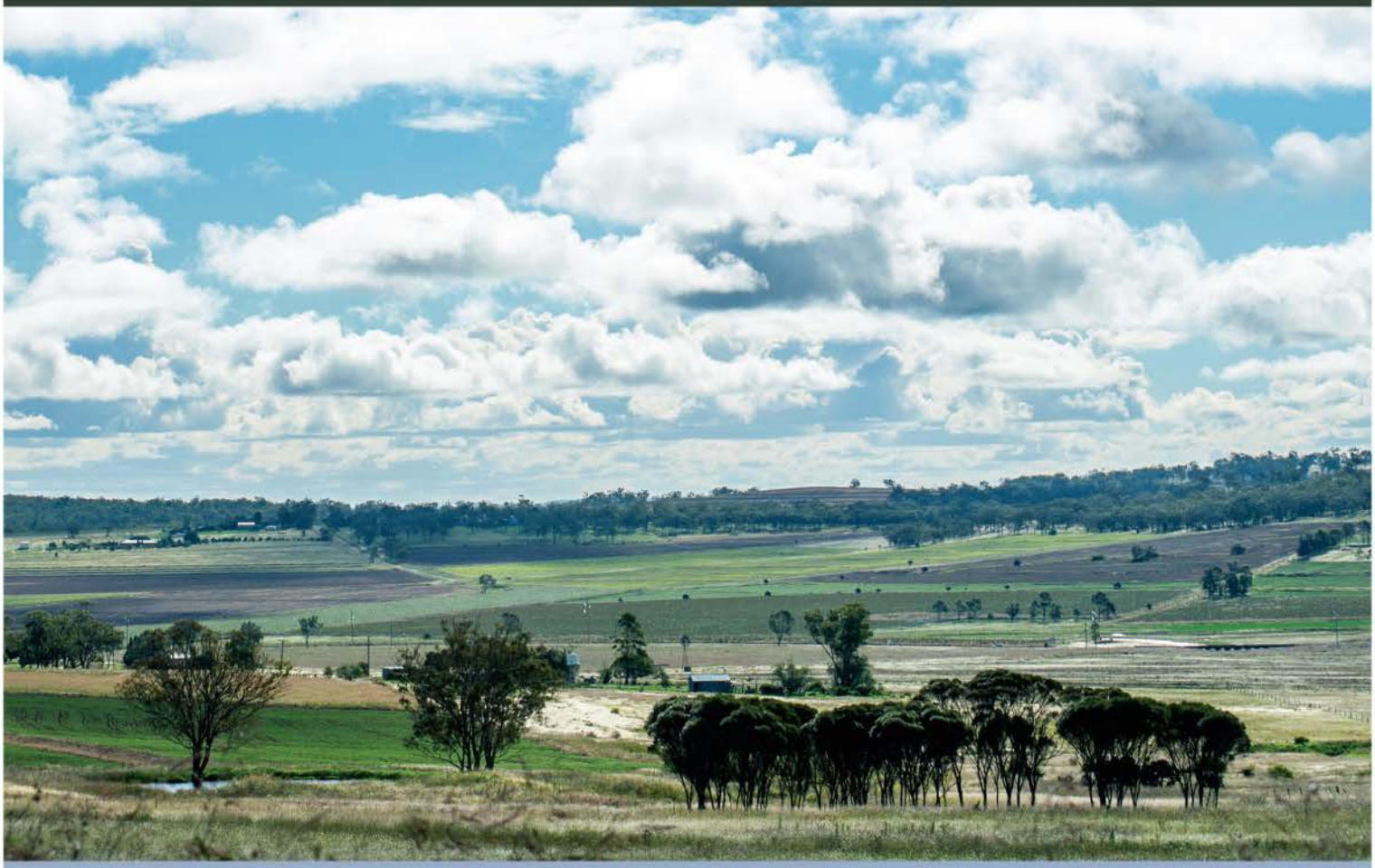
EAST COAST
NRM CLUSTER

CLIMATE CHANGE IN AUSTRALIA

IMPACTS & ADAPTATION
INFORMATION
FOR AUSTRALIA'S NRM REGIONS



East Coast Cluster Research Projects

Report for the Climate Change Adaptation for Natural Resource Management in East Coast Australia Project

Citation

Cox, M. (ed); Butler, D.; Harman, B.; Hosking, C.; Lee, C.; Lieske, S.; Lovelock, C.; Low Choy, D.; Marshall, N.; Mills, M.; Mitchell, P.; Rogers, K.; Serrao-Neumann, S.; Smith, E.; Smith, T.; Taylor, B. 2014. *East Coast Cluster Research Projects*. Report for the Climate Change Adaptation for Natural Resource Management in East Coast Australia Project, Griffith University. http://www.griffith.edu.au/research/research-excellence/griffith-climate-change-response-program/publications

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This report has been produced as part of the *Climate Change Adaptation for Natural Resource Management in East Coast Australia* project. The project is being delivered by six consortium partners: The University of Queensland (Consortium leader); University of the Sunshine Coast; CSIRO; New South Wales Office of Environment and Heritage; and Queensland Department of Science, IT, Innovation and the Arts (Queensland Herbarium) to foster and support an effective "community of practice" for climate change adaptation within the East Coast Cluster regions that will increase the capacity for adaptation to climate and ocean change through enhancements in knowledge and skills, and through the establishment of long term collaborations.

Funding for the project is received from the Department of Environment as part of the Natural Resource Management Climate Change Impacts and Adaptation Research Grants Program, under Stream 2 of the Natural Resource Management Planning for Climate Change Fund. The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein.

The authors acknowledge the important contribution and cooperation of stakeholders from East Coast Natural Resource Management Regional Body and Local Land Services Cluster partners who participated in the workshops and contributed to the development of this report. The authors wish to acknowledge and thank the following organisations: Fitzroy Basin Association, Burnett Mary Regional Group, SEQ Catchments, North Coast Local Land Services, Hunter Local Land Services, and Greater Sydney Local Land Services.

Executive Summary

The Climate Change Adaptation for Natural Resource Management (NRM) in East Coast Australia Project aims to foster and support an effective "community of practice" for climate change adaptation within the East Coast Cluster NRM regions that will increase the capacity for adaptation to climate change through enhancements in knowledge and skills and through the establishment of long-term collaborations.

The project relates to the East Coast Cluster, comprising the six coastal NRM regions and regional bodies between Rockhampton and Sydney. The project is being delivered by six consortium partners:

- The University of Queensland (project lead)
- Griffith University
- University of the Sunshine Coast
- CSIRO
- New South Wales Office of Environment and Heritage
- Queensland Department of Science, IT, Innovation and the Arts (Queensland Herbarium).

This report is a collection of brief descriptions of the research projects to be undertaken for the East Coast Cluster. The aim of the document is to provide more information on each of the research elements and to facilitate input from the regional body planners and other researchers to each of the research projects. More detailed descriptions of the expected project outputs will also facilitate use of the research by the regional NRM bodies.

The projects include:

- Needs analysis (GU)
- Downscaled climate projections and impacts research (OEH)
- Coastal vulnerability assessment (first pass assessment for the cluster, detailed assessments for specific areas) (UoW)
- Stocktake of available biophysical data and models, and agricultural species distribution models under possible climate futures (UQ)
- Socio-economic vulnerability assessments (USC)
- Carbon farming opportunities (Herbarium)
- Integrated assessments for resource sectors (CSIRO)
- Institutional adaptive capacity (UQ)
- Planning packages and research translation (GU)
- Policy appraisal through scenario planning workshops (GU).

Project outputs and timing are summarised in Table ES-1. Regional NRM planning and management in Australia is based on adaptive management and an adaptive planning cycle. The projects and project outputs have been summarised against a generalised adaptive planning cycle (Figure ES-1).

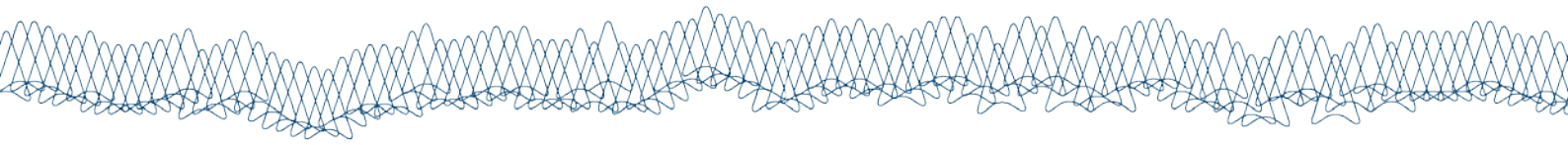


Table ES-1 Summary of project outputs and timing

OUTPUT	TIMING
Biophysical data and models, UQ	
Collation of data and models	Jan 2014
Maxent outputs	Sep 2014
Report reviewing existing and available tools for assessing impacts of climate change on natural resources	Dec 2014
Summary pamphlets/ facts sheets	Dec 2014
Coastal vulnerability, UoW	
Detailed modelling	Nov 2014
Opportunities for carbon farming, Herbarium	
Report (carbon farming)	Nov 2014
NARCLiM and ESCI, OEH	
Identification of likely impacts products	Jun 2014
Synthesis of the ESSCI research	Nov 2014
Access to NARCLiM data and information portal	Dec 2014
Socio-economic vulnerability assessment, USC	
Report and maps profiling the socio-economic vulnerability across the NRM regions and subregions – quantitative assessment	May 2014
Report and maps profiling in-depth case studies of socio-economic vulnerability for selected economic sectors and/or population groups (quantitative and qualitative assessment).	Dec 2014

OUTPUT	TIMING
Institutional adaptive capacity, UQ & USC	
Manuscript/Report ready	Dec 2014
Integrated assessments, CSIRO	
Draft assessment framework	Nov 2013
Framework selected, data inputs identified, indicators agreed, key focus sectors agreed	May 2014
Draft (preliminary) assessments prepared, consult and refine framework	Nov 2014
Final assessments	May 2015
Strategic policy appraisal, GU	
First scenario planning workshop	Sep 2014
Second scenario planning workshop	May 2015
Planning packages, GU	
Establish reference group and working group	May 2013
PWG workshops and communication	ongoing
Needs analysis workshop and report	May 2013
Adaptive learning review	Dec 2014
Planning packages	Jun 2015

Figure ES-1 East Coast Cluster projects and outputs around the AdaptNRM planning cycle

1. Introduction

1.1 The region

The East Coast cluster region comprises the coastal strip from Rockhampton to Sydney (Figure 1.1). The region forms the central part of the eastern seaboard of Australia and encompasses the drainage basins of a number of major rivers that flow from important head-water catchments within sub-tropical mountain ranges through the coastal zone and into the Pacific Ocean. There is considerable variation in the East Coast cluster, both within and between the regions. The cluster includes five of the ten largest significant urban areas in Australia (Sydney, Brisbane, Gold Coast, Newcastle, Sunshine Coast), with the population of the region totalling over 42% of Australia's total population (ABS 2013).

There are six regional NRM bodies in the cluster. In January 2014, the previous Catchment Management Authorities (CMA) of NSW were re-organised into Local Land Services (LLS), with new boundaries. The regional bodies are:

- Fitzroy Basin Association (FBA)
- Burnett-Mary Regional Group (BMRG)
- SEQ Catchments (SEQC)
- North Coast LLS (formerly Northern Rivers CMA)
- Hunter LLS (formerly Hunter-Central Rivers CMA)
- Greater Sydney LLS (formerly Hawkesbury Nepean CMA).

Dominant land uses of the region include extensive urban and per-urban development, large scale dryland grazing, large mining centres, and valuable agriculture. Internationally significant natural features in the cluster region include the southern end of the Great Barrier Reef, biodiversity rich world heritage rainforest, unique islands and important coastal ecosystems.

1.2 The project

The project is being delivered by six consortium research partners:

- The University of Queensland (project lead)
- Griffith University
- University of the Sunshine Coast
- CSIRO
- New South Wales Office of Environment and Heritage
- Queensland Department of Science, IT, Innovation and the Arts (Queensland Herbarium).

Funding for the project is received from the Department of Environment as part of the Natural Resource Management Climate Change Impacts and Adaptation Research Grants Program.

This East Coast project aims to foster and support an effective community of practice for climate adaptation across the region that will increase the capacity for adaptation to climate and ocean change through enhancements in knowledge and skills and through the establishment of long term collaborations among natural resource managers and researchers. The goals of the project are to:

- Understand the climate adaptation needs over the range of biophysical and socio-economic conditions in the region.
- Collaborate to identify the range of existing data, assessments, tools and processes suited to enhance adaptation over a wide range of regional contexts (catchment, rural, peri-urban, coastal).
- Support the NRM regional bodies in the synthesis, translation, interpretation and use of climate projections and its use in planning and decision making for NRM investment.
- Develop a whole-system framework to enable climate vulnerability assessments under a range of scenarios and projections that incorporate biophysical and socio-economic components.
- Facilitate dialogue to mainstream climate change adaptation within the NRM Cluster, and collectively deliberate over options for planning and decision support.

1.3 This document

This report is a collection of brief descriptions of the research projects to be undertaken for the East Coast Cluster. The aim of the document is to provide more information on each of the research elements and to

facilitate input from the regional body planners and other researchers to each of the research projects. More detailed descriptions of the expected project outputs will also facilitate use of the research by the regional NRM bodies.

The format of the report provides for a short description of each of the sub-projects, including methods, outputs, benefits, the team and risks.

Regional NRM planning and management in Australia is based on adaptive management and an adaptive planning cycle. The projects and project outputs have been summarised against a generalised adaptive planning cycle as described in the national AdaptNRM project (Rissik et al. 2014).

1.4 References

ABS (2013). 3218.0 Regional Population Growth, Australia, 2011–2012. Australian Bureau of Statistics.

Australian Bureau of Agricultural and Resource Economics and Sciences (2011). *Guidelines for land use mapping in Australia: principles, procedures and definitions*. Canberra, Australian Bureau of Agricultural and Resource Economics and Sciences.

Rissik, D., Boulter, S., Doerr, V., Marshall, N., Hobday, A. and Lim-Camacho, L. (2014) *The NRM Adaptation Checklist: Supporting climate adaptation planning and decision-making for regional NRM*, CSIRO & NCCARF, Australia.

Figure 1.1 The East Coast Cluster region, showing the regional NRM bodies and 2005-2006 land use

Source: Australian Bureau of Agricultural and Resource Economics and Sciences (2011)

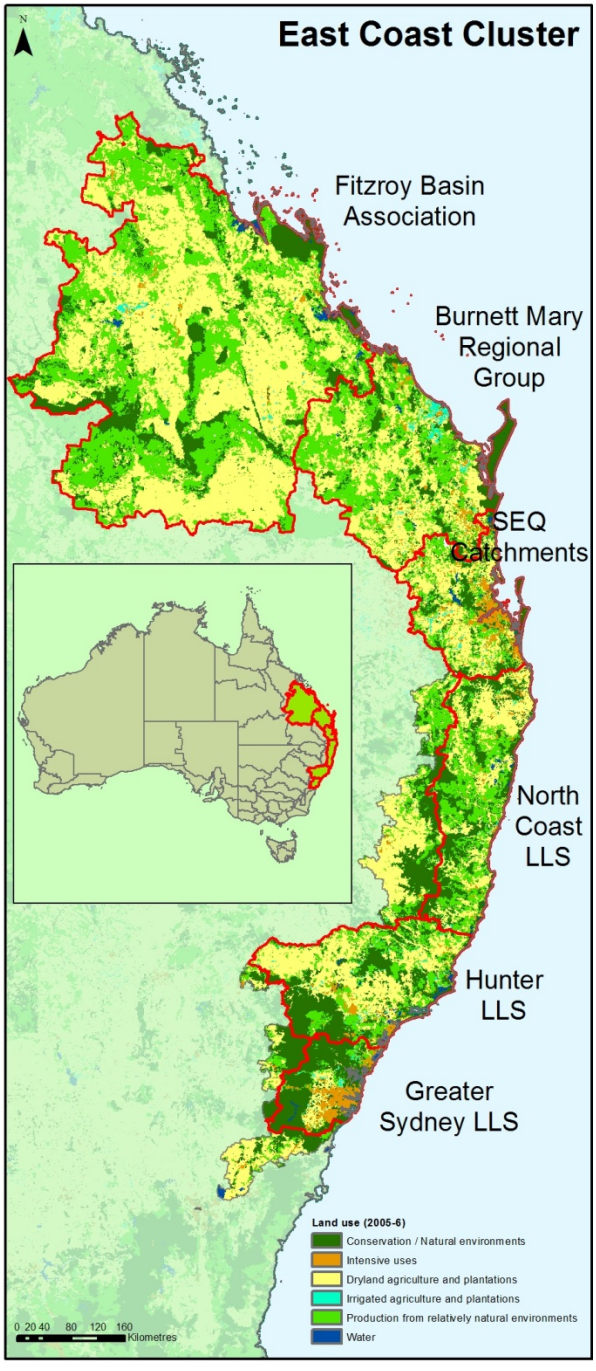
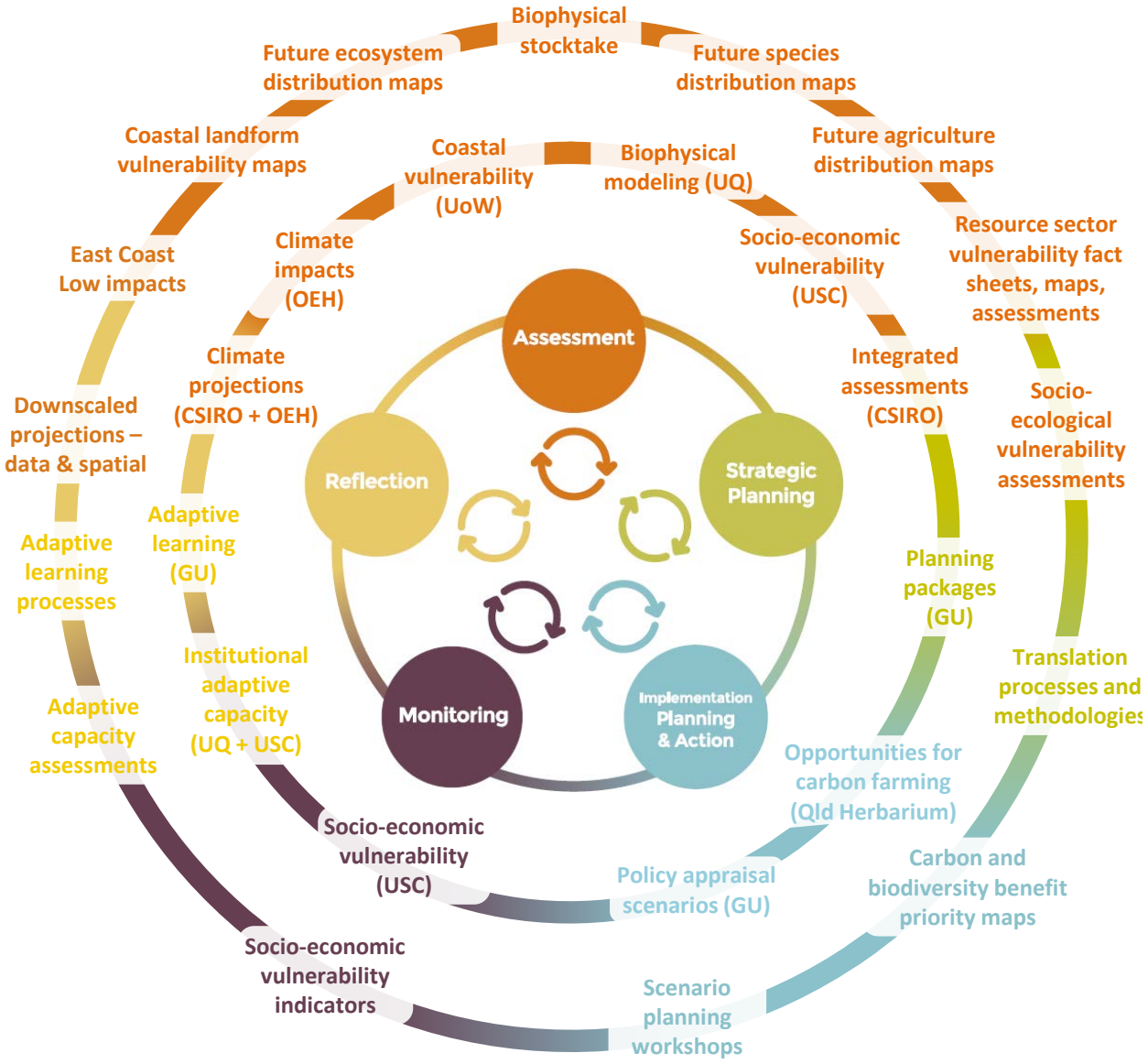


Figure 1.2 East Coast Cluster projects (middle ring) and outputs (outer ring) around the AdaptNRM adaptive planning cycle.



2. Collate key biophysical data

2.1 Short description

Develop a comprehensive table listing biophysical models and data for NRM planning.

2.2 Brief methods

Collate key biophysical models and data for the region by accessing a range of sources available from government and other institutional websites/portals and published literature.

2.3 Outputs and timing

The expected delivery timing for outputs is shown in Table 2.1. Outputs include a resource list for each NRM group in the East Coast Cluster of modelling tools and other useful data and information

Table 2.1 Outputs from biophysical data collation project

OUTPUT	TIMING
Collation of data and models	Jan 2014
Report reviewing existing and available tools for assessing impacts of climate change on natural resources	Dec 2014
Summary pamphlets/ facts sheets	Dec 2014

2.4 Benefit to NRMs

Helping to save time searching for material and potentially avoiding expensive, less effective actions by providing collated information on what tools and data are available, their ease of applicability and where they can be sourced from

2.5 Team

Cath Lovelock (UQ, sub-project coordination), Morena Mills (UQ, Climate adaptation planning), Christine Hosking (UQ, SDM modelling)

2.6 Resources, risks, constraints

Continual development of new data and tools would require ongoing updating of the biophysical information.

Availability of spatial data at the appropriate scale.

3. Biophysical models

3.1 Short description

We will conduct biophysical modelling of the future spatial suitability of three types of agricultural production, two native mammal species and future coastal ecosystem distribution under a range of future climate scenarios (see example in Fig. 1).

3.2 Brief methods

Build models of future distributions and suitability using a range of modelling tools (e.g. MaxEnt, SLAMM).

3.3 Outputs and timing

1. Maps showing the changes in areas of high suitability for cropping, grazing and avocado production as climate change progresses.
2. Maps showing the changes in areas of high suitability for the koala and the water mouse as climate change progresses.
3. Maps showing future coastal ecosystem distribution.

The expected delivery timing for outputs is shown in Table 3.1.

Table 3.1 Outputs from agricultural modelling project

OUTPUT	TIMING
Maxent outputs	Sep 2014

3.4 Benefit to NRMs

The suitability models can help inform landholders and NRM bodies about climate change adaptation, including strategies such as changing agricultural practices, coastal vegetation and development management strategies and native species/biodiversity management.

3.5 Team

Christine Hosking (UQ, SDM modelling), Morena Mills (UQ, Climate adaptation planning), and Cath Lovelock (UQ, sub-project coordination).

3.6 Resources, risks, constraints

Resources required are the relevant spatial data, and software and geo-processing expertise.

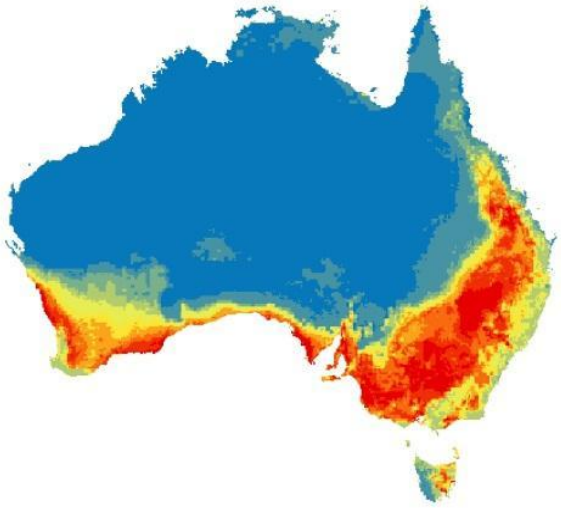


Figure 3.1 Example suitability map for an agricultural commodity at 2030. Red indicates highest suitability. Blue indicates lowest suitability.

4. Potential vulnerability of coastal landforms under multiple future scenarios

4.1 Short description

This project will apply a framework for undertaking coastal landform risk assessment to climate change, with particular focus on coastal floodplains, wetlands and estuaries. This approach will be validated in a catchment in the region under a range of future climate change scenarios, with particular emphasis placed on the effects of sea-level rise on inundation and erosion within the coastal zone.

4.2 Brief methods

1. Prepare an overview of the response of coastal landforms in the region to climate change
2. Review approaches to assessing coastal landform risk to climate change
3. Apply a 3-pass approach to coastal risk assessment in the region and validate this technique for a coastal catchment.
4. Project the effect of climate change on coastal ecosystems, with particular emphasis given to the response of mangrove and saltmarsh to sea-level rise.

4.3 Outputs and timing

The expected delivery timing for outputs is shown in Table 4.1. Outputs include:

- Maps of the potential vulnerability of coastal landforms to climate change at a range of spatial scales
- Maps of the projected distribution of mangrove and saltmarsh under a range of sea-level rise scenarios for selected study sites – constraints re existing datasets
- Report summarising the observed and projected response of coastal landforms to climate change in the region
- A validated framework for assessing the potential vulnerability of coastal landforms to climate change at a range of spatial scales.

Table 4.1 Outputs from coastal vulnerability project

OUTPUT	TIMING
Detailed modelling	Nov 2014

4.4 Benefits to NRM

The potential coastal vulnerability maps will guide resource allocation for further detailed assessment of the response of landforms to climate change; and management actions that facilitate adaptation of coastal landforms and ecosystems to climate change. Reviews of approaches to assessing coastal landform vulnerability to climate change will guide identification of appropriate techniques for coastal vulnerability assessment in the region.

4.5 Team

Dr Kerrylee Rogers (University of Wollongong), Professor Cath Lovelock (UQ)

4.6 Resources, risks, constraints

Risks include:

- The ability to access relevant spatial datasets and field data
- The quality of these data sets.
- Availability of spatial data at the appropriate scale, particularly for Queensland.

5. Opportunities for carbon farming

5.1 Short description

A concise and informative summary of the complex and ever-changing domain of carbon farming policy and its application across the east coast cluster. This project will assess current and emerging carbon farming methodologies, estimate their potential for application across the region, evaluate threats and potential dis-benefits, and identify potential co-benefits.

5.2 Brief methods

- Assemble key spatial data sets land-use, biodiversity values, salinity risk, fire scars
- Review literature and policy documents on carbon farming and its potential to drive land-use change, dis-benefits and co-benefits
- Develop spatial models where possible, including for biodiversity co-benefits and selected weed species, but potentially also for fire and salinity risk
- Identify tools useful for assessment of carbon farming potential
- Report on potential for carbon farming across cluster

Our approach is deliberately collaborative and looking for opportunities to work across cluster and 'stream' boundaries. We see support of a 'community of practice' in and around regional bodies as a core goal of this project.

5.3 Outputs and timing

The expected delivery timing for outputs is shown in Table 5.1. Outputs include:

- Report laying out carbon farming options, evaluating risks and benefits, and identifying likely best options.
- Identification of tools that can help regional bodies in their assessment and planning around carbon farming.
- Spatial data for biodiversity co-benefits and other modelled risks and co-benefits.

Table 5.1 Outputs from carbon farming opportunities project

OUTPUT	TIMING
Report (carbon farming)	Nov 2014

5.4 Benefits to NRM

Carbon farming is a key rationale driving ongoing investment in NRM planning, both stream 1 and 2. This project will provide a useful summary of the state of play in late 2014.

5.5 Team

Don Butler, Melinda Laidlaw, Keryn Oude-Egberink (Qld Herbarium)

5.6 Resources, risks, constraints

Need to be pragmatic about possible approaches to modelling fire, salinity and weeds. Carbon farming opportunities will relate only to those based on natural resource management (e.g. forest management, reforestation, avoided deforestation). Methodologies based on waste management (e.g. land-fill and piggery methane) or changes to intensive agriculture practices (e.g. fertiliser management) are excluded from the project scope.

6. Incorporating the NSW and ACT Regional Climate Model (NARCLiM) and climate change

6.1 Short description

Provide results from the NARCliM project and a summary of the results of the Eastern Seaboard Climate Change Initiative (ESCCI) to regional bodies.

6.2 Brief methods

- NARCliM data will provide dynamically downscaled (10km) climate projections and be made available through a web-portal by Dec 2014
- OEH will identify potential impacts research utilising the NARCLiM projection data that may be extended to the east coast cluster border and may be provided as data layers e.g. ecological changes, fire, hydrological changes, soil erosivity. Impact research will be delivered in the form of data layers.
- OEH will identify most appropriate formats for provision of the research outputs to regional bodies.
- OEH will provide a synthesised report of the Eastern Seaboard Climate Change Initiative research. The synthesis report will be delivered by November 2014. The ESCCI projects cover the following research topics.
  - MATCHES – BOM Historical Tracking Tool
  - ECL Future Changes - UNSW
  - Long term Historical Variability – Macquarie Uni
  - Assessing regional coastal and estuarine impacts of extreme ECLs – Macquarie University
  - Determining the influence of East Coast Lows on regional water security – Newcastle University
  - A framework to determine the economic impact to case study community from a cluster of East Coast Lows – Risk Frontiers

6.3 Outputs and timing

In collaboration with regional bodies, the following elements of the outputs will be identified:

- Impacts for which further synthesis is required by East Coast Cluster research team
- Output formats (GIS layers, impact statements)
- Scale of outputs
- Supporting documentation.

The expected delivery timing for outputs is shown in Table 6.1.

Table 6.1 Outputs from NARCLiM project

OUTPUT	TIMING
Identification of likely impacts products	June 2014
Synthesis of the ESSCI research	Nov 2014
Access to NARCLiM data and information portal	Dec 2014

6.4 Benefit to NRMs

- Providing outputs from NARCliM research that are useful and relevant across the whole cluster
- Providing outputs that are user friendly and engagement ready

6.5 Team

Polly Mitchell (OEH), Chris Lee (OEH)

6.6 Resources, risks, constraints

- Delivery of the cluster outputs are reliant on other OEH projects, specifically NARCliM projections and NARCLiM impacts.
- It is likely that only a selection of identified outputs will be able to be provided due to geographic constraints.
- Timing may be too late for many regional body applications

NARCLiM model domain does not extend to the northern boundary of the Fitzroy catchment.

7. Socio-Economic Vulnerability Assessment

7.1 Short description

This project will apply a framework for undertaking a systematic assessment of socio-economic vulnerability to climate change impacts across the NRM regions and subregions. The approach will be grounded within internationally and nationally accepted procedures for conducting socio-economic vulnerability assessments. It will consider how the impacts of climate change are likely to be unevenly experienced across the regions and between sectors.

7.2 Brief methods

1. Prepare a systematic review of the current knowledge regarding the factors that influence socio-economic vulnerability to a range of climate change impacts relevant to the NRM regions and subregions
2. Compilation and analysis of quantitative data available through national and state data sets measuring the factors of socio-economic vulnerability revealed through the systematic review.
3. In-depth case studies of subregions (e.g., a defined geographic area) and/or economic sectors (e.g., the grazing industry, tourism) that build more contextualised understandings of vulnerability in particular places. Case studies will be selected based on the systematic review, data analysis described in 2 above, and with input from NRM bodies.

7.3 Outputs and timing

The expected delivery timing for outputs is shown in Table 7.1.Outputs include:

- Report and maps profiling the potential socio-economic vulnerability across the NRM regions and subregions – based on national and state data sets (quantitative assessment).
- Report and maps profiling the socio-economic vulnerability of communities and/or economic sectors selected for the in-depth case studies (qualitative assessment).
- A framework for assessing the potential socio-economic vulnerability to climate change using easily accessible national and state datasets.

Table 7.1 Outputs from socio-economic vulnerability assessment project

OUTPUT	TIMING
Report and maps profiling the socio-economic vulnerability across the NRM regions and subregions – quantitative assessment	May 2014
Report and maps profiling in-depth case studies of socio-economic vulnerability for selected economic sectors and/or population groups (quantitative and qualitative assessment).	Dec 2014

7.4 Benefits to NRMs

The assessment of potential socio-economic vulnerability will guide resource allocation for management actions that facilitate adaptation to climate change impacts of particular areas and economic sectors. It will also guide further detailed assessment of socio-economic vulnerability through the identification of knowledge gaps that are unable to be fulfilled with currently available data.
The framework for assessing socio-economic vulnerability, in as much as possible, will include easily accessible national and state datasets meaning that the approach can be applied by NRM bodies to future data such as the 2016 census.

7.5 Team

Prof Tim Smith, Dr Scott Lieske, Dr Noni Keys, Erin Smith (USC)

7.6 Resources, risks, constraints

Risks include the ability to access relevant datasets at suitable geographies for the NRM regions. Constraints include availability of time series data at suitable and comparable geographies for the NRM regions.

8. Institutional Adaptive Capacity to Climate Change for Natural Resource Management

8.1 Short description

The aim of this project is to explore how different participants in local and regional governance build and mobilise their relations and linkages with other stakeholders to create the necessary capacities and resources (technical, knowledge, financial, institutional and/or political) to achieve NRM objectives under a changing climate. We will investigate the potential of existing institutions for regional NRM to enhance adaptive capacity to climate change, and identify challenges and opportunities to improve such institutions, enabling them to better respond to current and future impacts of climate change.

Institutions are defined here as "*...formal and informal rules, rule-making systems, and actor networks at all levels of human society (from local to global) that are set up to steer societies towards preventing, mitigating, and adapting to global and local environmental change*" (Biermann *et al.* 2009). Therefore, institutions play a critical role in determining the capacity of organisations or actors – including NRM organisations, community, government and industry – to adapt to climate change.

Responding to climate change will require responsive and flexible institutions that facilitate adaptive capacity. This involves, enabling NRM organisations and other relevant regional and local stakeholders to design new institutions and reform existing ones to respond effectively to the impact of a changing climate (Gupta *et al.* 2010).

Specifically, this project aims to:

- Identify and characterise the relevant players involved in NRM (e.g. NRM organisations, farmer associations, government departments) within our case study regions.
  - Explore how relations and linkages among players have helped or undermined capacities and resources (people, funding, information, decision-making processes etc.) to deliver key outcomes for climate adaptation.
- Assess to what extent the resources and capacity (mobilised via linkages) encourage institutional adaptive capacity, including (Gupta et al. (2010):
  - encouraging the involvement of a variety of perspectives, stakeholders and solutions;
  - enabling stakeholders to continuously learn and improve their institutions;
  - allowing and motivating stakeholders to adjust their behaviour;
  - mobilising leadership qualities;
  - mobilising resources for implementing adaptation measures; and
  - supporting principles of fair governance.

This project will provide recommendations for improving the adaptive capacity of NRM organisations, over time, to support more effective governance in any given regional area.

8.2 Brief methods

1. Data will come from relevant documents, scoping and formal interviews. Understanding the characteristics of institutions that enable adaptive capacity of regional NRM is paramount to improve success of NRM organisations in effectively responding to climate change and other pressing issues. Lessons from this study will also be useful to other policy arenas confronting climate change in Australia and elsewhere.
2. Objective 1 requires a desktop review in consultation with the NRM organisations.
3. Objective 2 will be answered using social network interviews using social network analysis.
4. Objective 3 will be answered using the interview questions and social network analysis (elements used for analysis are based on the framework by Gupta et al 2010) and shown in Table 8.1.

Table 8.1 Dimensions of institutional adaptive capacity and assessment criteria

DIMENSION	DEFINITION	ASSESSMENT CRITERIA
Diversity (variety)	Institutions encourage the involvement of a variety of actors, perspectives, and solutions	– Inclusive participation of relevant actors
Learning capacity	Institutions enable social actors to continuously learn and improve their institutions	– Monitoring
Autonomy	Institutions allow and motivate social actors to self-organise, design and reform their institutions. Authority (legitimate or accepted forms of power) is not challenged allowing actors to make and implement decisions	– Authority to make and implement decisions – Authority is not challenged by other decision-making entities
Leadership	Institutions mobilise leadership qualities of social actors	
Resources	Institutions can mobilise resources (human, financial, technical) for making and implementing decisions (e.g., adaptation measures)	– Financial – Human – Technical
Fair governance	Institutions support principles of fair governance, such as legitimacy (there is public support for institutions), equity (institutions are considered to be fair), responsiveness (institutions are responsive to society), and/or accountability	– Legitimacy – Equity – Responsiveness

8.3 Outputs and timing

The expected delivery timing for outputs is shown in Table 8.2.

Table 8.2 Outputs from institutional adaptive capacity project

OUTPUT	TIMING
Manuscript/Report ready	Dec 2014

8.4 Team

Morena Mills, UQ; Pedro Fidelman, USC; Catherine Lovelock, UQ; Christine Hosking, UQ

8.5 References

Biermann, F., M.M. Betsill, J. Gupta, N. Kanie, L. Lebel, D. Liverman, H. Schroeder, and B. Siebenhuner. 2009. *Earth system governance: People, places, and the planet.* Science implementation plan of the earth system governance project, 144. Bonn: International Human Dimensions Programme on Global Environmental Change.

Gupta, J., C. Termeer, J. Klostermann, S. Meijerink, M. Van Der Brink, P. Jong, S. Nooteboom, and E. Bergsma. 2010. The adaptive capacity wheel: A method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environmental Science & Policy* 13: 459-71.

9. Integrated assessments of major resource-dependant sectors

9.1 Short description

To integrate the ecological/carbon and socio-economic vulnerability assessments and understand the implications for the major resource-dependant industry sectors in the regions (e.g. grazing, horticulture, tourism) and the capacity of those sectors to respond.

9.2 Brief methods

1. Identify outputs - identify critical outputs from the ecological/carbon and socio-economic vulnerability components
2. Select assessment framework - review the strengths and limits of existing planning and research frameworks for their suitability to the task (e.g. state-trend, socio-ecological vulnerability, resilience and ecosystem services framework models); selection criteria (Conceptual soundness (review of literature); Capacity / consistency with research outputs from other components of the project and inform later stages of project (researcher workshop and discussions); Suitability to regional planning and investment needs (regional body consultation via PWG)).
3. Identify the resource-dependant sectors (e.g. grazing, horticulture, tourism) for which assessments will be developed
4. Prepare draft assessments for regional body consultation
5. Refine and finalise assessments

9.3 Outputs and timing

- We are looking to produce a number of 4-5 page ***Briefing Notes*** or ***Integrated Assessments*** based on specific sectors in specific landscape contexts
- These assessments will combine relevant material from the ecological and socio-economic vulnerability analyses being prepared in other parts of the consortia
- Each of the assessments will be structured around the main headings of: Sector background and policy environment; Exposure [climate threats to sector]; Ecological Impacts and Social Impacts; and Opportunities for Adaptation.
- At present the 'working list' of the assessments the team is considering include:
  - Briefing note 1: Coastal Tourism – Impacts and opportunities
  - Briefing note 2: Sustainable Landscapes / Forests – Impacts and opportunities
  - Briefing note 3: Peri-Urban Living – Impacts and opportunities
  - Briefing note 4: Rangelands Grazing – Impacts and opportunities
  - Briefing note 5: Resilient Horticulture – Impacts and opportunities
  - Briefing note 6: Broad acre Cropping – Impacts and opportunities
  - Briefing note 7: Synthesis: Adaptation trade-offs and interactions between sectors

The expected delivery timing for outputs is shown in Table 9.1.

Table 9.1 Outputs from integrated assessment project

OUTPUT	TIMING
Draft assessment framework	Nov 2013
Framework selected, data inputs identified, indicators agreed, key focus sectors agreed	May 2014
Draft (preliminary) assessments prepared, consult and refine framework	Nov 2014
Final assessments	May 2015

9.4 Benefit to NRMs

- Coherent, theme-based and integrated presentation of the outputs that is sector based
- Complimentary alternative to place or asset based approaches
- Can inform implementation and investment discussions with key stakeholder sectors
- Will support 'common' issue identification across regions that may support multi-regional investment proposals with key industry partners

9.5 Team

Bruce Taylor (CSIRO); Nadine Marshall (CSIRO), Ben Harman (CSIRO).

9.6 Resources, risks, constraints

- Identifying the 2, 3 or 4 sectors we can realistically focus on yet have sufficient relevance across the bulk of the regions in the cluster
- Dependant on timely delivery of outputs from earlier stages
- Ensuring some degree of consistency in the attributes used across ecological/carbon and socio-economic vulnerability assessments and the integrated assessments – this will need detailed discussions with USC, UQ and herbarium early 2014.

The 'integration' component of the research will not be able to integrate 'everything' for 'everybody', so the notes are a way of focussing effort on some key themes that have broad relevance overall but also some specific value for particular regions and sectors. The limits to this part of the work therefore will include restricting the "integrated assessments" to 4-6 agreed Briefing Notes. These themes will need to be decided through discussion with researchers and regional bodies.

10. Strategic policy appraisal (scenario planning)

10.1 Short description

Strategic appraisal of policies under conditions of uncertainty through documenting and testing policies against future possible landscapes (scenario planning).

10.2 Brief methods

- First workshop:
  - The identification of a focal issue or question
  - Assessing certain and uncertain drivers of the issue or question over a selected timeframe
  - The development of options based on those drivers – i.e. creation of scenarios (plausible and coherent pictures of possible futures)
- Development of narratives from the present to the possible futures (including a 'roadmap' for each scenario with signposts that could indicate if one future is becoming more likely than another), based around research from other consortium members for the cluster.
- Second workshop: testing existing plans, strategies and policies against each scenario.

10.3 Outputs and timing

- Narratives for cluster scenarios that synthesise information from other researchers and other sources in relation to possible futures.
- Through participation in these workshops, regional body representatives will learn how to run scenario planning exercises with stakeholders and use scenario planning outputs in stakeholder engagement.

The expected delivery timing for outputs is shown in Table 10.1.

Table 10.1 Outputs from scenario planning project

OUTPUT	TIMING
First scenario planning workshop	Sep 2014
Second scenario planning workshop	May 2015

10.4 Benefit to NRMs

- Improved capacity to use scenario planning as a tool in NRM planning
- Development of hypothetical, plausible alternative futures that can be used as a basis for discussions and working with stakeholders
- Assessment of NRM plans or implementation plans against possible future scenarios
- Improved learning and capacity to plan for alternative futures.

10.5 Team

Darryl Low Choy (GU), Silvia Serrao-Neumann (GU), Melanie Cox (GU), Marcello Sano, Olivia Koschade

10.6 Resources, risks, constraints

- Dependent on delivery of other projects and availability of additional information
- Timing is useful for testing plans but may be too late to feed into plan development.
- Methodology comprising two workshops and narratives is relatively fixed
- Format of the narratives and methodology outputs is open subject to expertise available.

11. Planning packages

11.1 Short description

Conduct a needs analysis to identify the needs of the NRM bodies in relation to climate change adaptation and inform detailed project planning.
Identify best management practices for incorporating climate change adaptation information into NRM planning and policy.
Synthesise the key learnings from the research and planning throughout the project for sharing with other researchers, NRM agents, regions, clusters and stakeholders.
Build the capacity of the regional body planners and researchers to foster adaptive learning in their institutions and stakeholders.

11.2 Brief methods

The first component of this project is the needs analysis, undertaken in April/May 2013. The Needs Analysis report (Cox et al., 2013) summarises the findings of this analysis.
This project is designed to influence NRM practices in relation to incorporating climate change adaptation information into NRM planning and policy. There are three main components:

1. Identify the rationale and process (the how and why) of incorporating East Coast Cluster research outputs from individual research projects to the full planning cycle.
2. Identify and develop a methodology for the above (e.g. translation methodologies). This is required as information may not be in a form that is usable in planning, and also provides a record of processes that is useful for sharing with other practitioners.
3. Develop an adaptive learning process that facilitates reflection on and evaluation of these processes, with a view to ongoing improvement.
    i. Literature review to identify possible approaches to adaptive learning
    ii. Investigate further options for processes to improve adaptive learning within regional bodies.
    iii. Develop process to document and share the key learnings from the research and planning processes, throughout the life of the project.

The Planners Working Group (PWG) workshops and communication are a key component of this project.

11.3 Outputs and timing

The expected delivery timing for outputs is shown in Table 11.1. Outputs include:

- Review of adaptive learning literature and processes
- Processes and methodologies for incorporating climate change adaptation research into planning
- Report on key learnings.

Table 11.1 Outputs from planning packages project

OUTPUT	TIMING
Establish reference group and working group	May 2013
PWG workshops and communication	ongoing
Needs analysis workshop and report	May 2013
Adaptive learning review	Dec 2014
Planning packages	Jun 2015

11.4 Benefit to NRMs

- Improved knowledge transfer from regional body planners to other staff and stakeholders and between regional bodies.
- Improved capacity to implement adaptive planning.
- Improved use of research outputs.

11.5 Team

Melanie Cox (GU), Darryl Low Choy (GU), Silvia Serrao-Neumann (GU)

11.6 Resources, risks, constraints

- Requires involvement of other regional body staff – may not have the time

- Changing institutional arrangements and lack of resourcing to regional bodies may hinder involvement
- Lack of existing tools that are appropriate to NRM planning context and lack of resources to develop new tools.

11.7 References

Cox, M., Serrao-Neumann, S., Vella, K., Sano, M. and Low Choy, D. (2013) *Analysis of the Needs of the East Coast Cluster Regional Natural Resource Management Bodies in Relation to Planning for Climate Change Adaptation*, Climate Change Adaptation for Natural Resource Management in East Coast Australia Project, Griffith University.

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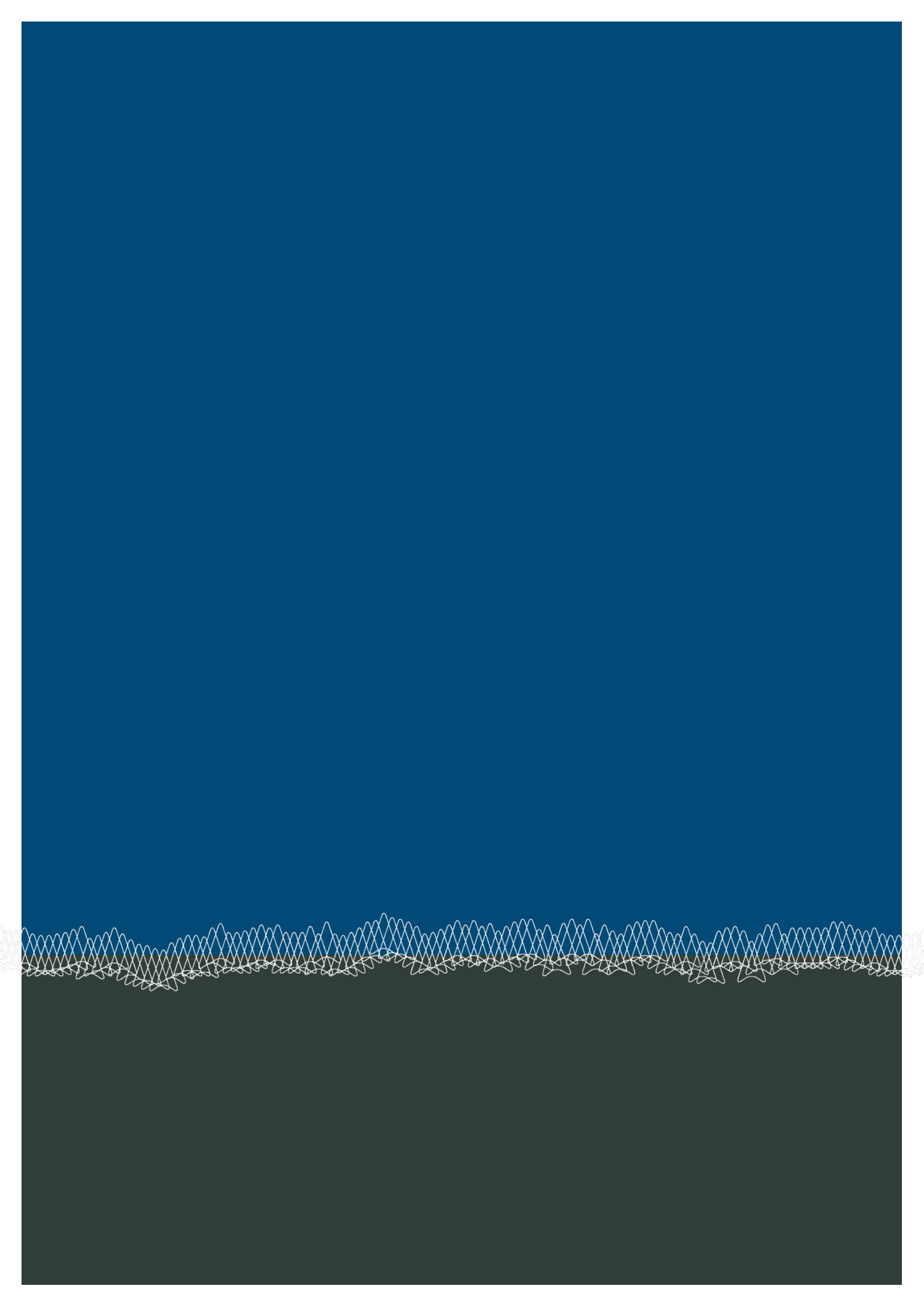
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