Coastal Collaboration Cluster Milestone 4 Report

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13 October 2011
Report to CSIRO Wealth from Oceans
Dr Andy Steven, Theme Leader
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1. CLUSTER UPDATE AND SUMMARY

1.1 Milestone Number 4

The Cluster book Sustainable Coastal Management and Climate Adaptation replaced the previous Milestone 3. The previous Milestone 3 becomes the current Milestone 4, reported herein. The previous Milestone 4 has been rolled into Milestone 5.

1.2 Date Due

13 October 2011

1.3 Cluster Leaders

Professor David Wood and Associate Laura Stocker

1.4 Milestone Status

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1.5 Project Progress and Achievements

All the Cluster themes are on track with their progress according to the revised schedule of deliverables.

- Work on the book is nearly complete and it is shortly to be sent to peer reviewers.

- The Governance Systems Theme (1) has completed the Google Earth Participatory Mapping workshop with the City of Mandurah and coastal stakeholders, and follow-up analysis is underway.

- The Socio-Cultural Context Theme (2) has finalised the survey instrument for the social network analysis; data collection and analysis for the case studies is in progress. The coastal champions survey instrument has been finalised and piloted.

- The Knowledge Systems Theme (3) has finalised the regional profile and research design for Portland and Derwent-Huon studies; principles for knowledge uptake have been synthesised from the literature; and interviews for first pass needs analysis for Portland Bay/Huon Channel are complete and used as basis for workshops.

- The Adaptive Learning Theme (4) has collected data for on-line toolkit from over 15 case studies; developed a comprehensive annotated bibliography with over 100 articles; and started designing a web-based interactive web page.
• The Synthesis Theme (5) has completed commitments for draft edited text of the CSIRO Press book which has been sent to peer reviewers. Theme 5 has started compiling coastal legislation and policy instruments to legal constraints and opportunities for science uptake in coastal zone management and compiled Milestone 4 report.

1.6 Project Outputs

Key activities included:

• Participation at Cluster committee meetings and other external committees including: INFORMD Partnership Steering Committee (Theme 3), Steering Committee of the Australia Coastal Alliance (Theme 4), and Local Government Association of NSW and Shires Association (Theme 5)
• 15 presentations as part of a forum or workshop
• 15 presentations at conferences
• 3 new collaborative partnerships
• 4 selected media
• 5 submissions and 17 journal/book chapter submissions.

1.7 Current research Students ECRs and RAs

New recruitments

Theme 3

Robert Crosthwaite (MA by research) Values and the Tasmanian State Coastal Policy.

Part–time Research fellow (Mr Chris Rees) - replacement for Dr Richard Mount who has resigned from the University of Tasmania.

Resignations

Theme 1

Dr Deborah Kennedy has resigned as Research Fellow at Curtin University due to ill health. A replacement fellow is being sought.

Jiska de Groot has withdrawn from her PhD candidature at USC.

Theme 4

Dr Stephen Myers (Steve has left the Cluster for a position at the University of Ballarat).

A replacement PhD student is currently being recruited to replace Jiska de Groot.
2. GOVERNANCE THEME

2.1 Theme Leader/Principal Investigators

David Wood and Laura Stocker

2.2 Milestone

Google Earth/kmz file of stakeholder responses; theme report.

2.3 Milestone Status

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2.4 Project Progress and Achievements

Outline the overall progress of the project

The project has progressed well and is on track. The Google Earth workshop with the City of Mandurah has been completed. Five PhD students from Curtin University and University of Sunshine Coast all have candidacy confirmed and most are underway with data collection and attending conferences.

Discuss any difficulties that have been experienced

The visualisation of the interactions among sea level rise, storm surge and catchment that was developed by CSIRO for use in the Mandurah and further workshops did not show a noticeable effect of sea level rise for some unknown reason. The reason needs further exploration so that the methodology can be applied to a realistic landscape for future workshop uses.

Describe the project’s major achievements / activities completed during this reporting period

The major activity of this reporting period has been to organise and conduct the Google Earth participatory mapping workshop at Mandurah. This was held on 18 August 2011 at Sebel Hotel in Mandurah (see Attachment for workshop program). The workshop was a joint exercise between the City of Mandurah and the Curtin-based members of the Governance Theme and CUSP Masters students. There were 50 participants, including community members, City of Mandurah officers and Mayor, and stakeholders from NGOs and State government departments. In addition, there were 12 facilitators and Google Earth operators from Curtin. Drawing on their own experience and on information presented by local government and state engineers, officers and decision-makers in a series of talks and a panel discussion, the participants together mapped on to Google Earth: coastal places of importance and their cultural, social, economic and ecological values; the concerns they had about these places as a result of climate change impacts; and suggested adaptive strategic pathways (see Attachment for kmz file of results). Key stakeholders were interviewed before and after workshops (ongoing) and participants were
survey before and after workshop (see Appendix A for interview and survey schedules). Analysis of results is ongoing. Figure 1 shows a screen grab of the kmz file.

Figure 1. Screen grab of kmz file showing results of Mandurah participatory mapping workshop.

Claudia Baldwin and Johanna Rosier at USC are extending Stocker’s work on coastal governance and climate change into SEQ. The ethics application is almost complete. Baldwin has also undertaken 8 interviews of flood-affected businesses in Rocklea Brisbane as part of the ‘Flood Risk Communication’ project. Further interviews will be undertaken in November with report writing allocated to December.

PhD student progress:

Gonni Bruekers
- Candidacy and ethics approval
- Interviews underway

Chiara Danese
- Twenty three interviews with key stakeholders
- Conducted BROCs workshop on planning and implementing coastal vulnerability analysis
- Completed technical report for workshop
- Two research papers in development
- One conference paper
- Applied for leadership program for region through Coastwest
• Attending NSW Coastal Conference in November

Carolyn Hofmeester

• Completed field work for Geraldton and SEQ studies
• Transcript verification and analysis in process
• Research paper ready for submitting to journal
• Attending Queensland Coastal Conference in October

Jenny Shaw

• Candidacy and ethics approval
• Completed scoping survey with small fishing industry organisation
• Will shortly embark on two national workshops, surveying participants and presenting information on climate change
• Attending NSW Coastal Conference in October

Sabiha Zafrin

• Paper accepted for Queensland Coastal Conference in September 2011
• Candidacy confirmed, seeking ethics approval.

Jiska de Groot

• Candidacy confirmed on 27 July
• Resigned from the PhD program effective 26 August 2010
• Prepared a brief report for Sunshine Coast Council (who contributed to her scholarship) summarising her work to date.

Deborah Kennedy

• Working on the governance modelling paper
• Working on finalising Rottnest paper
• Book review
• Student supervision, governance theme discussions and workshop facilitation

2.5 Project Outputs

2.5.1 Committee Participation

Cluster Management Committee Meetings.

2.5.2 Presentations to External Stakeholders

N/A
2.5.3 Presentations as part of forum or workshop


2.5.4 Presentations as part of a conference


2.5.5 New & existing collaborative relationships (formally acknowledge)

Rottnest Island Authority; City of Mandurah; City of Geraldton

2.5.6 Selected media


2.5.7 Submissions

On 14 Oct 2011, Baldwin, Stocker et al submitted a proposal to NCCARF for the theme of “What would a climate-adapted Australian coastal settlement look like in the year 2030?”

2.5.8 Journal submissions

Journal articles and book chapters


2.5.9 Other documents

N/A

2.6 Students

N/A

2.7 Other Recruitment (new positions created)

Dr Deborah Kennedy has resigned as Research Fellow due to ill health. A replacement is being sought.

Jiska de Groot has withdrawn from her PhD candidature.

2.8 Awards

N/A

2.9 Connections with Other Projects

Ongoing connection with Ningaloo Futures Cluster.

2.10 Contact with Beneficiaries

N/A

2.11 Variations to Project

Milestone adjusted as agreed.
3. SOCIO-CULTURAL CONTEXT THEME

3.1 Theme Leader/Principal Investigator

Professor Nick Harvey, Adelaide University and Dr Beverley Clarke, Flinders University

3.2 Milestone

Survey instrument complete; theme report

3.3 Milestone Status

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3.4 Project Progress and Achievements

Outline the overall progress of the project

The socio-cultural theme is progressing according to the schedule.

Describe the project’s major achievements / activities completed during this reporting period

The major achievements of the Socio-cultural theme are as follows:

1) Social Network Analysis

Research design

- The survey instrument was finalised during this reporting period

Data Collection

- A focus group was conducted with Department of Environment and Natural Resources coastal management staff, June 2011. The focus group assisted in identifying relevant coastal development decisions for use as cases studies in the Social Network Analysis (SNA) and the notion of barriers to science uptake into decision making was explored.

- On the basis of the focus group and internal discussion and consideration, 3 cases studies were identified for the SNA (2 metropolitan and 1 regional): the Minda Dunes retirement development, the Henley Surf Life Saving Club re-development, and the Point Boston ‘eco’ residential development.

- Data collection was completed for the Minda Dunes case study. This comprised: 12 interviews, and content analysis of secondary sources.
• Data collection commenced for the Henley Surf Life Saving Club re-development and Point Boston. So far 7 interviews have been completed, with a further 12 scheduled. There is also ongoing secondary source data collection.

Data Analysis

• Initial analysis has commenced on the networks of the different case studies.

Report writing

Background descriptions based on secondary sources have been written for the Minda Dunes case study.

2) Influence of coastal champions on science uptake in coastal policy

Research design

• The survey instrument (questionnaire) was finalised and given ethics clearance during this reporting period.

Data Collection

• A pilot questionnaire survey was conducted on-line through the Australian Coastal Society (ACS) website.

• On the basis of the pilot survey further questionnaires were sent for distribution at the Western Australia and Queensland conferences in October 2011.

• A third questionnaire survey is planned for face-to-face interviews at the NSW coastal conference in November.

3.5 Project Outputs

3.5.1 Committee Participation

Theme 2 leaders participated in teleconference cluster committee meetings.

3.5.2 Presentations to External Stakeholders

N/A

3.5.3 Presentations as part of forum or workshop

NA

3.5.4 Presentations as part of a conference

Two presentations to the 2nd International Symposium on Integrated Coastal Zone Management, 3-7 July 2011, Arendal, Norway.
• Nursey-Bray, M (presenter) and Harvey, N The role of learning processes in bridging the science-policy divide in the coastal zone.

• Pelton, N Federalism and Coastal Governance in Australia: Integration, an Impossibility?

3.5.5 New & existing collaborative relationships (formally acknowledge)

N/A

3.5.6 Selected media

N/A

3.5.7 Submissions

Nursey-Bray, M and Harvey, N The role of learning processes in bridging the science-policy divide in the coastal zone, submitted to the Norwegian, Arendal ICZM conference committee for inclusion in a book on ICZM (contract with Blackwell)

Scott, Michael. “Social network analysis in environmental governance: embedding, governmentality, actant’ submitted to Environmental Politics September 2011.

3.5.8 Journal submissions

Harvey, N, Clarke, B and Nursey-Bray, M (in press) Australian coastal management and climate change, Geographical Research, volume 50.

3.5.9 Other documents

N/A

3.6 Students

N/A

3.7 Other Recruitment (new positions created)

N/A

3.8 Awards

N/A

3.9 Connections with Other Projects

N/A
3.10 Contact with Beneficiaries
N/A

3.11 Variations to Project
N/A
4. KNOWLEDGE SYSTEMS THEME

4.1 Theme Leader/Principal Investigator

Kevin O'Toole (Deakin University) and Marcus Haward (UTas)

4.2 Milestone

First pass needs analysis for Portland Bay/Huon Channel

Project Overview:

Problems arise when multi-level governance at an institutional level and multi-interest governance at local level are at odds with one another over the future directions of ICZM. Decisions are often made without reference to larger knowledge systems (especially scientific) and even when scientific knowledge is used it is can be piecemeal, narrow or selective to serve special interests. Since knowledge – scientific, managerial and lay – plays a central role in decision-making one of the first ways to proceed is to recognize and understand the processes of knowledge diffusion at local level. This implies that the knowledge generators and knowledge users need to find better ways to communicate in a meaningful way as people always act in local contexts that are spatially and temporally specific. Attempts to diffuse knowledge into local decision making can take a variety of forms but there are three major approaches that governments use; direct controls, economic incentives and moral suasion. This project will analyse this process of knowledge diffusion as it presently affects ICZM and how the different forms of knowledge – scientific, managerial and lay – affect the decision making and outcomes for end users of that knowledge.

Project Objectives:

The knowledge systems theme will:

- Identify information we need to know and use to confront the challenges of ICZM - what information sources are considered to be important by coastal managers and other end users, and how that information is used to enhance science impact on management actions.

- Identify how coastal managers and other end users utilize (or not) science in their decision-making processes.

- Analyse our ability to deal with future knowledge requirements.

4.3 Milestone Status

| Has this milestone been achieved (Yes/No) | Yes |
| Will the project be completed according to the current milestone schedule (Yes/No) | Yes |
4.4 Project Progress and Achievements

Overall Progress

Deakin University

The Deakin University research group has met the designated revised milestones:

1. Regional Profile of Portland Region and south west coast has been completed.

2. Development of specific research design details for data collection instruments in collaboration with University of Tasmania research group – to ensure complementarities in data collection and analysis.

3. Key principles in knowledge generation and diffusion elaborated from literature (See revised Milestone 3).

4. First pass analysis underway – initial in-depth interviews with key informants (To date 30 interviews have been completed). The data from these interviews is being analysed for use in the upcoming workshop to be held on November 28. (See Appendix B for interview schedule). Interviews are ongoing into the next milestone.

University of Tasmania

The University of Tasmanian research group has met the designated revised milestones:

1. Regional Profile of Derwent-Huon Region has been completed.

2. Development of specific research design details for data collection instruments in collaboration with Deakin research group – to ensure complementarities in data collection and analysis.

3. Key principles in knowledge generation and diffusion elaborated from literature

4. First pass analysis underway – initial interviews/ workshops undertaken with key informants (see Appendix B)

Difficulties Experienced

Deakin University

There were no major difficulties for the research team in Victoria during this period. It was hoped that the interviews would be further progressed in terms of numbers but we have reached our lower threshold of 30. This gives us sufficient data to use for the workshop at the end of November.

University of Tasmania

No major difficulties, but it has taken a longer time than expected to establish contacts with salmonid industry. Despite this, eight in-depth semi-structured interviews have been conducted
with participants in the salmonid case study and some buy-in from industry participants has been achieved. The project has also linked with other salmonid projects happening in the state and 2 relevant workshops were attended in which useful data was gathered.

**Major achievements/activities**

Deakin University

In this milestone Deakin has been able to fulfil some significant achievements. In order to explore different aspects of the ways in which different forms of knowledge and information inform coastal zone management 30 semi-structured interviews were conducted between June and October 2001 (see interview schedule attached). The interview subjects were identified on the basis of their active involvement in an aspect of coastal zone management relevant to the investigations being undertaken in Theme 3 (coastal inundation, marine protected areas, regional economic development planning, estuary entrance management, and recreational values). Interview subjects included state government employees, local government employees, members of coastal and catchment bodies, scientists, members of non-government organisations and community groups, and representatives from industry bodies. Initially, the insights obtained from the interviews will be used to inform discussions at a regional knowledge exchange forum to be held in Warrnambool on Monday 28 November. As part of these discussions forum participants will be asked to express their responses to various statements derived from the interviews using turning point technology.

Very rough initial impressions include that:

- People engage in coastal management in various different ways and with diverse backgrounds and viewpoints, as a consequence people often talk past each other or assume people know what they are saying (for example, some respondents didn’t consider that they were involved in coastal management despite being actively involved in fishing activities, consideration of coastal infrastructure (ie boat ramps and other infrastructure, and the condition of dune vegetation).

- People draw on many diverse sources of knowledge in dealing with coastal issues scientific, lay etc). Many people drew on tacit as well as codified knowledge in their practices.

- People often rely on trusted networks when dealing with new issues. Various reasons were provided as to what determines whether a source of information is trustworthy or not. Science is but one of these sources of knowledge.

- Some respondents also considered that the challenge is not so much to make the best use of available information, but how to make sense of the extensive information that is available.

- People and organisations deploy a range of approaches to managing information and knowledge, with this often influenced as much by tradition as it is need. Information is also shared in particular ways, often with little thought given to who it should be shared with, or how it might be shared more effectively.
• Science was not always viewed as being most critical when finding out about new issues.

• Views about what role science should have in coastal decision making varied considerably.

• There were widely divergent views about which forms of analysis were most influential in coastal zone decision making (e.g. scientific information, surveys, opinion polling, stakeholder consultation, discussion papers, focus groups, computer modelling, economic analysis) and widely divergent views as to which forms of analysis should be given more credibility in coastal zone decision making.

• There was a sense that the working relationships between organisations was influenced by the people involved (sometimes people were able to work effectively despite the organisational arrangements), although there was also a sense that working relationships would be improved through the establishment of improved communication channels (e.g. formal partnerships of MOU). Many relationships were as a consequence of a particular issue or project, rather than planned or proactively facilitated.

• Some respondents suggested that they were not well understood by other stakeholders.

• Various barriers or constraints on the effective use of information and knowledge were identified, with these ranging from very practical to more theoretical barriers.

• Numerous suggestions were provided on how the use of science and other forms of knowledge could be enhanced.

University of Tasmania

In the Tasmanian knowledge systems theme, the projects are mostly in the data collection and analysis phase, so major achievements relate largely to engagement, data collection and analysis with the Salmonid and Sea-Level Rise Projects. Preparation of drafts of the historical themed investigations (Bruny Bioregion and Ralph’s Bay) is well underway.

4.5 Project Outputs

4.5.1 Committee Participation

• Oyster Information Portal Project – Technical steering committee for Marine NARP funded project (Peat Leith).

• INFORMD Partnership Steering Committee (Marcus Haward).

• Reference Committee Tasmanian Coastal Adaptation Decision Pathways (TCAP) Project (Marcus Haward).

• Continuing as Vice President Australian Coastal Society. Monthly meetings have been held of the Executive (Geoff Wescott).
• Zoological Parks and Gardens Board in Victoria (could have valuable marine and coastal links through a variety of possibilities.) (Geoff Wescott).

• Western Coastal Board, Victoria (Helen Scarborough).


• Dept. Sustainability and Environments: Technical Audit Panel for Streamflow and Groundwater Management Plans (G Quinn).

4.5.2 Presentations to External Stakeholders

• Presentation to the Tasmanian Salmon Growers Association Technical Committee, 15 July, Hobart.

• Presentation at Institute of Marine and Antarctic Studies to executive and staff, 3 April.

4.5.3 Presentations as part of forum or workshop

• Workshop with Kingsborough Council staff including presentations, April 2011.

• Tasmanian Coastal Adaptation Decision Pathways (TCAP) Project Forum 22 September .

• National SeaChange Task Force Australian Coastal Councils Forum (March) Torquay. Presented on research potential projects in local councils and climate change.

• Coffey B and O’Toole K (2011) Understanding knowledge dynamics in Australian coastal zone management: A knowledge systems approach, presentation at Environmental Policy Institute Seminar Series, Memorial University of Newfoundland, Corner Brook, Newfoundland, Canada. 25 July.

4.5.4 Presentations as part of a conference


• O’Toole, K., Keneley, M., Arundel, H., Macgarvey, A., Quinn, G., Mondon, J. and Coffey, B. Integrating knowledge systems in local coastal management; the case of an estuary entrance management support system (EEMSS) in Australia. ACES, Aberdeen Scotland

• Coffey B and O’Toole K (2011) Informing regional strategic planning for sustainable coastal management, presented at Institute of Australian Geographers Conference, University of Wollongong, 5-7 July.
• Coffey B (2011) Victorian Labor and the environment: A legacy to be proud of? Refereed proceedings of the Australian Political Studies Association Conference, Australian National University, Canberra, 26-28 September.

4.5.5 New & existing collaborative relationships (formally acknowledge)

• Tasmanian Coastal Adaptation Decision Pathways (TCAP) Project – relationships with Local Government Association of Tasmania and Climate changes Adaptation Unit, Department of premier and Cabinet, Tasmania.

4.5.6 Selected media

• Letter to the Editor, The Age, 24 September on coastal planning decisions by current State Government (Wescott).

• Research Interested in province’s coast: Australian management project looking to tap into Newfoundland’s expertise, Western Star and The Telegram, Tuesday 26 July 2011 (Coffey).

4.5.7 Submissions

• Submission to Minster of Environment on the terms of reference of the VEAC Proposed study into Marine Protected Areas.

• Submission to Vic Economic Efficiency Commission on tourism in coastal parks and reserves.

4.5.8 Journal submissions


Manuscripts prepared


Coffey B and Marston G, How neoliberalism and ecological modernisation have shaped environmental policy making in Australia, submitted to *Journal of Environmental Policy and Planning* (under review)

Coffey B and O’Toole K Understanding Coastal Zone Management: the Potential of Knowledge Systems, *Conservation and Society* (under review)


Keneley, M., O’Toole, K., Coffey, B., and MacGarvey, A., Stakeholder Participation in Estuary Management: The Development of Victoria’s Estuary Entrance Management Support System (EEMSS) submitted to *Ocean and Coastal Management*

Glover, HK, Weston, MA, Maguire, GS, Miller, KK, Christie, BA (accepted; in press), Towards ecologically meaningful and socially acceptable buffers: response distances of shorebirds in Victoria, Australia, to human disturbance. Submitted to *Landscape and Urban Planning*

Lawson, J and Miller, KK (accepted; in press), Green revelations in a parched country: a case study of Abrahamic faith communities and sustainability. Submitted to *International Journal of Environmental Studies*

Lautenschlager, A.D., Matthews, T.G. & Quinn, G.P. Utilization of organic matter by invertebrates along an estuarine gradient in an intermittently open estuary. *Marine Ecology Progress Series.*

Weston, MA, Dodge, F, Bunce, A, Nimmo, DG, Miller, KK (accepted; in press), Do temporary beach closures assist in the conservation of breeding shorebirds on recreational beaches? Submitted to *Pacific Conservation Biology.*

### 4.5.9 Other documents

Peat Leith, Brian Coffey, Marcus Haward, Kevin O’Toole and Simon Allen. ‘Improving science uptake in coastal zone management: Using principles to explore the challenges, lessons and opportunities arising from the INFORMD process in south-eastern Tasmania’. Revised version of chapter for Cluster book.

### 4.6 Students

New enrolment:

Robert Crosthwaite (MA by research) Values and the Tasmanian State Coastal Policy.

Ongoing Enrolments:

Martin Farley (PhD) Research on track. Case study on Tasmanian coastal zone management.

Jan Shaw (PhD) completed period of suspension for personal leave, research on track with revised research plan.

### 4.7 Other Recruitment (new positions created)

Part–time Research fellow (Mr Chris Rees) - replacement for Dr Richard Mount who has resigned from the University of Tasmania.

### 4.8 Awards

Geoff Wescott: Awarded the Deakin Alumni (to be presented 19 October): “Awarded for outstanding service and achievement in the community”.

### 4.9 Connections with Other Projects

Wescott: $6,000 from the Faculty Research Cluster in Environmental Sustainability to prepare a literature review (to first draft) on the topic: Domestic Dogs in Coastal Parks – their impact and management.

4.10 Contact with Beneficiaries

N/A

4.11 Variations to Project

N/A
5. ADAPTIVE LEARNING THEME

5.1 Theme Leader/Principal Investigator
Professor Tim Smith, University of the Sunshine Coast

5.2 Milestone
Adaptive Learning for coastal organisations

5.3 Milestone Status

| Has this milestone been achieved (Yes/No) | Yes |
| Will the project be completed according to the current milestone schedule (Yes/No) | Yes |

5.4 Project Progress and Achievements

The Adaptive Learning Theme team have completed over 15 case studies at the local, national and international level on coastal management drawing on principles and practices of adaptive learning, organisational learning, sustainability learning, adaptive management, and integrated coastal zone management. The case studies will provide part of the knowledge base to enable adaptive learning within coastal organisations and inform the development of a simplified framework for coastal organisations to monitor and evaluate their institutionalisation of adaptive learning. We have also developed a comprehensive annotated bibliography with over 100 articles (approximately 2/3 are ready to be published online – see Appendix C) and the remaining are undergoing final review) related to adaptive learning particularly as it relates to the coastal zone.

As part of the Adaptive Learning Theme’s commitment to provide accessible information and knowledge on the role of adaptive learning in the coastal zone, we have started designing a web-based interactive web page that outlines the various aspects of adaptive learning. These include:

- **What is adaptive learning?** This provides an overview of adaptive learning with a descriptive list of principles and the role of adaptive learning in coastal organisations. This section also provides links to published material, and the annotated bibliography.

- **What are we learning for?** This reviews information on the goals of integrated coastal zone management as detailed in the Commonwealth Coastal Policy 1995. It identifies the approaches to defining and setting goals within coastal organisations delivered through a downloadable guide to goal-setting.

- **What does an adaptive learning organisation look like?** This provides a downloadable checklist characterising an adaptive learning organisation. It includes various descriptions under the categories; *It would be..., It would have..., It would do..., and It would achieve.*
• *Becoming an adaptive learning organisation.* This explores pathways, processes and tools for adaptive learning structured according to the adaptive learning cycle. It presents opportunities and barriers to embedding adaptive learning, building capacity, maintaining learning spaces, and transformation from limited learning to adaptive learning. The checklist from the previous section (*What does an adaptive learning organisation look like?*) is being expanded to present a simplified monitoring and evaluation framework.

• *Becoming an adaptive learning network.* This provides approaches for identifying, utilising and strengthening organisational networks. It builds on strategic networks and alignment, and partnership/collaborative models.

Primary data collection and case studies

The Adaptive Learning Theme is in the process of analysing primary data from interviews with the Sunshine Coast Council and Coolum Coastcare. The study is focused on organisational learning in relation to coastal management. Specifically we were interested in individual and collective learning including lessons or practices that could be translated across the organisation and potentially change behaviour. We were also attempting to understand the broader impacts on other coastal management organisations.

5.5 Project Outputs

5.5.1 Committee Participation

Prof Tim Smith continues to be involved on the Steering Committee of the Australian Coastal Alliance.

5.5.2 Presentations to External Stakeholders

N/A

5.5.3 Presentations as part of forum or workshop

Professor Tim Smith gave an invited presentation at Griffith University, Gold Coast Campus on New Directions for Coastal Research on Sept 16th – Australian Rivers Institute

Public Forum - Professor Tim Smith outlined the relationship between climate change and marine and coastal adaptation at the forum ‘The Climate Story – from Impacts to Adaptation’, which was organised by the National Climate Change Adaptation Research Network for Marine Biodiversity and Resources (Marine Adaptation Network) on 04 September, 2011.

Australian Leadership Award Fellowship ‘Building Executive Knowledge and Leadership Capacity in Cambodian Coastal Tourism’. 22 August to 04 September, 2011. The presentations were:

• An introduction to sustainability and partnerships for the future of the coastal zone - Dr Dana Thomsen
• Climate change projections and vulnerability - Prof Tim Smith
• Overview of coastal zone management issues - Dr Claudia Baldwin
• Governance tools - A/Prof Jo Rosier

5.5.4 **Presentations as part of a conference**


- Key note speaker: Tim Smith – Enhancing the Ability of Coastal Regions to Respond to Climate Change

The 3rd Queensland Coastal 2011 Conference ‘Ancient Knowledge Contemporary Innovation’, 19-21 October 2011, Cairns, Qld. Presentations will be made by the following:

- Keynote speaker: Associate Professor Johanna Rosier, New Zealand Coastal Policy, People and Partnerships: Are there lessons for Queensland Practice
- Mohammed Latif Siddique: Co-learning and Stakeholders' Participation in Marine Protected Area Management
- Sabhia Zafrin: Queensland's Coastal Management: Indicators to Measure Coastal Governance Outcomes
- Lavenia Tawake: Indigenous Learning Approaches for/from Sea Country

5.5.5 **New & existing collaborative relationships (formally acknowledge)**

USC has successfully gained Collaborative Research Network (CRN) funding through the Commonwealth Government. The CRN includes the University of Tasmania and builds on research related to the Cluster.

5.5.6 **Selected media**

Coast’s Future Flood Shock” The Sunshine Coast Daily, 9 April 2011 (Professor Tim Smith).

5.5.7 **Submissions**

N/A

5.5.8 **Journal submissions**


**5.5.9 Other documents**


**5.6 Students**

Craig Stephenson, PhD student (USC)

Sabiha Zafrin, PhD student (USC)

Jiska de Groot (Jiska has left the Cluster for a PhD position in the UK and a new PhD student is currently being recruited)

Mohammad (Latif) Siddique, PhD student (USC)

Lavenie Tawake, PhD student (USC)

**5.7 Other Recruitment (new positions created)**

Dr Stephen Myers (Steve has left the Cluster for a position at the University of Ballarat).

A replacement PhD student is currently being recruited to replace Jiska de Groot.

**5.8 Awards**

N/A

**5.9 Connections with Other Projects**

N/A
5.10 Contact with Beneficiaries

N/A

5.11 Variations to Project

As the book chapter replaced the last milestone the launch of the toolkit will now be combined with the delivery of the next milestone. However, this will not affect the end date of the project.
6. INTEGRATION, ANALYSIS & SYNTHESIS

6.1 Theme Leader/Principal Investigator

Professor Richard Kenchington, University of Wollongong

6.2 Milestone

1st Annual CZM Cluster report

6.3 Milestone Status

| Has this milestone been achieved (Yes/No) | Yes |
| Will the project be completed according to the current milestone schedule (Yes/No) | Yes |

6.4 Project Progress and Achievements

*Progress to date includes:*

Editing of Sustainable Coastal Management and Climate Adaptation: Lessons from Regional Australia; CSIRO Publishing. Completion and editing for coherence of approach has taken more time than expected because of delays in receipt of sections of text.

Compilation of coastal legislation and policy instruments to identify legal constraints and opportunities for science uptake in governance and institutional arrangements for CZM. Work is in progress towards the development of a joint manuscript with Brian Coffey and Tom Baxter.

Debora De Freitas has designed and compiled information to produce information brochure package for the Cluster (see Appendix D). Debora has been continuously updating information at the SharePoint.

Debora De Freitas has recently participated at a intensive two weeks training in agent based modelling hosted by CIRAD, France, 5-16 September 2011.

*Difficulties Experienced:*

Book delay. The thematic chapters provide substantial coverage of case studies of coastal management that differ in geographic scale and disciplinary approach to issues. This has presented interesting challenges for introduction, synthesis to achieve an integrated text that is greater than a collection of papers. This has taken longer than originally expected but CSIRO Press has been kept informed, arrangements for review are in place and completion should follow rapidly once review comments are to hand.

Graduate student. It has proved difficult to find a graduate student interested in a transdisciplinary project who is suitably qualified for a PhD scholarship. A research assistant has been appointed on a six month contract and the option of part time study with supplementary funding for completion beyond the life of the Cluster project is being explored.
6.5 Project Outputs

6.5.1 Committee Participation

Richard Kenchington participated in the majority of CSIRO Cluster Management Committee meetings.

Richard Kenchington and Debora De Freitas invited by Local Government Association of NSW and Shires Association (LGSA) of NSW to present the Coastal Collaboration Cluster and to discuss barriers to science in the coastal zone. LGSA also invited Richard and Debora to integrate a reference group on proposal ‘Regional Climate Change Summits for Councilors’.

6.5.2 Presentations to External Stakeholders

Richard Kenchington presented the Coastal Cluster Collaboration project at the quarterly meeting of the Coast and Marine Working Group Southern Rivers Catchment Management Authority (SRCMA) on September 13th, Batemans Bay, NSW.

6.5.3 Presentations as part of forum or workshop


6.5.4 Presentations as part of a conference


6.5.5 New & existing collaborative relationships (formally acknowledge)

N/A

6.5.6 Selected media

N/A

6.5.7 Submissions

N/A

6.5.8 Journal submissions

6.5.9 Other documents

Debora De Freitas is currently leading as guest-editor a special issue edition in Ocean and Coastal Management for the upcoming Research Forum day of the Australian Coastal Councils Conference 2012, 5-7 March, Hobart, Tasmania. She is working in collaboration with Alan Stokes (Executive Chair of the National Sea Change Taskforce) and with Tim Smith as a co-editor.

6.6 Students

Research assistant Katie O’Neil has demonstrated good performance and her initial six months contract experience has been extended to November 2011. Further extension in 2012 will be depending on available resources. Katie is currently doing the paperwork for admission at postgraduate course to conclude the master research component of her degree in Environmental Planning.

6.7 Other Recruitment (new positions created)

N/A

6.8 Awards

Debora De Freitas has been awarded partial funding by the University of Sydney Business School NSW to attend the upcoming Summer School on Complex Systems Research and Methods in Business and Biology (CSBB). 16-27 January 2012, Heron Island.

6.9 Connections with Other Projects

A link has been established with the NCCARF project (2011-12) - coordinated by Professor Colin Woodroffe (School of Earth and Environmental Sciences, University of Wollongong). The overall aim of this project is to develop a model framework for assessing risk and adaptation to climate change on Australian coasts integrating geomorphological, engineering and economic approaches to assessing risk for the Australian coast/coastal land use planning and management. Professor Woodroffe and Professor Kenchington made presentations to a meeting of the Coast and Marine Working Group Southern Rivers Catchment Management Authority (SRCMA) explaining the approaches of the 2 projects and exploring options for most effective engagement with managers as providers and users of information concerning coastal adaptation and mitigation for climate change.

6.10 Contact with Beneficiaries

N/A

6.11 Variations to Project

N/A
Appendix A - GOVERNANCE

A.1 Post Workshop Interview Questions for City of Mandurah

Convening
1. To what extent and in what ways did the workshop get the necessary people in the room together?

Translating
2. To what extent was the science communicated in an accessible way?
3. Which science communication methods worked best and why?
   • Specialist talks?
   • Panel?
   • KMZ layers in Google Earth?
   • PowerPoint showing inundation levels?
   • Video/visualisation?
   • How could the science translation have been improved?

Collaborating
4. To what extent and in what ways did the workshop foster collaboration among the various participants?
5. To what extent did discussion and mapping around the table enable participants to:
   a. understand new information
   b. develop new ideas or shift their perspective
   c. transform their way of thinking.
6. What did you think of the Google Earth participatory mapping process as a collaborative method?
7. To what extent was the workshop useful in terms of:
   a. Enhancing communication/ future networking about coastal adaptation among City officers?
   b. Raising awareness in the community?
   c. Generating ideas that can be fed into future scenario planning?
   d. Legitimising policy, planning or action by the City?

Mediating
8. Was there conflict around climate change at the tables and to what extent was it resolved constructively by the mapping/discussion processes?

Future work
9. Could the results generated from the workshop be useful as the basis for developing a series of governance scenarios that could be fed into the PNP project or used separately?
A.2 Workshop Coastal Adaptation to Climate Change and Sustainability for Mandurah

Coastal Adaptation to Climate Change and Sustainability for Mandurah

8.30am-6.00pm, 18 August 2011, Sebel Hotel, 1 Marco Polo Drive, Mandurah

Workshop presented by
City of Mandurah, Curtin University and CSIRO Coastal Collaboration Cluster

Our collaborative objective for the day is to develop shared understandings about the impacts of climate change on Mandurah’s coasts and waterways, and to develop pathways forward. We will use Google Earth to map participants’ ideas. The results will contribute to ongoing climate change and sustainability planning by the City of Mandurah and to the research findings of Curtin University and the CSIRO Coastal Collaboration Cluster.

Workshop Program

8.30am  Registration and surveys
8.45am  Welcome to country
8.50am  Workshop opening and welcome; Mayor Paddi Crewe, City of Mandurah
9.00am  Overview of Mandurah’s coastal adaptation actions to date
         (Mr Craig Perry and Dr Neil Carroll, City of Mandurah)
9.10am  Explanation of workshop process and coastal adaptation principles (Laura Stocker)
9.20am  Icebreaker
9.30am  Google Earth participant mapping activity: Places of Importance
10.00am  Plenary
11.00am  Morning tea
11.10am  Specialist talks and visualisations
          • Mrs Vivienne Panizza – Coastal planning and climate change
          • Mr Charlie Bidwell – Hazards and impacts of climate change and sea level rise
          • Dr Rob Kav – Coastal vulnerability study for Mandurah
          • A/Prof Laura Stocker – Animation of sea level rise, storms and floods
12.10pm  Panel discussion: Questions and answers
12.20pm  Lunch
1.15pm  Google Earth participant mapping activity: Concerns
2.15pm  Plenary
2.45pm  Afternoon tea
3.00pm  Google Earth participant mapping activity: Strategies and Actions
4.00pm  Plenary
4.30pm  Surveys
5.00pm  Workshop closes – thank you.

Contact: Associate Professor Laura Stocker, Curtin University Sustainability Policy Institute,
phone 9266 9004 or email L.Stocker@curtin.edu.au
A.3 Mandurah Survey

Thank you for participating in the workshop on
*Coastal Adaptation to Climate Change*
*and Sustainability for Mandurah*

8.30am-5.00pm, 18 August 2011, Sebel Hotel, 1 Marco Polo Drive, Mandurah
Workshop presented by
City of Mandurah, Curtin University and CSIRO Coastal Collaboration Cluster

Thank you for completing this survey.
The results will contribute to our research and help us assess how well we
presented the workshop.

**Morning Survey**

<table>
<thead>
<tr>
<th><strong>You and the workshop</strong></th>
<th><strong>Comments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>What is your main occupation?</td>
<td></td>
</tr>
<tr>
<td>What is your age group (Please circle)</td>
<td>&lt;20 20-29 30-39 40-49 50-59 60-69 70+</td>
</tr>
<tr>
<td>What was your motivation for coming to this workshop?</td>
<td></td>
</tr>
<tr>
<td>Sex? (Please circle)</td>
<td>M F</td>
</tr>
<tr>
<td>What do you hope to gain from today’s workshop?</td>
<td></td>
</tr>
</tbody>
</table>

**Your pre-workshop self-assessment**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Very Low</th>
<th>Low</th>
<th>Avg</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please rate your knowledge of the impacts of climate change on the coast. What are your specific areas of knowledge?</td>
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<tr>
<td>Please rate your level of concern about the impacts of climate change on the coast. What are your specific areas of concern?</td>
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<tr>
<td>Please rate your level of active involvement in coastal adaptation to climate change? What specific activities have you been involved in, if any?</td>
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</tbody>
</table>
### Your views about the coast

**Do you consider the coastal zone to be:** *(please tick as many as appropriate)*

<table>
<thead>
<tr>
<th>Human Pressure</th>
<th>Resilient</th>
<th>Adaptive</th>
<th>Protected/Managed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under increasing</td>
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<td></td>
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<tr>
<td>Unpredictable</td>
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<tr>
<td>Fragile</td>
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</table>

### The best way of solving our coastal problems is:

<table>
<thead>
<tr>
<th>Method</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>For governments to take a strong leadership and coordination role</td>
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<tr>
<td>To allow market forces to find the most efficient technological/innovative solutions</td>
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<tr>
<td>To involve a wide range of stakeholders including the community</td>
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<tr>
<td>To let nature take its course and minimise human interventions</td>
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<tr>
<td>To take a sustainability perspective by balancing economic, social and environmental objectives</td>
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<tr>
<td>To lessen human pressures &amp; change human behaviours</td>
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</table>

### Your views on climate change (provide specific sources if possible)

<table>
<thead>
<tr>
<th>Source of views</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My political and moral views ..................................</td>
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<tr>
<td>My intuitions ..................................................</td>
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<tr>
<td>Scientific evidence ............................................</td>
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<tr>
<td>Workplace ideas ................................................</td>
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<tr>
<td>Family ideas ....................................................</td>
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<td>Media ............................................................</td>
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<tr>
<td>Other .............................................................</td>
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</table>
### Afternoon Survey

<table>
<thead>
<tr>
<th>You and the workshop</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>What activities helped further develop a shared understanding of the impacts of climate change on the coast?</td>
<td>Circle. Google Earth mapping? Group discussions? Speakers and panel? Video? Interactive online inundation tool?</td>
</tr>
<tr>
<td>What was the highlight for you?</td>
<td></td>
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<tr>
<td>What aspects of today's workshop could be improved and how?</td>
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</tbody>
</table>

### Your post-workshop self-assessment

<table>
<thead>
<tr>
<th>Questions</th>
<th>Very low</th>
<th>Low</th>
<th>Avg</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please rate your knowledge of the impacts of climate change on the coast, now? What specific new knowledge have you gained?</td>
<td></td>
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</tr>
<tr>
<td>Please rate your level of concern about the impacts of climate change on the coast, now? What specific areas of concern have you now</td>
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<td></td>
</tr>
<tr>
<td>What level of active involvement in coastal adaptation to climate change will you have now? What specific strategies and actions might you now focus on?</td>
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<tr>
<td>Who else should be involved and what should they do?</td>
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</tbody>
</table>

Any other comments?

Contact: Assoc Professor Laura Stocker, CUSP, 0266 9034 or L.Stocker@curtin.edu.au

L.Stocker@curtin.edu.au
Appendix B - KNOWLEDGE SYSTEMS THEME

B.1 Interview Guide: Understanding Coastal Knowledge Exchange (Victoria)

Research aim: To improve understanding of the way in which knowledge is used along the coast.

Role and interests
• Can you provide a brief outline of your involvement in coastal related issues?
• How have you come to be involved in these issues, and what do you see your role as being?

Sources of knowledge and information
• What sources of information do you draw on? (name sources if possible)
• When dealing with new issues who do you seek advice from?
• What sources do you consider to be the most trustworthy?
• What kinds of factors influence your choice of which sources are trustworthy?

Managing knowledge and information
• How does your organisation/ group store information?
• Do you have an information storage system?
• What goes into this system?
• Who has access to this information?

Using and knowledge and information
• How do use information that you obtain from other sources, in your everyday practices [making decisions, advocacy and lobbying, applying compliance or regulations]
• When dealing with new issues what strategies do you use to familiarise yourself with them?
• Is scientific knowledge important in your deliberations?

Sharing knowledge and information
• What kind of information do you share with others?
• How do you share your information with others?

Contested knowledge
• While there are many forms of knowledge and analysis [e.g. scientific information, surveys, opinion polling, stakeholder consultation, discussion papers, focus groups, computer modelling, economic analysis] which do you think are most influential?
• From your experience, which of these forms of knowledge and analysis, do you think should be given more credibility in decision making?
• How would you describe your working relationships with other organisations with an interest in the coast [e.g. government agencies, council, universities, industry associations, community groups, etc]?
• Can you tell me about any instances where there has been disagreement (between people and/organisations) about what knowledge or information is relevant to coastal issues?

• What role should science have in the making of coastal management decisions?

Views about other stakeholders

• Can you provide examples of the ways that other stakeholders use information to advocate their views?

• What forms of information do they draw on, in what ways, and for what purposes?

• How do you think you are seen by other stakeholders?

Constraints on knowledge use

• Can you identify any barriers that limit the way in which the knowledge and information that you draw on is used? Can you provide examples?

Enabling the use of knowledge

• How might these barriers be addressed or overcome?

• What consultative (formal and informal) mechanisms have been used?

• Are there any local matters that you think science could play a bigger role in coastal issues?

Conclusion

• Finally, are there any other issues you would like to raise or points that you want to emphasise or clarify?
B.2 Interview schedule for Salmonid aquaculture / INFORMD (Tasmania)

Role and warm-up
Can you first tell me about what your work entails
Interest in the coastal zone/ marine systems

Information and decision-making
What sorts of information do you use/produce on a regular basis?
How is this information used (e.g. in decision-making)?
Has science been useful in resolving controversy in this space? (follow-up: examples)
Has science created controversies? (follow-up: examples)

The roles and responsibilities of stakeholders: science, government industry and community
In terms of production and use of information, what do you see as the roles of various groups:
- Scientists (IMAS/CSIRO) (follow-up: SCL, applied/basic, meta-data, uncertainty implications, application, decision-options, policy-advice)
- Government (MFB) (follow-up: scientific uncertainty, metadata, policy-relevance, politics, applicability, trust)
- Industry (follow-up: SCL, commercial in-confidence, sensitivity, relationships, trust, social license)
- Community (NGOs, community groups, citizens) (follow-up: SCL, Do these groups consistently maintain these roles and responsibilities? (follow-up: How do they and for what purposes? )

Knowledge other than science
- Beyond science are there other forms of knowledge that you think are important in contemporary coastal zone management? (follow-up: what are they? Who has this knowledge? How can it be used? By whom? What skills, training or institutions are required to incorporate it?)
- Are these forms of knowledge currently applied in any way to coastal zone decision-making? (follow-up: How are they used? By whom? In what ways? Are they competing? What prevents them from being incorporated?)

Knowledge system characterisation
- How would you broadly characterise the relationships between these different groups in relation to the use of information and knowledge in decision-making? (follow-up: stasis/dynamism, trust/distrust, conservative/progressive, engaged/disengaged)
- How do you think your group (scientists/government/community/Industry) are perceived by other stakeholders?

Concluding
Finally, are there any other issues you would like to raise or points that you want to emphasise or clarify?

Snow ball?
Thanks / outputs / workshop / / timeline etc.
Appendix C ADAPTIVE LEARNING THEME

C.1 Draft web design and sample content
What is adaptive learning?

Adaptive learning draws on organisational learning, sustainability learning and adaptive management to institutionalise responsive learning processes for improved integrated coastal zone management (ICZM). As with most reflective

![Adaptive Learning Diagram]

**Figure 1** The adaptive learning cycle

Adaptive learning practices are cyclical and incremental with each stage providing the foundation for the next. The focus on ICZM outcomes also requires that coastal practitioners and their organisations are intimately connected with the social and ecological dimensions of dynamic coastal systems. An adaptive learning approach needs to detect and respond to socio-ecological change cognisant of broader system goals. This requires knowledge, creativity and vision. It also requires that organisations function as effective conduits between different scales of learning such as from the individual to the societal or from local to global.

Figure 1 highlights the connections between individual learning, organisational learning and system outcomes. It also demonstrates the central role of adaptive learning in all stages of responsive practice, the creative role of networks and ideas generation in facilitating change, and the inspirational role of goal setting in focusing or guiding activities. Combined with an effective monitoring and evaluation strategy, this approach can facilitate tangible benefits for the coastal zone and those who live there.
What are we learning for?

Draft sample of text below

The coastal zone is valued by many communities who rely on these diverse systems to meet fundamental needs and established ways of life. Located in the dynamic and transitional space between the marine and terrestrial ecosystems, the coastal zone is one of the most biologically productive ecosystems supporting the nutritional needs of 1% of the world’s population. A further 2% is provided indirectly through contributions to the marine and terrestrial ecosystems. The coastal zone is also valued for aesthetic, recreational and spiritual amenities that attract significant numbers of permanent residents and tourists. For example, approximately 90% of the Australian population lives within 100km of the coastline and coastal tourism was worth $20 billion (2000-4). The pressures of climate change (e.g. sea level rise and storm surge) and development in the coastal zone will significantly impact coastal communities and all those that benefit from coastal services.

Download our goal-setting guide for coastal organisations to determine your organization’s role in the coastal zone.


Home Page | What is Adaptive Learning? | What are we learning for? | Case Studies | Related Links | About Us
Case studies

Experience can provide some of the most effective lessons and a tasted array of “tools” to apply in different contexts. We have compiled the following collection of cases ranging from the rich insights of local organisations through to agreements and cooperation at the international scale. Browse or use the keyword search to navigate your way through the following cases.

Search case studies: 

Local
Local communities and community-based organisations are often at the forefront of local coastal issues and can be effective advocates for integrated coastal zone management. Many have impressive networks and innovative approaches. Browse cases.

Regional
Working at the regional scale presents organisations with opportunities to work across a range of coastal ecosystems, to incorporate diverse community values and to effectively use inter-agency networks. Browse cases.

National
Organisations that function at the national scale have broad obligations and engage in programs of national significance with the potential for significant and far-reaching outcomes for integrated coastal management. Browse cases.

International
Programs and activities of concern to communities at the international scale present organisations with unique opportunities and challenges. Review these cases to learn more about addressing international and even global challenges. Browse cases.
About us

<Insert overview of the Coastal Collaboration Cluster>

The Adaptive Learning Theme of the Coastal Collaboration Cluster includes 8 researchers from the Sustainability Research Centre of the University of the Sunshine Coast and the University of Adelaide. Collectively the research team has skills in coastal management and planning, climate change adaptation and adaptive capacity, natural resource management, community-based research, coastal tourism and social and sustainability learning. We also have doctoral researchers conducting studies in coastal planning, co-management of marine protected areas, indigenous learning for Sea Country, and learning in response to extreme events in the coastal zone.

Research team

<Insert individual photos of the research team with qualifications and research interest>

Dr Dana Thomsen
Prof. Tim Smith
Dr Melissa Nursery-Bray
Assoc. Prof. Bill (Bill) Carter
Dr Gayle Mayes
Assoc. Prof. Johanna Rosier
Dr Claudia Baldwin

PhD students

<Insert individual photos of the students with qualifications and title of PhD>

Craig Stephanson
Sahra Zafiri
Lavinia Taiwaike
Mohammad (Latif) Siddique
Local case studies

**Seagrass-Watch**
How a collaborative community based monitoring program builds scientific knowledge while enabling local groups and individuals to work for more sustainable environments.  
[Read more...](#)

**Fiji Locally Managed Marine Area (FLMMA) Network Experiences**
Adaptive learning in local marine area management.  
[Read more...](#)

**Beach Protection Strategies on the Gold Coast**
From single issue 'problems' to integrated pathways to sociological health.  
[Read more...](#)

**Haumoana, Hawke’s Bay, New Zealand**
Tensions arise between big picture and little picture learning.  
[Read more...](#)

**Indigenous Learning Strategies**
Lessons from the Ngatiwhatua people.  
[Read more...](#)

**Project Twin Streams**
Voluntary property acquisitions in a vulnerable coastal community, Waitakere, New Zealand.  
[Read more...](#)

**Room for the River**
How the Dutch continuously learn how to live with water.  
[Read more...](#)

**Kaohsiung, Taiwan**
Marine pollution and prevention.  
[Read more...](#)
Regional case studies

**Cod Today, Gone Tomorrow**
An analysis of Newfoundland cod fishery, [read more...]

**ExxonMobil Corporation**
Black tide, the Exxon Valdez Oil Spill Disaster, [read more...]

**Haumoana, Hawke's Bay, New Zealand**
Tensions arise between big picture and little picture learning, [read more...]

**Beach Protection Strategies on the Gold Coast**
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Indigenous Learning Strategies
Lessons from the Nhunggubara people. Read more...
National case studies

Shoreline management in Britain
Building science into policy. Read more...

Fiji Locally Managed Marine Area (FLMMA) Network Experiences
Adaptive learning in local marine area management. Read more...

Representative Areas Program (RAP)
Creative leadership in a marine park succeeds in engaging community in the decision making process. Read more...

Room for the River
How the Dutch continuously learn how to live with water. Read more...

The Solomon Islands
Island community adopts proactive learning strategy to adapt to climate change. Read more...
International case studies

**Clean Up the World**
A global approach to cleaning up marine and coastal litter.
Read more...

**Cod Today, Gone Tomorrow**
An analysis of Newfoundland cod fishery.
Read more...

**The Helsinki Commission**
A collaborative approach to environmental management in the Baltic Sea ensures effective science-policy interfaces.
Read more...
C.2 Sample Case Studies

Title:
Building science into policy: the case of shoreline management in Britain

Abstract:
The second round of shoreline management planning in Britain offers an opportunity for insights into how adaptive learning has advanced delivery and consultation on coastal issues. This case study examines the role played by adaptive learning in the two rounds of shoreline management planning and discusses their implications for the ways in which science and policy meet to progress coastal management objectives.

Keywords:
Adaptive learning, science, policy, shoreline management, coast, England, Wales

Introduction:
Shoreline Management Plans (SMPs) are one mechanism whereby coastal risks have been managed in the United Kingdom. Established in the 1990s, the SMP process is now reaching the end of its second round, with SMPs extending across the entire 6000 km coastline of England and Wales. SMP 2 specifically built on lessons learned from SMP 1, and also yielded lessons in its own right. This case study summarises some of the key lessons learned from both rounds of management, and the implications of such learning for the integration of science in policy for coastal management.

Approach:
1. Shoreline Management Plans: Round 1
Shoreline Management Plans (SMPs), first introduced in the 1990s across England and Wales, provide a policy framework by which individual sections of the coast may be managed. The first round of SMPs was completed around the coastline of England and Wales, and was based primarily on sediment boundaries in relation to the movement of sand and shingle along various coastlines. The plans were designed to then be implemented by the relevant operating authority, which would include them as part of individual strategic plans, and inform decision making about capital investment and environmental management. Specifically, they were the key mechanism by which flood and coastal erosion risks were managed.

Since their completion, numerous other initiatives have had bearing on the SMP process. These included the UK Climate Projections 2009 report (Lowe et al. 2009), the FutureCoast project (DEFRA 2002), the implementation of catchment management plans (directed by local Environment Agencies), flood and coastal erosion strategies (undertaken by the EA and local authorities), strategic flood risk assessments (undertaken by local authorities), and the UK Climate Impacts Programme. Changes in the actual shoreline as a result of climate and other impacts also necessitated some new management approaches. Specifically, the Foresight program took a long-term view of national flooding and coastal erosion risks to 2100 and estimated that there were £130 billion of assets (homes, businesses etc) at risk of coastal flooding with at least £10 billion of assets at risk of coastal erosion. Further, the study predicted that future climate change could lead to potentially significant increases in future risk by the end of this century with annual losses due to flooding increasing to between 2 and 20 times the current values with coastal erosion annual losses rising by 3-8 times.
2. Shoreline Management Plans: Round 2

From this learning, the SMP 2 process was specifically undertaken to provide a way forward for local authorities and other decision makers to meet future needs in light of anticipated challenges. SMP 2 overall provided a conceptual framework to manage the risks to the coast in the short term (0-20 years), medium term (20-50 years) and long term (50-100 years). Management decisions within the plan were constructed according to the principles of (i) hold the line, (ii) retreat the line, (iii) do nothing or (iv) advance the line (see Box 1 for details).

<table>
<thead>
<tr>
<th>Box 1: SMP 2 Management Directives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hold the line. Retaining the existing line of defence through maintenance of existing defences or by constructing new defences where existing structures no longer provide sufficient protection.</td>
</tr>
<tr>
<td>2. Retreat the line. Actively manage the rate and process by which the coast retreats (known as ‘managed retreat’).</td>
</tr>
<tr>
<td>3. Do nothing but monitor. The option chosen for stretches of coastline where it is not technically, economically or environmentally viable to undertake defence works.</td>
</tr>
<tr>
<td>4. Advance the line. Build new defences seaward of the existing line</td>
</tr>
</tbody>
</table>

Importantly, local stakeholders, previously having played a minimal role, were actively recruited to be part of the SMP 2 process via the formation of Coastal Groups and other mechanisms. Each Coastal Group, convened by the local authorities was charged with supervising the write-up of the SMP for its stretch of coastline. A Coastal Group will usually be comprised of members from all authorities with an operational responsibility in the plan. This initiative builds trust and empowers local stakeholders and citizens to take responsibility for decisions and actions. Both empowerment and responsibility are crucial elements in the exercise of any coastal management strategy (O’Riordan and Ward 1997).

**Key findings and lessons for adaptive learning:**

SMP 2 built on the learning and experience of the SMP 1 process. It focused on mechanisms to take the SMP 1 process forward on the ground and actively engaged with local stakeholders and communities. Furthermore it actively developed a futures focus to planning and took on a range of time frames for thinking and enacting coastal strategies. As such it is an example of adaptive learning and subsequent adaptive management on a vast scale. For example, new data made clear that climate change predictions estimated that sea level rise had increased since the first round of SMPs, and needed incorporation into the next round. This included raising awareness of the longer-term implications (50 to 100 years) of coastal change, climate change and rises in sea levels, and finding ways to deal with the inherent uncertainty associated with predicting future impacts. As such, existing SMPs were adapted to include more consistent time horizons, with a focus on assessing and managing flood risks over a consistent time scale, in most cases one hundred years.

It was clear that more emphasis was also needed on finding ways to improve links within and between the multiple planning systems and arrangements, including longer time frames on coastal policies. Considering estuaries within SMPs and linking their management to the catchment flood management plan process is a good example of this in practice. The mapping and assessment of the implications of EU policies on local biodiversity objectives, and various national targets and aims relating to the natural and cultural environment is another.
Another major lesson was that stakeholder involvement needed to be much improved – the first round had paid scant attention to this factor in the initial implementation. As such SMP 2 endeavoured to conduct more efficient and targeted consultation with stakeholders in each planning area invited to comment. Public meetings, stalls, website activities and many other means of feedback were encouraged and received during this period. Adopted policies thus made an attempt to incorporate all comments received. While it may appear a small thing, a standard template/format for all SMPs was developed, and attention paid to ensuring public access to plan drafts was enabled via distribution of a free CDROM, and upload of documents to the internet. Current shoreline defences were revealed to have a limited durability, and improvements shown to be costly, so alternatives needed to be evaluated. In this context, the identification of anticipated sources of funding for coastal structural work or operations was considered thus making the implementation of policies more feasible.

As noted by Hunt et al. (2011) in relation to estuary planning within SMPs, key lessons for future planning include:

- The necessity of incorporating flexibility
- The importance of good and reliable science
- Acknowledgement of the role played by local experts and
- The need to build trust within local communities

Adaptive Learning, the coast and SMPs

Coastal management is always challenging, dominated as it is by competing interests and multiple management regimes. As such, learning from past experience is a crucial step to ensure future success. Torell (2000) notes that adaptive, learning based management in the coastal zone is derived from three principles:

- Adjusting actions and project strategies as new information is obtained
- Learning by doing and experimentation, and
- Active participation by relevant actors (Torell, 2000, 354).

In the case of SMP2 in England and Wales all these principles have been adhered to. The overall approach to shoreline management planning has been adjusted according to new science, and other learnings, lessons have been drawn from the active experience of implementing SMP1, and via the increased stakeholder consultation and participation on coastal groups in SMP 2 relevant actors have become part of the process.

Summary

However, adaptive learning is a complex process, and the question remains as to whether proactive or deeper learning has occurred to ensure that SMP 2 will be effective in achieving its aims of managing the flood and erosion risk to the coast in the long term. While the integration of science into policy at this level created some opportunities the SMPs are still very technically oriented, and often reliant on structural fixes, or, in their absence, a policy of no action. A key question remains as to whether the SMP process is one of enacting structural defences or is one of proactive policy. Is it better to use the SMP process to fight the ongoing incursion of the seas, or to use it as a justification, as shown in the evocative quote below about the coastal settlement of Happisburgh, to leave the coastal settlements and villages that have grown up along the coast over hundreds of years to fend for themselves?

"But once the revetments began to break up, the earth began to move. They became places where many people wouldn’t spend a stormy night. Even their names, though evocative, had displayed foreboding. There was 'Oversand', now sadly under sand, and there was 'White Horses' which, ultimately, couldn’t be kept away from the garden."
'Turning Tides' still hopes forlornly but 'Thalassa' is a picture of lassitude. The rest have gone (Worrall 2003).

There are also many lessons from overseas that could assist in refining future SMP programs, such as the use of boundary organisations as translators between science and policy institutions (Pietri et al. 2011). As Cash et al. (2002) argue, boundary organisations embody three key attributes; salience, credibility and legitimacy which augur well for ensuring the incorporation of science into policy. Creating the opportunity for civic minded scientists to have an enhanced role in public processes is advanced by Pielke (2007) as an opportunity in coastal management. Moreover, as McGinniss and McGinniss (2011, 231) note: 'the integration of science and policy does not take place in a political vacuum'. Ultimately, how science can be used to help build bridges between technical, institutional, social and political knowledge systems is a future challenge worthy of research. Until then, while SMP 2 is a considerable improvement on SMP1, there is some way to go.

**Summary Table**

<table>
<thead>
<tr>
<th>Geographic scale</th>
<th>The United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timescale</td>
<td>1990-current</td>
</tr>
<tr>
<td>Organisational type</td>
<td>Government and local stakeholders, Coastal organisations</td>
</tr>
<tr>
<td>Organisational level(s)</td>
<td>Executive level initially then included stakeholders in the decision-making and strategies</td>
</tr>
<tr>
<td>Trigger point(s)</td>
<td>Coastal erosion, flooding</td>
</tr>
<tr>
<td>Type(s) of information</td>
<td>UK Climate Projections 2009 report, implementation of catchment management plans (directed by local Environment Agencies), flood and coastal erosion strategies Undertaken by the EA and local authorities), strategic flood risk assessments undertaken by local authorities), and the UK Climate Impacts Programme</td>
</tr>
<tr>
<td>Learning type(s)</td>
<td>Approach to shoreline management planning has been adjusted according to new science, and other learning's, lessons have been drawn from the active experience of implementing SMP1, and via the increased stakeholder consultation and participation on coastal groups in SMP 2, relevant actors have become part of the process.</td>
</tr>
<tr>
<td>Adaptive behaviours (outcomes from learning)</td>
<td>SMP 2 was implemented with the benefit of hindsight. As such it is an example of adaptive learning and subsequent adaptive management on a vast scale. Raising awareness of the longer-term implications (50 to 100 years) of coastal change, climate change and rises in sea levels, and finding ways to deal with the inherent uncertainty associated with predicting future</td>
</tr>
</tbody>
</table>
impacts.

<table>
<thead>
<tr>
<th>Socio-ecological outcomes</th>
<th>Improved shoreline management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barriers to and opportunities for adaptive learning</td>
<td>The integration of science into policy at the SMP2 level has created some opportunities however; the SMPs are still very technically oriented, and often reliant on structural fixes, or, in their absence, a policy of no action. There are also many lessons from overseas that could assist in refining future SMP programs, such as the use of boundary organisations as translators between science and policy institutions</td>
</tr>
</tbody>
</table>

References:

Worrall, J. (2003) ‘Coastal erosion is a serious issue especially for the folk of Happisburgh’

Title:
How a collaborative community based habitat monitoring program builds scientific knowledge while enabling local groups and individuals to work for more sustainable environments: the Case of Seagrass-Watch

Abstract:
The case of the award winning community based program Sea Grass Watch sheds light on collaborative processes that bring communities into the work of monitoring their local ecosystems. The success of this habitat assessment program underlines the importance of collaborative partnerships in addressing sustainability issues.
Keywords:
Seagrass-Watch, Moreton Bay, community-based monitoring, conservation volunteers, capacity building, South East Queensland.

Introduction:
Seagrass-Watch (SGW) is an award winning (AMCS 2007), community-based, habitat assessment program (McKenzie et al. 2001). It is a partnership between local conservation groups, conservation colleagues, various other communities of interest and the Queensland Government. Volunteers vary in age from 12 to 68 and represent a diverse cross-section of the community, including tradespeople, engineers, housewives, school teachers, fishers, boaties, retirees, high school and university students, biologists and ecologists. (Finn et al. 2010). The key aim is to raise awareness of the condition and trends of near-shore seagrass ecosystems and provide an early warning of major coastal environmental changes (Finn et al. 2010). The program also assesses the correspondence between and accuracy of seagrass cover data collected by volunteers and scientists. In addition, the study has wider ramifications concerning the qualities of successful community-based monitoring programs.

SGW was established in 1998 in Australia as an initiative of Fisheries Queensland and is now the largest scientific non-destructive seagrass assessment and monitoring programme in the world, with 26 countries participating (McKenzie et al. 2000). There are currently 18 regions within Australia where SGW programmes have been established, and 15 of these are in Queensland (Finn et al. 2010). The largest of these regions in Queensland is located in Moreton Bay, a large estuarine bay adjacent to the city of Brisbane (south-east Queensland) and a marine park.

A key driver for SGW was the declining condition and loss of sea grasses from natural and anthropogenic causes (Finn et al. 2010). Increasing intensity of human activity in coastal regions and associated impacts on water quality entering estuarine systems is a critical factor in this decline and loss (McKenzie et al. 2001). Yet, resource and logistical problems meant that government agencies could not respond to the issue alone. Pressure from coastal communities concerned about the condition and loss of seagrasses in their regions was also an important factor in driving the establishment of the program (McKenzie et al. 2001). The program is focussed on collecting biophysical data, but also contributes to social outcomes through the collaborative and participatory approach taken to monitoring whereby scientists train community teams to monitor coastal sites.

Approach:
The program was developed initially through the Queensland Department Primary Industries (QDPI) that established and co-ordinated several steering groups to capture local enthusiasm. The steering groups included representatives from local community groups, the Queensland Parks & Wildlife Services (Environment Protection Authority) and the QDPI. This led to early support through the first round of Natural Heritage Trust funding (NHT1). Key monitoring areas (representing a particular management focus) were identified jointly by community groups and the QDPI, with community and industry groups also providing input into initial planning and ongoing monitoring (McKenzie et al. 2001).

The program strongly emphasises its scientific underpinnings, which includes consistent data collection, recording and reporting. The monitoring program utilises simple, but scientifically rigorous methods. Initial training is done with large groups (10-30 people) in the classroom and/or in the field, with individual teams (2-4 people) who wish to adopt a site being trained at that focal site. Surveys are conducted three
transformative learning processes may be identified. Viewed as the root cause of many of the conditions that negatively affect sea grass, then local planning and decision making are likely to be based on scientific data, as well as engaging ways in which communities can directly influence and benefit from sea grass ecosystem health. What might be described as reactive learning, the innovative and proactive community-based approach is testing long-held assumptions about the production and use of scientific data, as well as engaging ways in which communities can directly influence local planning and decision-making (proactive learning). If communities themselves are viewed as the root cause of many of the conditions that negatively affect sea grass, then transformative learning processes may be identified.

Among other uses, data from Seagrass Watch is used by the SEQ Healthy Waterways partnership in their Ecosystem Health Monitoring Program, supplementing water quality data (Finn et al. 2010). A wide range of associated activities are also used to engage community volunteers including a seminar series on local wildlife and environmental processes involved with seagrass habitat, and night time spotlighting expeditions to increase the general natural history skills of participants (Finn et al. 2010).

Ongoing funding is supplied largely through SEQ Catchments, a regional natural resource management body. Additional funding is provided by the Ecosystem Health Monitoring Program, part of the SEQ Healthy Waterways Partnership, as well as industry representatives and a private trust. In-kind support is also made available through the Queensland Parks and Wildlife Service, commercial supporters and non-government organisations (Finn et al. 2010).

**Key findings and lessons for adaptive learning:**
SGW monitoring has provided information to coastal managers on seagrass resources, and developed communication pathways between government agencies and the community, allowing the exchange of information on the condition of coastal habitats. The program has led to collaboration between state government agencies (QDPI,QPWS, EPA) to develop information for use in management plans in response to development proposals and assessments of management status (McKenzie et al. 2001). It also engages industry and commercial interests (Port of Brisbane Corporation and Tangalooma Wild Dolphin Resort), university (Griffith University and the University of Queensland), community groups (the Wildlife Preservation Society of Queensland and the Queensland Conservation Council) and educational facilities (the Moreton Bay Environmental Education Centre among others) (Finn et al. 2010). Operational outcomes identified from SGW include cost efficiency, and coverage over large spatial scales (Finn et al. 2010). Community involvement, education and the sense of ownership experienced by volunteers are major benefits that have been identified (Finn et al. 2010). The program in Moreton Bay has been steadily growing since started, with several volunteer teams remaining unchanged for this entire time (Finn et al. 2010).

While the program is essentially reacting to various pressures and impacts through what might be described as reactive learning, the innovative and proactive community-based approach is testing long-held assumptions about the production and use of scientific data, as well as engaging ways in which communities can directly influence local planning and decision-making (proactive learning). If communities themselves are viewed as the root cause of many of the conditions that negatively affect sea grass, then transformative learning processes may be identified.
### Summary table:

<table>
<thead>
<tr>
<th><strong>Geographic scale</strong></th>
<th>Local</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timescale</strong></td>
<td>Established in Moreton Bay since 2001 and is ongoing</td>
</tr>
<tr>
<td><strong>Organisational type</strong></td>
<td>Community-based with support from state government</td>
</tr>
<tr>
<td><strong>Organisational level(s)</strong></td>
<td>Operational, but data is linked to broader planning and decision-making</td>
</tr>
<tr>
<td><strong>Trigger point(s)</strong></td>
<td>Increasing pressure on ecosystems within Moreton Bay due largely to rapid development and population growth</td>
</tr>
<tr>
<td><strong>Type(s) of information</strong></td>
<td>-Scientifically reliable data on sea-grass cover and condition jointly collected by scientists and community volunteers as well as other associated information (e.g. dugong activity) -Raw data for technical staff, analysed report for managers, annual report for management and periodical newsletter for community</td>
</tr>
<tr>
<td><strong>Learning type(s)</strong></td>
<td><strong>Reactive</strong>: Responsive to population and development impacts (e.g. decreasing water quality, increasing sediment and nutrient loads) <strong>Proactive</strong>: Innovative community-based approach to provide an early warning of system changes through to ultimately influencing planning and decision-making</td>
</tr>
<tr>
<td><strong>Adaptive behaviours (outcomes from learning)</strong></td>
<td>Logistic and resource limitations of government to address the issue led to the adaptive behaviour where communities took ownership of the issue</td>
</tr>
<tr>
<td><strong>Socio-ecological outcomes</strong></td>
<td>-Raising community awareness -Increased access to information -Community ownership of local environmental issues -Utilisation of local knowledge -Community environmental education -Community capacity building -Building of networks with other local programs (e.g. SEQ Healthy Waterways Partnership) and between communities, industry, NGO’s, government agencies and others) -Links to other international projects</td>
</tr>
<tr>
<td><strong>Barriers to and opportunities for adaptive learning</strong></td>
<td><strong>Barriers</strong>: -Uncertainty regarding the continuation of funding and resources to maintain training and monitoring programs -Potential difficulties maintaining/synchronizing collaboration among organizations/institutions involved -Political and institutional resistance to change <strong>Opportunities</strong>: -Collaboration between scientists and non-scientists for data collection, analysis and interpretation</td>
</tr>
</tbody>
</table>
- Relatively simple and user-friendly methods, with deeper benefits for enhancing community resilience
- Ownership feelings of the volunteers that inspire them to monitor much more than specified in the study
- Freely available data to the volunteers, management agencies and other stakeholders via website, regular newsletters and/or contacting the coordinators
- Experiential learning on local wildlife and ecological processes involved with seagrass habitat
- Locally collected (and owned) data used in the assessment of marine park permits and other planning and decision-making (indicating empowerment rather than placation)

Opportunities:
- Collaboration between scientists and non-scientists for data collection, analysis and interpretation
- Relatively simple and user-friendly methods, with deeper benefits for enhancing community resilience
- Ownership feelings of the volunteers that inspire them to monitor much more than specified in the study
- Freely available data to the volunteers, management agencies and other stakeholders via website, regular newsletters and/or contacting the coordinators
- Experiential learning on local wildlife and ecological processes involved with seagrass habitat
- Locally collected (and owned) data used in the assessment of marine park permits and other planning and decision-making (indicating empowerment rather than placation)

References:
C.3 List of annotations for annotated bibliography

Organizational Learning


**Sustainability Learning**


Van Der Veen, R. G. W. 2000. Learning natural resource management. IN GUIJT, I., J. A. BERDEGUE and M. LOEVINSOHN (Eds.). *Deepening the basis of rural resource management*. The Hague/ Santiago de Chile, ISNAR & RIMISP.


**Adaptive management**


Integrated Coastal Zone Management

Resilience
C.4 Sample annotations for annotated bibliography


**Publication type:** Journal article

**Aim/objectives:** This article describes how double loop learning can be applied to enhance organizational learning by addressing broader, systemic issues.

**Geographic focus:** General application

**Methods:** General theory development

**Key findings:** The paper argues that an organization striving to learn more effectively should encourage double loop learning, where people advocate their view in ways that invites confrontation, and that challenges and tests the organisation objectives and systems. The ability of employees to challenge organisational objectives and systems provides mechanisms for reflexive learning.

**Lessons for adaptive learning:** Double loop learning requires an opposition of ideas for comparison, which opens up and challenges the underlying assumptions, norms and objectives of the organization. This is facilitated by a culture of open communication within an organisation. By way of contrast, authoritarian management styles tend to suppress such learning.

**Keywords:** double loop learning, learning organization, process.

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**Publication type:** Journal article

**Aim/objectives:** The article uses the adaptive co-management context to reflect on the dimensions of learning.

**Geographic focus:** Indonesia, Laos, Vietnam, Cambodia,

**Methods:** Desktop analysis, literature study

**Key findings:** The paper outlines the key dimensions of learning in the context of adaptive co-management. The first dimension of learning emphasises the need to define and conceptualise learning to provide an understanding of the definition of learning. Establishing learning goals and expectations, mechanisms by which learning take place, actors participating in the learning process, and finally the risks and ethical uncertainty faced by different actors expected are also identified as key learning dimensions. Capacity building, risk management, incentives, consideration of the role of power and the potential marginality of actors
participating in the learning process, and evaluation and monitoring of learning outcomes were also identified as factors that interact and can enhance learning when taken into account.

**Lessons for adaptive learning:** Collaborative management systems, joint decision making, and multi-stakeholder arrangements that ensure self-organised learning processes, and pay careful attention to skill sets and incentives to support learning, are key to social and institutional learning. Linking evaluation of learning outcomes to a more precise conceptualization of learning types, approaches and challenges will foster adaptation and collaboration in natural resource management.

**Keywords:** Adaptive governance, adaptive management, collaborative management, co-management, learning, sustainability

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**Publication type:** Journal article

**Aim/objectives:** The paper discusses local capacity building for collaboration through the development of local knowledge in a practice-based training programme, and how this knowledge affects the community’s future collaborative action.

**Geographic focus:** Cappadocia, Turkey

**Methods:** Participatory action research, interviews, workshops

**Key findings:** Experiential learning processes can help construct and maintain collaborative platforms in urban planning, and learning can function as a catalyst for collaboration. The project showed the necessity of a process view to ensure democratic dialogue and participation in planning.

**Lessons for adaptive learning:** Collective learning experiences may enhance the sense of collaboration in a community, and may increase stakeholders’ interest and commitment to collaborative initiatives. Collaborative learning systems are facilitated by participatory planning and socially meaningful training programmes that enhance individual and collective learning.

**Keywords:** Experiential learning, collaboration, participatory planning

**Publication type:** Journal article

**Aim/objectives:** This article develops a conceptual framework to provide an understanding of learning within multi-party collaborative projects in natural resources management.

**Geographic focus:** General application

**Methods:** Desktop study, literature review

**Key findings:** The paper identifies multi party collaboration in natural resource management as a means to facilitate social learning. In such collaboration, the paper emphasises the need for an understanding of the interdependent roles of stakeholders, a shared problem definition, coordinated actions/activities at different levels of involvement, and a shared common script and action strategy to enhance social learning. The paper also highlights the important role of facilitation in multiparty collaborative including mediating the framing and reframing of issues and fostering new meaning where ambiguities exist to provide mechanisms for reflection.

**Lessons for adaptive learning:** Social learning is a multi-scale process where different actors at different levels are involved. However, there exists the challenge of integrating different perspectives and conflicting interests across individual actors, social groups, key stakeholders and disciplines in multiparty collaborations. Continuous deliberation, negotiation and engaging in joint activities to develop shared knowledge and a common understanding of problems amongst actors can provide a platform for social inclusion. It can also facilitate the development of a shared and desired outcome through the integration of different perceptions. Facilitation of such a learning process by creating situations where social groups and stakeholders can learn collectively with the facilitator taking an “interested” party role rather than a “neutral” party role is important for the learning process and to facilitate learning for interdependence.

**Keywords:** multi party collaboration, social learning, framing and reframing, relational practices, learning for interdependence

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**Publication type:** Journal article

**Aim/objectives:** This paper reviews the role of monitoring in environmental management and complexities in co-management based monitoring, and provide a methodological approach to implementing a learning based approach to monitoring in natural resources management.

**Geographic focus:** General application
Methods: Desktop study, Literature review

Key findings: Collaborative monitoring can be useful in integrating learning based approaches in adaptive co-management and the broader context of environmental management. A number of unique attributes including surprise and uncertainty characterise complex adaptive systems which makes traditional linear approaches of monitoring ineffective. Consideration of spatial and temporal variability is important in more nonlinear approaches to account for complexity.

Lessons for adaptive learning: Problem identification, visioning, monitoring, taking action, reflection and redefining the problem are necessary components of the cyclical process of a social learning approach to monitoring in adaptive co-management. Continuous social learning cycles can assist resource managers to cope with uncertainty and change in complex adaptive systems.

Keywords: Adaptive co-management, collaborative monitoring, social learning, complexity


Publication type: Journal article

Aim/objectives: The authors propose a protocol to guide an adaptive management approach to water quality management in north-eastern Australia.

Geographic focus: Great Barrier Reef, Australia

Methods: Iterative process of reflection and discourse within a multi-disciplinary project team

Key findings: The authors provided an adaptive water quality management approach, which articulates a framework for documenting uncertainties and performance expectations, negotiating feedback and anticipating iterative and transformative responses that account for future water availability scenarios. The proposed protocol guides adaptive management emphasising the importance of developing rigorous and timely monitoring and evaluation systems, anticipating changes to plans, and the need to coordinate responses on multiple-scales to tackle environmental knowledge, and manage uncertainties and assumptions.

Lessons for adaptive learning: The potential to nest adaptive management strategies across planning scales provides opportunities to handle uncertainty associated with ecosystem management. This is enhanced through proactive preparation for transformative responses that manages anticipated changes and test underlying assumptions.

Keywords: Collaboration, Great Barrier Reef, integrated natural resource management, partnerships, risk, transformative, uncertainty, watershed planning, social learning.

**Publication type:** Research paper

**Aim/objectives:** The paper proposes a meta-theoretical approach to organizational sustainability that considers economic, social, environmental and governance sustainability issues.

**Geographic focus:** General application

**Methods:** Document analysis

**Key findings:** The paper develops a meta-theoretical approach to organizational sustainability providing three important meta-theoretical lenses; the developmental, internal-external and learning lenses. These lenses provide new ways for organisations to meet economic, environmental, and social and governance requirements for achieving sustainability. The meta-theoretical context also provides an avenue for discussing learning and sustainability paradoxes that present challenges for organisational learning capacities. It opens up new ways of conceptualizing the transformations required to meet sustainability challenges.

**Lessons for adaptive learning:** Theories of learning have to be embedded within conceptualisations of development that are transformative in nature and which present a direction for organizational change based on shifts in the entrenched core purposes of organizational activities.

**Keywords:** learning organizations, sustainable development, organizational learning

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**Publication type:** Journal article

**Aim/objectives:** This paper examines the relationship between four types of organizational cultures and how they contribute to shaping a learning organization in the public service system.

**Geographic focus:** Iran

**Methods:** Survey

**Key findings:** Results demonstrate that an organisational culture, a participative culture and a learning culture can have a positive effect on facilitating a learning organisation. By way of contrast, bureaucratic and competitive cultures demonstrated a negative relationship with developing a learning organisation. Of the four organizational cultures discussed (bureaucratic, competitive, participative and learning organizational culture) the learning organizational culture has the highest influence on shaping learning public organisations.
Lessons for adaptive learning: Participative management systems and delegation of authority to subordinates are key to supporting learning in public learning organizations. Participation and delegation of authority unlocks subordinates’ creativity essential for improving systems.

Keywords: Learning organization theory, learning public organizations, organizational culture, bureaucratic culture, participative culture, learning culture.


Publication type: Journal article

Aim/objectives: The article provides insight into how resource users and other stakeholders learning and capabilities can be fostered to make well-informed decisions and stimulate adaptive management.

Geographic focus: Zimbabwe

Methods: Case study, action research

Key findings: The authors provided insights into how learning can be fostered using a case example of farmers in the semi-arid parts of Zimbabwe elaborating on the approach, processes and tools to enhance farmers’ learning. The paper highlights the need to scale up learning from small groups to the wider community and the challenges involved. The role of facilitation in farmers’ learning is also highlighted. The authors argue that learning can be facilitated by enhancing the facilitation skills of development agencies and farmer organizations to stimulate well-informed decisions and adaptive management.

Lessons for adaptive learning: The data from the case studies showed that the effectiveness of learning tools is highly dependent on its application within a coherent learning process. Therefore, to ensure effective results from the application of learning tools, it is essential to apply them within a learning process guided by “strong vision, empathy and a culture of enquiry”. The role of facilitation is essential to these processes and therefore, the need for enhancing facilitation skills amongst development agencies and beneficiaries is paramount.

Keywords: adaptive capacity, natural resource management, process facilitation, participation, experiential learning, learning tools


Publication type: Journal article
**Aim/objectives:** The article proposes a multilevel model in which organizational learning is an interdependent system where effective leaders enact intervention strategies at the individual, network, and systems levels.

**Geographic focus:** General application

**Methods:** Desktop study, literature study

**Key findings:** Leaders set the conditions and structure for learning to occur in the learning organization, while limiting direct interference in the active creative processes. Leaders have three important functions in learning organizations: (1) leaders may increase the level of developmental readiness of individual followers; (2) leaders may promote knowledge diffusion between actors within and across social networks; and (3) leaders may target actions at the system level to improve the diffusion of knowledge to the broader organization.

**Lessons for adaptive learning:** Leadership is vital in facilitating learning within organisations. Leading organizational learning is a multilevel and multistage process requiring an integrated approach to designing and implementing intervention strategies. This can be achieved through a system of formal and informal leaders that engage in developmental experiences to promote learning, facilitate and encourage knowledge networks, and institutionalise emergent knowledge at the system level using both leadership and management practices.

**Keywords:** Leadership, organizational learning, multilevel, knowledge catalyst, knowledge network, diffusion.
Appendix D - INTEGRATION, ANALYSIS & SYNTHESIS

D.1 Draft Cluster Themes brochure information pack

Theme 1 - Governance

Collaborative policy-making and planning in the coastal zone

There are serious policy and planning implications for Australian coastal communities resulting from existing coastal pressures and the new pressures of climate change. Low-lying and eroding-prone coastal areas are more vulnerable to sea-level rise. Social disadvantage can worsen coastal vulnerability in regional areas. New sea-level policies tend to relate to new developments, leaving existing ecosystems and old infrastructure without adaptive plans.

The challenge for coastal governance is to:

- engage coastal stakeholders in a shared understanding of climate change on the coast and opportunities for adaptation
- enable broad, meaningful participation in knowledge-based governance of the coast in a rapidly changing context
- plan for long term impacts of climate change while at the same time having short cycles of review that allow new information to be considered and acted on as it becomes available.

Lead by Curtin University, Theme 1 explores how governance in the South West of Western Australia can best respond to climate change science in adapting to coastal impacts such as sea level rise.

Coastal governance is the set of processes, mechanisms and institutional arrangements through which political actors and stakeholders influence decisions, actions and outcomes on the coast

(after de Luc et al. 2009)

Aims

The research aims of the Theme are to:

- investigate features of current systems of coastal governance and planning
- identify constraints to effective engagement of governance systems with relevant knowledge bases
- investigate how systems of coastal governance can become more reflexive and open to knowledge through engaging stakeholders and decision-makers in an adaptive learning process
- collaboratively develop futures scenarios, transition pathways and local trials in coastal policy and planning
Design and Methods

The Governance theme is using deliberative techniques such as Google Earth participatory mapping, scientific visualisations, and scenario planning to generate future governance pathways.

Key Outputs

- Scenario planning tool based on a Google Earth participatory mapping process, encompassing spatially explicit values and concerns of stakeholders and decision-makers and their suggested governance pathways for coastal adaptation.

- An edited book (Kenchington, R., Stocker, L. & Wood, D., ed) with chapters by theme leaders from the Coastal Collaboration Cluster titled "Sustainable Coastal Management and Climate Adaptation: Lessons from Regional Approaches in Australia."

- Articles and conference presentations on governance for coastal adaptation.

Research to date suggests that good governance for coastal adaptations:

- Is a long term strategic process with sustainability goals and visions
- Is relational, reflexive and adaptive
- Is participatory, engaging all stakeholders and the broader community
- Works with both social and cultural norms and local contexts
- Uses front runners and champions
- Uses boundary agents and boundary organisations to span the knowledge-governance interface
- Learns continually using the best available evidence
- Is a complex adaptive system including both ecological and social aspects.

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The CSIRO Flagship Collaboration Fund facilitates involvement of the wider Australian research community in addressing the nation's most significant challenges and opportunities. Flagship clusters are three-year partnerships between Flagships, universities and other public research agencies.
Theme 2 - Socio-cultural Context

Dimensions and Networks: informal and formal connections between community-industry-government

The Socio-cultural Context Theme investigates the informal and formal associations among community, industry and government in relation to knowledge formation and its use in decision-making with the aim of identifying barriers to adaptive coastal management.

In essence, the socio-cultural context is the formative setting in which human activity is generated and mediated. This context interacts continually with the biophysical context within which human activity is embedded, thus creating a socio-ecological system. In relation to coastal adaptation, this interaction is characterised by multiple scales, complexity and uncertainty.

Theme 2 explores how institutional structures and cultures, and the social networks among stakeholders play a role in explaining decision-making about the coastal zone.

Conducted by the Adelaide University and Flinders University, Theme 2 builds on a range of decisions made for coastal developments across case studies in South Australia to explore the social context for decision-making by assessing preparedness of peri-urban regions for sea level rise.

The socio-cultural context of the coastal zone is comprised of social networks and communities of actors who operate within and among formal structures and informal systems, and whose worldviews and values differ widely.

Aims

The research aims of Socio-cultural Context Theme are to:

• develop a method for exploring the socio-cultural context of coastal management
• identify how and to what extent the current socio-cultural context constrains or enables knowledge transfer/learning between knowledge-makers, such as scientists, and agency decision-makers, such as state and local governments
• analyse the social networks that surround coastal knowledge and decision-making and show how they can overcome or modify any constraints to learning and response created by the socio-cultural context
Design and Methods

The research for Theme 2 is based upon document analysis, social network mapping, and in-depth interviews with the intent to:
- represent a contrast between "successful" and "inappropriate" knowledge-policy engagement processes
- analyse the processes that led to the decisions, by interview
- analyse the social networks that generated these decisions.

Key Outputs

- A critical analysis of the relationship between the broader socio-cultural context and the specific functioning of the social network and its capacity to influence knowledge systems/policy formation in the coastal zone under study.
- A set of guidelines to facilitate adaptive learning through social networks for greater engagement at the knowledge-policy interface.

Understanding the social and cultural context and frameworks in which policy is developed and decisions are made in relation to the uptake of information and application of knowledge is central to resolving the knowledge - governance divide and enabling effective decision-making for climate change.

Part of this project examines the role and importance of coastal champions in linking coastal science with coastal policy. It is important to find out how these individuals operate as successful communicators in influencing policy development. This will help planning for effective coastal management in the future.

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Theme 3 - Knowledge Systems

Towards more engaged and interactive knowledge generation, exchange and use

Sustainable management of the coastal zone represents a considerable challenge to Australian society. This challenge is rooted in the complexity of the biophysical and socio-cultural characteristics of coastal areas, including uncertainty about system characteristics and processes, and the diversity of stakeholders, their interests, values and perspectives, and the jurisdictions involved in coastal governance and management.

The Knowledge Systems Theme (Theme 3) analyses the process of knowledge interaction and exchange as it presently affects coastal zone management. It addresses both barriers to uptake, and how different forms of knowledge - scientific, managerial, lay and Indigenous - can better influence the decision-making process and outcomes for and users of that knowledge.

Theme 3 provides the focus of effort for researchers from Deakin University and the University of Tasmania, who work collaboratively to conduct comparative studies into the operation of knowledge systems in two regions, one centered on the Derwent-Huon region in southern Tasmania, and one centered on the South West Victoria region in Victoria, with this centered around the regional cities of Portland and Warrnambool. The selected regions enable comparisons to be made between an area that has consolidated science and one that has dispersed science.

Alms

The research aims of the Knowledge Systems Theme are to:

- develop a model of current coastal knowledge systems
- identify constraints to knowledge communication (resulting from, for example, power, funding, complexity, uncertainty, scale and self-referentialism)
- investigate whether systems of knowledge can be more open and communicative with governance and decision-making processes, and more reflective and civic in orientation
- understand how situated and relational knowledge affect the specific outcomes of decision making in particular areas
Design and Methods

Evidence regarding the way that science and other forms of knowledge inform coastal management will be explored using five key principles:

- Making different forms of risk and uncertainty transparent
- Enabling stakeholder engagement in framing issues
- Addressing the potential for controversy and conflict
- Considering social and cultural boundaries and their implications for knowledge and decision making
- Recognising common heuristics and cognitive biases

The theme members apply these principles using a comparative dimension in two case study areas:
- Derwent-Huon estuary in Tasmania and South West Victoria.

Key Outputs

- A model of credits, communicative, reflective, valid and transdisciplinary knowledge system capable of supporting change in the coastal zone.
- Report presenting a critical analysis of the knowledge system in the coastal zones under study.
- Papers published in scholarly journals and conferences.

A knowledge system approach involves actors, organisations and objects that perform a number of knowledge-related functions. An important element of such a system is boundary spanning between knowledge generators and knowledge users.

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Theme 4 - Adaptive Learning

Organisational, social and sustainability learning

Complexity, uncertainty and high decision stakes are typical characteristics of many coastal systems. Adaptive management has recently emerged as a paradigm for responding to these characteristics within coastal systems. Adaptive learning essentially drives the adaptive management process by facilitating connections between science and management processes and thereby maximises pathways to science uptake.

The Adaptive Learning Theme (Theme 4) is researching a range of national and international coastal management cases studies drawing on principles and practices of adaptive learning, organisational learning, sustainability learning, adaptive management, and integrated coastal zone management. These will provide part of the knowledge base to enable adaptive learning within coastal organisations and inform the development of a simplified framework for coastal organisations to monitor and evaluate their institutionalisation of adaptive learning.

The Adaptive Learning Theme focuses research on South East Queensland to analyse how a more communicative relationship between knowledge-makers and decision-makers could be enabled for the coastal zone.

Adaptive learning is a concept that combines organisational learning, social learning, and sustainability learning through the institutionalisation of learning processes and outcomes for improved integrated coastal zone management. It calls for action on the basis of the ‘best’ available information at the time, and to monitor and evaluate the results to derive ‘learned lessons’ that will aid in the improvement of our response to the problem.

Aims

The research aims of the Adaptive Learning Theme are to:

- determine the processes by which adaptive learning frameworks function in the coastal management context
- analyse the barriers and opportunities to embed adaptive learning within coastal institutions
- assess institutional adaptability success factors
- develop and test a monitoring and evaluation framework for assessing adaptive learning about science uptake in the coastal zone
Design and Methods

This research focuses on coastal organisations responsible for managing social-ecological systems that are characterised by complexity and uncertainty in relation to change. The proposed study will be grounded in the literature relating to three broad theoretical frameworks: sustainability, resilience and adaptive learning.

Desk-top case studies of adaptive learning across Australia and international coastal organisations will be analysed. These studies will also provide scope to assess adaptive learning in case studies where primary data will be collected.

The theoretical framework will be applied to 3-4 coastal organisations within Australia. The purpose is to evaluate organisational structures and processes and related information/knowledge sharing arrangements that exemplify adaptive learning. Qualitative interviews will be conducted with individuals within the organisational structure of the case studies.

Key Outputs

- An on-line toolkit for institutionalising adaptive learning within coastal organisations, including:
  - mechanisms to enable adaptive learning within coastal organisations
  - principles of adaptive learning (searchable annotated bibliography)
  - examples of adaptive learning successes
  - a simplified framework for coastal organisations to monitor and evaluate their institutionalisation of adaptive learning
- Reports and articles that detail a framework for monitoring and evaluating science uptake in the coastal zone.

The need for coastal organisations to become adaptive learning organisations and to contribute to improved system resilience is recognised by the inherent dynamic nature of the coastal zone. Thus, mechanisms that assist coastal organisations to become more intelligent, flexible and reflective and to become part of a collaborative adaptive learning network will aid in developing sustainable solutions and strategies for integrated coastal zone management.

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Theme 5 - Integration and Synthesis

Leadership, cooperation and communication fostering a collaborative approach

Integration and Synthesis plays an active role in drawing together the work of other themes to generate insights and analysis that will be greater than the sum of individual Themes. Integrating, distilling and testing lessons increases understanding of how different disciplinary knowledge systems can be brought to bear on complex coastal problems.

Theme 5 will also identify improvements to research commissioning and research outputs delivery facilitated by better mutual understanding of the needs perspectives and priorities of:

- management and policy makers
- science providers in critical areas such as effectively dealing with the impacts of coastal development and climate change
- application of science in regulatory controls

Based in the Faculty of Law at the University of Wollongong, Australian National Centre for Ocean Resources and Security (ANCORS) specialises in transdisciplinary studies of marine management.

Aims

The primary and essential aims of the Synthesis and Integration theme are:

- Develop practical, workable strategies for improving integrated management and communication between the many players with diverse needs, expectations and perspectives involved in the coastal zone. Such strategies represent a core focus on how development, implementation and dissemination of the results of scientific work might be developed to better contribute to overall outcomes for the future of the coastal zone.

- Identify legislative, institutional and implementation constraints to the design, conduct, reporting and application of science in coastal policy and management.
Design and Methods

The integration and synthesis Theme will explore results from the four input Themes. It will use a variety of techniques including systems, contingency, risk, effects-based analysis, agent-based modelling and complex systems approaches to explore interactions of theme outcomes and legal implications for governance and transition management.

Key Outputs

- An enabling roadmap for assessing knowledge-making and decision-making approaches designed to:
  - compile practical and implementable suggestions for improvement of interaction between scientific and management agencies
  - enhance the take up of outcomes from scientific inputs for policy development from local to regional and national levels
  - identify legal constraints and opportunities in governance and institutional for on-going science implementation in the coastal zone.
  - provide a frame for the future of coastal zone management in Australia
- Reports and articles that draw and review the collective findings of the series of Cluster research. These will provide recommendations for improving the path for science by identifying and developing strategies for addressing the social and institutional impediments to effective and integrated management of Australia’s coastal zone in the face of future change.

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