly variable over time and space. For example, the number of people using the boat ramps fluctuated greatly by the time of day, day of the week, weather conditions, and special events.

### ***Important places***

From the description of everyday activities, it is possible to discern some of the places that are important to people. The places they spent most time was in their homes, other people's homes, their gardens and their workplaces. They also mentioned their children spending considerable time at school and in childcare centres.

The places where they preferred to spend their leisure time tended to be near water—on beaches, foreshores, esplanades, jetties, footbridges and fishing platforms—or on water—boating on rivers, lakes, inlets and the ocean. Of particular significance to people from all the communities, except for Port Albert, was Ninety Mile Beach.

For people who lived in Lakes Entrance, the following places held particular significance for interviewees: Cunningham Arm, North Arm, Eastern Beach, the Entrance, Bullock Island, Jemmy's Hill, the Winery, the Gippsland Lakes, Lake Tyers, Apex Park and Marine Parade.

For people living in Seaspray, Merriman's Creek, the surf club, the community hall and the tennis courts were important. They also mentioned a love of the view of Seaspray that is visible from the road driving down the hill into the town.

People living in McLoughlins Beach, Manns Beach and Port Albert mentioned Shoal Inlet, Corner Inlet and Snake Island. In McLoughlins Beach and Manns Beach the community halls were also important meeting places.

Interviewees also identified that there were a number of places beyond their towns that were important to them. These were places where they had grown up, where their families live or used to live and where there are natural, built or Indigenous sites of significance. They mentioned these places because they valued their ability to continue to visit these places and the people in them.

### ***Significant relationships***

Families were one of the most important social groups that interviewees discussed. They discussed the day-to-day interactions that they had with their families as well as the less frequent visits that they received or undertook themselves.

Family was a great motivating force for choosing to live in these towns. One of the most commonly cited reasons for moving to the study areas was the connection people felt as a result of having regularly holidayed in these towns as they were growing up. Interviewees also mentioned moving to these towns with their families as children or moving to these towns to be near their family. A small number mentioned moving to these towns to be further away from their families.

Friends were also significant. A number of interviewees explained that they moved to these towns because they had been brought there by a friend. Building friendships was also an important part of what made people feel that they belonged in these communities and was a reason for staying, rather than moving somewhere else and having to build new friendships.

Interviewees also valued the relationships that they had with their neighbours. If they had lived elsewhere previously, they frequently indicated that they had better relationships with their neighbours now than they did living in other, often larger towns. With few exceptions, they had the sense that people looked out for one another (more so than in larger towns) and that they would readily help out if needed. This was particularly important in the smaller communities, where neighbours would look after one another's houses when they went away, they would offer to buy groceries for one another if they were heading into town and they would help one another with chores if one of them was unwell.

Beyond these close ties, interviewees in all of the study areas indicated that one of the things that they valued about living in these areas was the sense that "everyone knows everyone". Although they acknowledged that this was occasionally undesirable—when they felt like being anonymous or when it was used for gossip—they usually emphasized that it was a good thing overall.

Associated with this sense of being a part of a small, close-knit community, came a sense of safety. Interviewees felt that they and the people they cared about, particularly their children, were safe and that other people would look out for them too. The main concerns about safety were associated with holiday periods, when large numbers of people visit the town from outside and may be less trustworthy.

### ***Overall values***

When interviewees were asked what they valued most about living in the study areas the most common answer was being near the water and/or the beach. They appreciated being able to spend time on the beach, which for a number of people was important for unwinding, and hearing the sound of the ocean. The water and beach were also important places for recreation and enabled people to participate in fishing, boating and other water activities. As such, individuals appreciated the availability, accessibility and maintenance of infrastructure that helped them to participate in these activities. This includes jetties, boat ramps, footbridges, fishing cleaning tables, etc.

Associated with wanting to be near water was a desire to feel close to nature and observe changes in it. Some individuals commented on the natural beauty of the area, the abundance of wildlife and the quality of the environment, such as the clean air.

After proximity to water, the next most valued quality of the study areas was their quiet and peaceful atmosphere. Interviewees explained that they enjoyed their relaxed lifestyles and the low levels of stress. This was partly attributed to the small populations and little traffic, which makes the places feel less busy.

Interviewees also appreciated the isolation and remoteness of the smaller study areas and in particular that they could be the only people on the beach at times. This appreciation of the quietness of these areas meant that there was some frustration associated with holiday periods, particularly in Lakes Entrance and Seaspray. Some interviewees reported avoiding the beach and central parts of town during these times because they do not like the busyness.

A number of interviewees also appreciated the connection that the study sites gave them to their family histories. Some of these interviewees had family connections to these places that spanned generations. This gave them a strong sense of belonging and familiarity with the area, which they also enjoyed being able to pass on to their children.

The temperate, coastal climate was another highly valued quality of the study sites. The climate was offered as a key reason why individuals moved to the study areas and what kept them living there.

Finally, there were two other highly valued qualities of the study areas that are somewhat in conflict with one another; interviewees valued their independence, but also their close social relationships. A number of interviewees mentioned valuing their ability to do what they wanted to do when they wanted to do it, without other people's input or judgments. On the other hand, interviewees also appreciated how friendly and helpful people were and the sense that everybody knows everybody. This also gave peace of mind about their own and their children's safety. This tension between independence and social interactions seems to reflect the notion of 'friendly distance' that has been identified in past research on neighbourhoods (e.g. Crow et al. 2002).

Overall, the results from the interviews indicated that almost all the lived values identified in our framework (Figure 1) were valued by some interviewees. As indicated above, the lived values that were mentioned by the largest number of interviewees were aspects of the natural environment (for their existence, aesthetic, therapeutic and recreational values), the social setting (being close to and spending time with others) and also a sense of belonging and place attachment. The only lived values that were not explicitly mentioned by any interviewee were: wealth, social stability, predictability and liberty. This indicates the potential explanatory power of the framework.

These results reveal how our conceptualization of lived values goes beyond previous research that has attempted to document social values of coastal places. Past research (e.g. Novaczek et al. 2011) has focused on values pertaining to the natural and built environment, rather than people's lives more generally. These preliminary findings reveal that while the natural environment is important to residents of coastal communities, other aspects of their daily lives are also highly important, such as social interactions and home-work proximity. Our preliminary findings suggest that there is a wide range of values that will need to be considered if equitable adaptation options are to be developed. These values indicate what is important about people's lives and the places they live in, and so they need to be taken into account when developing responses to adapt to sea-level rise.

## Future Activities

There are four phases of this project (outlined on pages 4-5) that are yet to be completed. The details of these phases are described below and represented pictorially in Figure 2.

### ***Scoping and confirming lived values at risk from sea-level rise***

In year 3 we will continue to collect data about the lived values of people exposed to sea-level rise in the study sites. This will involve in-depth analysis of the qualitative interviews conducted to date. The insights gained from this analysis, combined with the results of the place-based observations, will guide the development of a quantitative survey that will be administered by phone in Lakes Entrance and by mail in the four smaller communities. The results of this survey will be analysed to provide a detailed description of the diversity and distribution of lived values that exist in each of the communities and how they use environmental and social features locally. Consideration will also be given to the way in which these values differ among residents, and how they may be affected by sea-level rise.

It is expected that this phase of the project will be completed by November 2012.

### ***Scoping potential adaptation strategies***

Drawing on findings from the project's earlier work (interviews with policy actors, informal interviews, analysis of secondary data, document analysis of community plans and newspaper articles, place-based observations, qualitative interviews and quantitative survey), the project team will develop potential adaptation strategies for these study areas. These hypothetical strategies developed by the research team (and not by government partners) will be used to then explore the potential social justice outcomes of different adaptation options.

It is expected that this phase of the project will be completed by December 2012.

### ***Individual and community evaluation of hypothetical adaptation strategies***

Once a set of hypothetical strategies have been scoped and evaluated for their feasibility, focus groups will be run with community members from each of the study sites. Like Tompkins et al. (2008), we consider that evaluation by the community is necessary to finalise the best adaptation options, equitably, for this context. The participants for the focus groups will be drawn from those who participated in the interviews and surveys. It is not possible to specify the exact composition of the focus groups at this stage – we leave open the possibility that they may focus on particular issues or adaptation strategies or that they might focus on a particular view that requires elaboration.

It is expected that this phase of the project will be completed by February 2013. It is hoped that by conducting the focus groups over a peak holiday period that it will be possible to capture the opinions of a wider range of people who use the study areas.

### ***Final report and manual development***

The final six months of the project will involve synthesis and publication of the results of the whole project for distribution to the project partners. A considerable part of this time will also be dedicated to producing a practical manual that lays out the project methodology, so that others can follow or adapt it to undertake similar studies elsewhere.

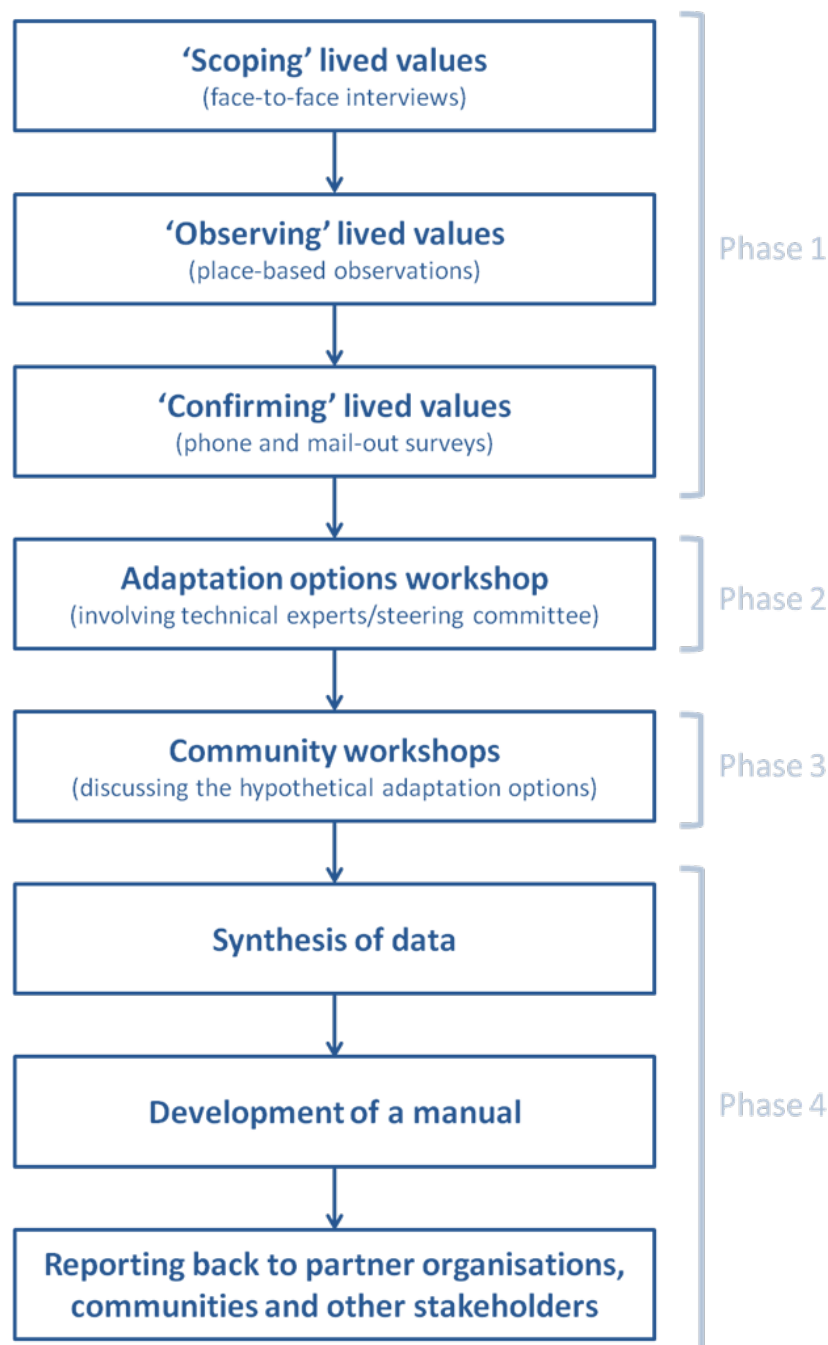


Figure 2: Remaining phases of the project to be completed in year 3

## Summary

As we have outlined in this report, a large body of work has been conducted over the past year, which has contributed towards our understanding of the issue of equitable adaptation to sea-level rise in Gippsland East, Victoria.

Our research findings in this second year of the project have focused on four kinds of knowledge relating to: the nature of evidence about climate risks in Gippsland East; the nature of social disadvantage in the study areas; the kinds of 'lived values' that might be at risk from sea-level rise; and evidence from interviews about which of these values matter most.

Our analysis indicates that there are still many information gaps relating to the nature of evidence about climate risks in Gippsland East. There is a need to understand a greater range of flood drivers in the Lakes environment (for example, the effects of extreme rainfall), as well as a need for improved spatial data at finer resolutions to assist more diverse practical purposes such as town planning.

With regards to the nature of social disadvantage in the study area, our analysis of ABS data indicates that the study sites are in a position of socio-economic disadvantage relative to the Australian population. Interviews with members of key community groups and service providers inform how this disadvantage is distributed within the study sites, and importantly, how this relates to vulnerability to flooding. Tourists, newcomers, the elderly and those on low income are most likely to be vulnerable, due to issues of knowledge, and physical location of housing respectively.

In order to understand the potential social impacts of sea-level rise, we have established that it will be useful to identify the 'lived values' – the actual practices and engagement people have with places. We developed from theory a framework for categorizing these values. This framework has been successfully used to guide our empirical research this year. Using this framework we have conducted 36 interviews collected with 43 individuals across our study locations.

These interviews provide us with an understanding as detailed earlier in the report about what these people value about their everyday lives—what activities they participate in, who they interact with and the places that they spend their time. These values will be confirmed through a large scale phone survey in Lakes Entrance, and through mail based surveys in the smaller communities.

A significant program of research remains to be conducted in the year to come. In the next year we will consolidate our findings, make adaptation recommendations for our study locations, and produce a manual to guide others in conducting such activities.

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