Climate Change Adaptation
Good Practice - Case Study

Tasmanian Climate Change Adaptation Pathways Project

About Adaptation Good Practice

Adapting to climate change is a relatively new concept to many. It is important to learn from practitioners who are undertaking adaptation activities that are beginning to have tangible outcomes. Documenting examples of good practice and identifying the criteria that makes them work, enables those interested in adaptation to learn about how to take action.

There are expectations that Adaptation Good Practice (AGP) includes a definite start and finish to a project. However climate change practitioners' experiences show that adaptation projects are often steps in longer learning journeys. There are no golden rules on how to adapt and often practitioners across Australia are inventing the wheel that drives future AGP. This case study of Tasmanian Climate Change Coastal Adaptation Pathways (TCAP) project is part of a series of 16 case studies that recognise exemplars for AGP in Australia. Through the development of these stories of successful adaptation it was refreshing to see an emergence of similar experiences and challenges regardless of the project or location. A synthesis of these stories can be seen in the Synthesis Report 'Climate Change Adaptation Good Practice: Key lessons from practitioners experiences', which which will help practitioners to understand that they are not alone in their challenges and to see some of the clear lessons learned about what drives good practice in adaptation.

Following the Snapshot there is a more in depth narrative of the experiences, learnings and network links to stimulate further engagements and knowledge sharing among the growing community of adaptation practitioners.

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Case study snapshot

Tasmanian Climate Change Adaptation Pathways Project

The City of Clarence is confronted with coastal hazards including erosion, sea level rise/coastal inundation, and a rising saline water table. Impacts of coastal erosion, flood inundation and more frequent events of seawater across the highway since 2000 prompted strong action by Clarence City Council, help from government agencies and committed community engagement.

Through the Tasmanian Climate Change Coastal Adaptation Pathways (TCAP) project, a long term adaptation strategy was developed in consultation with the community to prepare for the effects of climate change and urbanisation in four sites including the Lauderdale foreshore area. The Lauderdale community was responsive and engaged in a fruitful consideration of the options available.

The TCAP project provides a phased adaptation strategy for Lauderdale to ease the effects of erosion and inundation based on the expectation that the suburb will be affected by 0.9 m sea level rise. If coastal hazards are not addressed, most of the properties in Lauderdale would be at significant risk from erosion, inundation or both with the predicted sea level rise. A number of natural areas fringing the suburb contain threatened species or communities and important migratory bird habitat and fish breeding grounds that could also be adversely impacted.

The most challenging outcome was that although there was significant prior investigations of potential adaptation works, when the Lauderdale community's preferred approach (beach nourishment alone for the short term) was assessed in more detail, costs were higher and practicality lower than had been expected, requiring a more intrusive and expensive approach to be adopted to be effective.

The project journey

In the 1990's Clarence City Council established a framework for working with their Landcare and Coastcare groups to coordinate community-based action on natural resource management and coastal issues encompassing areas of coastal erosion near beach suburbs including the Lauderdale foreshore. A great deal of community education grew from Council's work engaging a range of geomorphologists, coastal managers and other specialists.

In 2006, the Water Research Laboratory (WRL) at the University of NSW conducted detailed hazard assessments for 17 coastal areas within Clarence City. The WRL's work clearly showed major impacts in two suburbs, and one of these could be potentially affected by extreme events that may occur under current conditions. It also showed that residents would need to take protective action if these suburbs were to remain occupied over the next 100 years.

Through this work, confidence was gained to present hazard maps to the community. This information was well received as it provided some clarity about an issue that they were well aware of, but unsure of its severity. An emergent issue was whether and how, affected communities could address this, or whether they even had a long-term future in this location. The Council was advised that active discussion of the options within each community was needed to

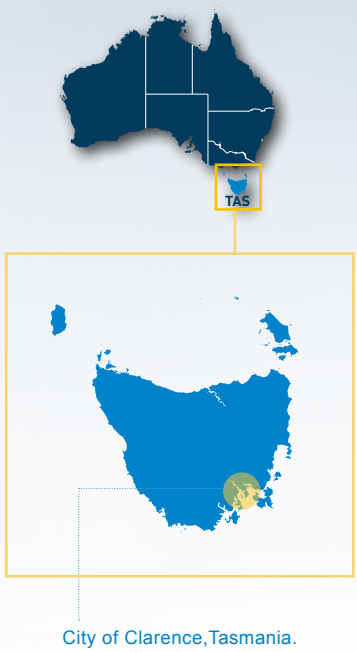

Figure 1: Lauderdale is in the City of Clarence, Tasmania (I of 4 Tasmanian Climate Change Coastal Adaptation Pathways Project [TCAP] sites).

An emergent issue was whether and how, affected communities could address this, or whether they even had a long-term future in this location.

explore potential courses of action and agreed on whichever was appropriate in each context. Over the next few years the Council's consultants worked on investigation and communication of specific short to medium term adaptation actions: beach nourishment, groynes, etc.

Drivers for adaptation action

Ongoing history of response to impacts. Big shift forward during 2006 - 2008 with DIICCSRTE funded Clarence City Council (CCC) and TCAP work.

→ Adaptation action

In 2011, funding was obtained for TCAP which provided a framework to explore longer term options and develop an adaptation strategy for sites including Lauderdale. This strategy provides a blueprint for other coastal communities to develop adaptation pathways to plan for climate change.

Impact and risk addressed

- Coastal erosion, sea level rise/coastal inundation
- Rising and increasingly saline water table
- Concern about significant growing present day erosion risk and more frequent sea water across the highway since 2000 drove both Council action and strong community engagement.

Key project aims

Selection of a long term adaptation pathway for the suburb which informs immediate short term works to address erosion risk and manage risks to development in flood prone areas.

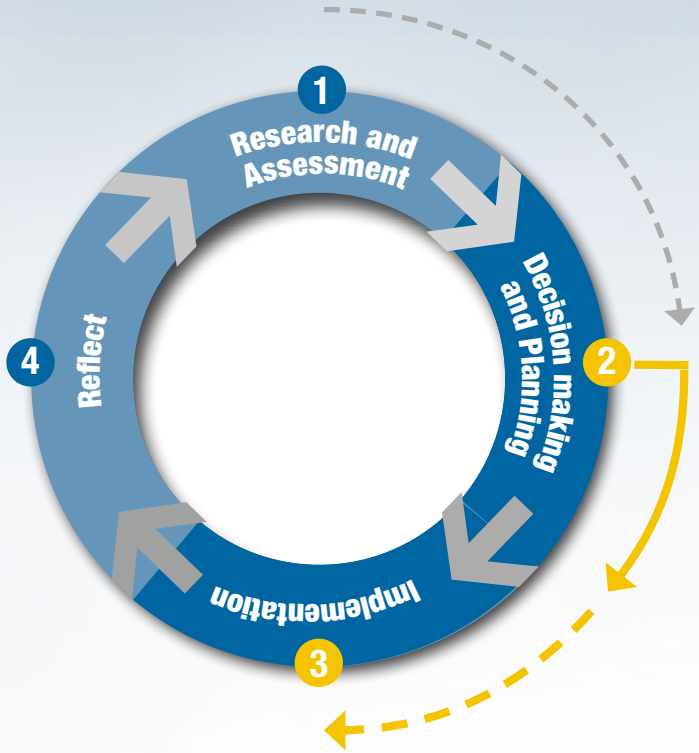

Figure 2: Tasmanian Climate Change Adaptation Pathways Project Adaptation Good Practice phase

Outcomes achieved

Detailed plans and staging for responding to short and longer term risk from present day accommodating a sea level rise of about 0.9 m.

Emerging outcomes

This principle was clearly enunciated:

Risk must be actively managed, not allowed to develop in an uncontrolled manner.

If this principle is adhered to, it is likely to provide a stimulus for self-initiated adaptation actions.

The project

Lauderdale, one of four sites for the long term adaptation strategy known as TCAP, provides a phased adaptation strategy to ease the effects of erosion and inundation based on the expectation that the suburb will be affected by 0.9 m sea level rise.

The hazards are coastal erosion, sea level rise/coastal inundation, rising saline water table. If these hazards are not addressed, most of the properties in the residential suburb would be at significant risk from erosion, inundation or both with the predicted sea level rise. A number of natural areas fringing the suburb contain threatened species or communities and important migratory bird habitat and fish breeding grounds that could also be adversely impacted.

CCC has a long term involvement with coastal erosion of the Lauderdale foreshore area. With the spectre of a predicted 0.9 m sea level rise with the potential to cause inundation of infrastructure and property, the Council engaged both the local community and State Government agencies to prepare for this eventuality.

Risks and impacts addressed

- Coastal erosion at Roches Beach, Lauderdale and net recession from repeated cut and fill cycles over many decades
- Rising and increasing saline water table
- Properties at risk from erosion or inundation or both. Beachfront properties are threatened with significant risk during major storm events. On the other side of the dunes, low lying land in Lauderdale is subject to inundation from rainfall combined with high tides in Ralphs Bay.

Figure 3: 1974 flood in Lauderdale, Clarence City Council (archive image)

Figure 4: Damaged revetment repaired after storm

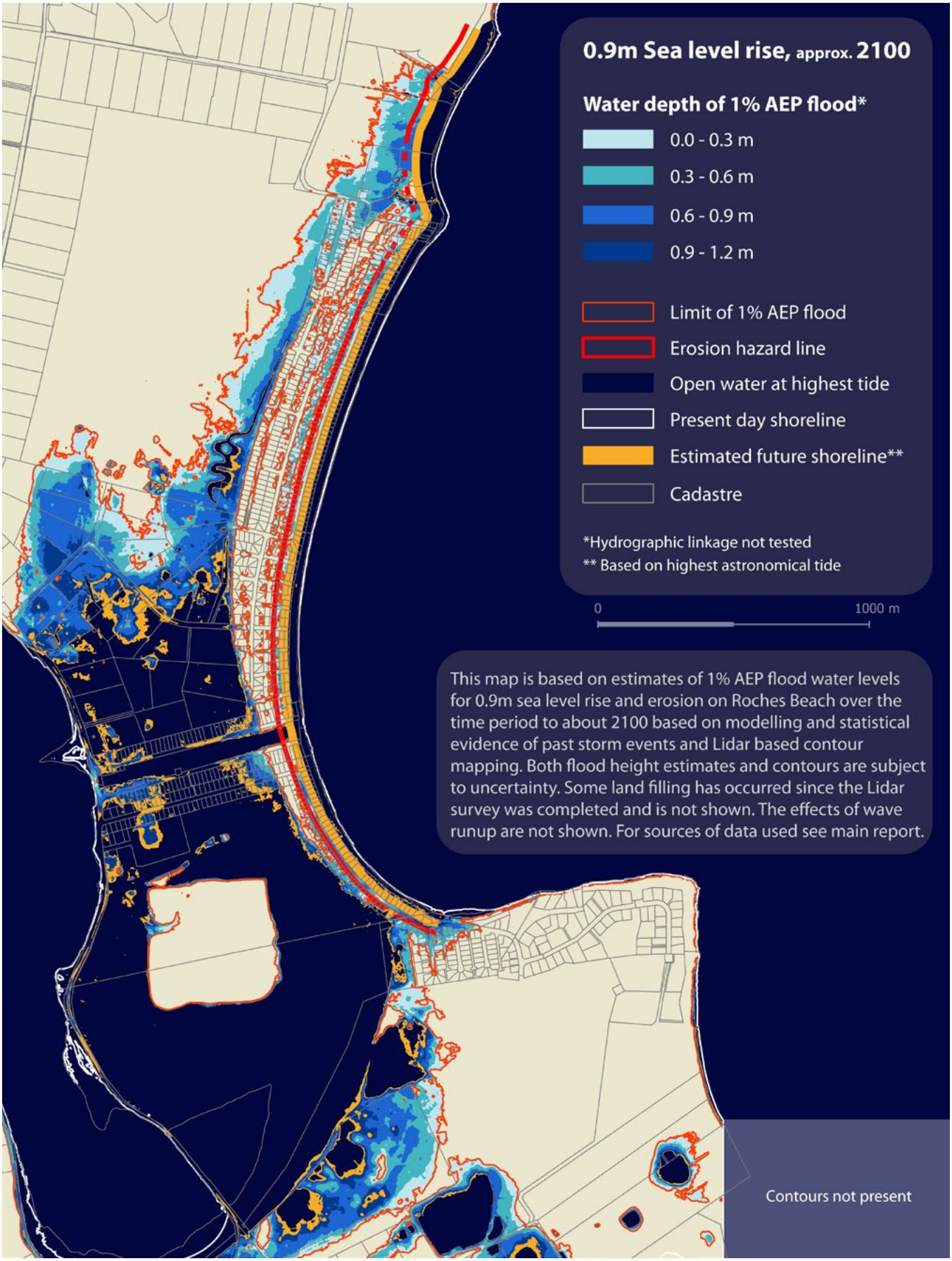

Figure 5: Hazard map for Lauderdale, showing hazard associated with a 0.9 m Sea Level Rise

- Sectoral impacts on infrastructure
- Potential damage to important migratory bird habitat and fish breeding grounds
- Impact on threatened species or ecological communities.

Response strategy

The objective of the strategy is to define a broadly supported viable future adaptation pathway for the suburb that manages risks to acceptable levels at a cost that is sustainable by the community.

Implementation phases

- Hazard assessment and mapping
- Planning scheme amendments
- Technical studies on feasible short to medium term erosion control works and first round of works completed
- Additional adaptation options were listed with indicative costings
- Ongoing community engagement history with an active coast care group for about 20 years previous project from 2006 - 2008 involved public meetings where a hazard map was shown. The Planning scheme process involved advertising and public meetings
- Broadly staged preferred adaptation plans and works were then 'reality checked' by further engineering and environmental investigations
- The results of these further investigations were presented to Council with some modification of the proposals from the community workshops in light of findings

Figure 6: Dune erosion July 2011

http://climatetechwiki.org/content/sea-dikes

Figure 7: Concept photo - road as dike, Holland

Figure 8: Short-term works to reinstate dunes

- Immediate actions (e.g. beach scraping and dune bulk increase), regulatory changes and a plan for longer term adaptation when specific triggers occur resulted
- The changes to beach conditions and environmental indicators are being monitored.

Outcomes achieved

- The 'reality check' process largely confirmed the practicality of the preferred approach to inundation management
- The assessment of the response to erosion revealed issues that required further technical and environmental investigation and higher costs that previously expected

Figure 9: Filling of low lying land, Lauderdale

- Additional work is required to resolve the governance and funding issues identified in the project but a general approach was agreed.

Specific adaptation responses included:

- Proposed further adjustments to the planning scheme to provide protection and an inland migration pathway for significant wetlands
- A staged plan for improvements to drainage and drainage controls for any development in flood prone areas permitted for intensification
- A staged plan for raising roads to ensure reliable access during extreme events while using some of the elevated roads to reduce the exposure of low lying land to flood events from the sea to reduce risk to existing development
- Identifying controls to be applied to any filling of low lying flood prone land
- Short term beach nourishment for eroded beaches where property is at immediate risk from storms sufficient to reduce, but not eliminate, that risk
- Staged coastal protection works (groynes, offshore reefs) to increase the effectiveness and reduce the expected frequency of beach nourishment
- Draft plans for funding contributions to the works that will require more detailed development and support before implementation
- Awareness of the issues and involvement of affected parties was raised through extensive consultation processes.

Emerging outcomes

Two principles were clearly enunciated:

1. There can be no subsidies to occupy hazardous locations.
2. Risk must be actively managed, not allowed to develop in an uncontrolled manner.

This is expected to stimulate a significant degree of autonomous adaptation.

Critical success factors

AGP analysis of the project

Success of this approach has been driven by strong leadership and excellent engagement and connectivity between all stakeholders and by lasting and sustainable vision.

This project is strong in:

- **Leadership**
- **Engagement**
- **Connectivity**
- **Sustainability**

Residents were engaged...and resulted in planning amendments to respond to coastal hazards; hazards that are clearly present today and expected to increase as a result of climate change.

Leadership

CCC, faced with a number of its coastal communities affected or at risk from coastal erosion and flooding proactively sought opportunities to progress technical and consultation aspects of the project, and has funded substantial investigations from its own resources.

The most recent TCAP initiative was led by the State Government in conjunction with the Local Government Association of Tasmania (LGAT). CCC has also been a keen collaborator with other Councils, and recognised the need to work constructively with the State Government to progress in some aspects of its coastal management efforts and so was keen to participate in the TCAP initiative.

Previously, differing approaches to management of waterfront land by CCC and the State Government had the effect of undermining the community's confidence that risk to property can be managed effectively.

Liability for works done, or not done, and about roles and responsibilities for approval of works and funding is yet to be clarified.

CCC's early work on coastal hazards over the past decade to maintain dunes, access ways and amenity in beachside areas valued by residents across the City was based on collaboration with land care /coast care groups.

A wider and more integrated approach by Council covering 17 locations in the City occurred between 2005 and continued through to 2008.

Extensive community consultation engaging residents, as part of the City-wide approach resulted in planning amendments to respond to coastal hazards; hazards that are clearly present today and expected to increase as a result of climate change.

As technical work proceeded on assessing the best options to address short term risk, extensive community engagement processes were undertaken.

The most recent work to consider the long term evolution of the area included building on previous community consultation through more community meetings and workshops.

Extensive consultation exposed these agencies to the issues presented in the four project sites, the range of approaches available to address them and some of the implications.

State Government agencies joined with the LGAT to form a steering committee for the project.

The steering committee conducted a series of community meetings and workshops.

Leadership lesson learnt:

Leadership from State and Local Government Associations can drive positive planning and action at the local government level.

There are benefits to working constructively with State Government for progressing coastal management.

Consultation can identify the issues and present a range of approaches including some of the implications involved in dealing with these issues.

Engagement

Residents were engaged with extensive community consultation as part of the earlier City-wide approach. This included presentation of and discussion about hazard maps produced in 2008, and resulted in planning amendments to respond to coastal hazards; hazards that are clearly present today and expected to increase as a result of climate change. As technical work proceeded on assessing the best options to address short-term risk in Lauderdale, there were a series of workshops with

The Lauderdale site was one of four TCAP sites. Due to prior work done at Lauderdale, this site progressed further than the others in detailed planning, acting as a pioneer site for this approach.

Councillors and regular letterbox drops and articles in Council newsletters kept the community informed. Council officers had regular face-to-face contact with affected citizens. The most recent work to consider the long term evolution of the area built on previous community consultation, starting with additional workshops for Councillors. There was a letterbox drop to announce the TCAP project along with a press release; a presentation of the future scenarios proposed for consideration with Q&A session; and a subsequent weekend of 4 workshops with several parallel sessions to explore four scenarios for Lauderdale in detail.

→ Engagement lesson learnt:

Community engagement ensured that they were informed and aware of challenges faced by Council. With the community on board responding to coastal hazards through planning amendments was possible.

Connectivity

The most recent project is a further development of previous work on amendments to the planning scheme, short term works to reduce erosion risks, dialogue with the State Government and proposals for a structure plan amendment to consolidate the development pattern of the suburb. The project linked prior research with new investigations including additional investigations into natural values that had previously not been fully documented.

The results have also been used to link with planning by the state infrastructure agency (Department of Infrastructure, Energy and Resources, DIER) to upgrade a section of state road in a way that will enhance flushing of an enclosed wetland area. Provision will be made to ultimately raise the road both to ensure it is not submerged during extreme events and provide some protection against inundation from coastal high tide extreme events.

Transferable outcomes are:

- Coordinated research between and within Local Government and State Government
- Continuing community involvement in decision making
- Coordinated work programs.

The project was part of a larger project including three other local areas in Tasmania. The approach is being rolled out to additional local areas that are the next most affected by coastal hazards.

The project required engagement with a range of local government activities including engineering, planning, natural areas management, legal and communications. Discussions between these activities generally led to consistency in approach for the subject area not always found between these activities. However, the need for ongoing coordination of these activities requires constant attention.

The Lauderdale site was one of four TCAP sites. Due to prior work done at Lauderdale, this site progressed further than the others in detailed planning, acting as a pioneer site for this approach. The broad approach to adaptation pathway planning is being extended to other communities in Tasmania.

→ Connectivity lesson learnt:

Coordinated research and work programs along with continuing community involvement requires constant attention.

Sustainability

The project identified a pathway for adaptation where those that benefit from occupying highly valued coastal areas contribute substantially to the cost of actively managing risks to property, in a way that does degrade or detract from the value of the area, including key natural values. Reasonably detailed investigations at significant cost are required to ensure that works undertaken do not have adverse unintended effects on property or the environment. Whatever action is taken, sea level rise will result in inevitable changes to the area, whether occupied or not, including the likely loss of threatened coastal ecosystems due to a rising saline water table.

This project encouraged residents and non resident property owners to become involved and address the issues

The approach developed will ultimately provide greater certainty to residents of the area making investment in the area less risky. It should maintain the integrity of a valued coastal community for many decades, even while making residents more highly aware that in the very long term, it may not be practical to continue to occupy the area in the current manner.

→ Sustainability lesson learnt:

Ongoing research programs with constant review will minimise the likelihood of maladaptation or future uncertainties.

Cost

The costs of short term works are clearly modest compared to the reduced risk of potential damage to property. In the short term, as part of a transition

strategy, these costs have been borne by CCC. It is intended to transition to a funding model in which the owners of properties in the hazard zone make the majority of the contribution to the cost of any protection works. In turn, they would have a say in the specific works to be adopted, but this is constrained by the requirements of approval processes that protect the wider community interest in access to beaches, amenity and environmental values.

Local Government and State Government cooperation regarding the implementation of the approach requires resolution.

The proposed approach will ultimately link the value of occupying these areas to the costs associated with adaptation where this involves collective protection works. When these costs or the conditions of implementation are seen to exceed the value of occupying this area, a process of disinvestment and retreat would be expected. This in unlikely to occur in the next 100 years or more.

Prior to the TCAP work, Clarence Council had spent about $500,000 on studies to evaluate and address coastal hazards in Clarence, much of which was directed to Roches Beach. The TCAP funding was for about $500,000 including in kind contributions for four locations around Tasmania with about one quarter used for Lauderdale. Clarence will continue to implement the findings of the project.

Access to follow-on funding has not yet been determined.

→ Cost lesson learnt:

Spending money now on understanding risk, engaging with communities and on planning and implementation helps reduce long term impacts and associated costs and saves substantial infrastructure costs.

Conclusion

CCC officers and some elected representatives have been strong supporters of sharing their experiences with other Councils. While this was originally a requirement of funding agencies, officers report that whenever they engaged with staff from other Councils, they gain new insights and ideas as well as providing support to others. This allows them to continue to respond to opportunities to share experiences with other Councils.

An open process engaging effectively with the community can gain substantial support for adaptation approaches, including funding models where those receiving the benefits pay for the costs of keeping risks to acceptable levels. Cooperation and coordination between State Government and Local Government is required for effective implementation of some elements. The process is iterative and ongoing, with significant costs for technical investigations before action is taken to ensure that works do not have adverse longer term impacts on property or the environment.

Lessons learnt:

Engaging with other Councils leads to new insights and ideas and encourages support of each other.

Gaps and future challenges

- Information is required on potential longer term responses to erosion and flood hazards with indicative costs
- Implications of adopting one of a number of different adaptation options
- Further detailed assessment of each proposed action will be required during detailed specification and design, including consideration of off-site impacts
- Impact of prior works will also be monitored over time to ensure any adverse effects are noted and responded to.

The main challenges to implementation are:

- The need for improved coordination between land managers (Council, State agencies and private land owners) and ongoing support for implementation of the plan
- Legal liability and insurance issues
- Confirmation of the proposed funding and governance approach and additional detailed work required to implement it.

Links to more information and projects

Earlier reports on all of Clarence coastal areas that formed the foundation for the recent project in Lauderdale:
www.ccc.tas.gov.au/page.aspx?u=1075

Scenarios and recent technical reports for Lauderdale:
www.ccc.tas.gov.au/page.aspx?u=1630

Principle reports from the TCAP project in Lauderdale:
www.ccc.tas.gov.au/page.aspx?u=1697

Overview of TCAP project including background on other sites:
www.dpac.tas.gov.au/divisions/climatechange/adapting/_tasmanian_coastal_adaptation_decision_pathways_project

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