FINAL REPORT
Project - Understanding Indigenous climate knowledge: A case study with Kowanyama Aboriginal Community.

A sub-project of Indigenous knowledge of climate change to improve adaptation planning

1. Research Group

Project leader: Brendan Edgar. Team: Sam Capon, Sarah Connor & Sarah Rizvi

2. Objectives

The primary objectives of this project was to (i) build the capacity of the Kowanyama Aboriginal Land and Natural Resources Management Office (commonly known as the Kowanyama Lands Office) to communicate climate change projections specific to their lands and the possible effects (ii) consult with the Kowanyama Aboriginal community (primarily through the Kowanyama Lands Office) to improve the understanding of Indigenous knowledge of climate change (iii) contribute data and knowledge to support the development of a synthesis report to guide NRM planning processes.

The study area and field research was primarily focused on the coastal freshwater and marine wetlands of the Mitchell River Delta. These areas are very important to the Kowanyama people and changes are already being felt and documented. Also, preliminary research into the geomorphic history, marine inundation and storm surge information already exists making these areas a logical focus subject for this project.

This project had two aims:
Work with the Kowanyama Aboriginal Lands Office to:

1. Generate information and develop communication products, materials and tools to communicate climate science to an Indigenous audience; and
2. Consult and engage the Indigenous people of Kowanyama Aboriginal Community (primarily through the Indigenous rangers of the Kowanyama Lands Office) on their observations and perceptions of climate change and its potential impacts.

This project will value-add to existing projects and programs including;

- Current project work updating and improving the Kowanyama Land Information system, a significant store of data and information.
- Assist the Kowanyama Lands Office in communication and education by producing materials which will contribute to the Land Information system and generally increase awareness of the unique environments and habitats of the region.
- The Northern Gulf Resource Management Group's (NGRMG) Traditional Owner engagement program by facilitating discussion and consultation with Kowanyama people.
- The NGRMG's overall community engagement program by including engagement in the significant township of Kowanyama.

3. Approach

Collect and synthesize research and information to support the development a series of three posters to collectively communicate climate science and Indigenous knowledge of climate change. The target audience for these posters was the Kowanyama community but primarily the Kowanyama Lands Office. The posters were developed in close partnership with Dr Jeffrey Shellberg who is currently working with the Kowanyama Lands office on a separate project and the Indigenous Rangers. Dr Shellberg has worked in the area for many

years and his technical support was invaluable. Traditional Owners were also engaged about their perceptions of climate change and the possible effects on Land and Sea country during a field trip and workshop in early May 2015. Following these field observations the poster series will be finalised for use by the Kowanyama Lands Office and a report developed for NRM bodies to assist in developing their NRM plans.

The poster series (see Attachment 1) were developed with three themes in mind;

- The historic changes to the Mitchell River delta and how the coastline has changed dramatically over thousands of years, thereby introducing the concept of natural landscape and sea level change which has shaped the coastline.
- How some of the bigger climatic changes have shaped the Mitchell River delta such as cyclone Dora. This cyclone in particular was used as an example as many of the local people remember the devastation it caused and this could be related to one of CSIRO's medium level confidence climate projections that there will be fewer but more intense tropical cyclones. The concept of storm surge was also introduced in this poster to tie in with the main climatic changes discussed in poster 3.
- Future projections and the possible effects that climate change may have on the Mitchell River delta. This summarised key CSIRO projections and other research data and related them to the local examples detailing potential storm surge inundation.

4. Timeline

The project was completed over an 8 month period concluding end of June 2015.

Action	Timeline
Carry out a literature review of possible climate change impacts specific to the special places of the Kowanyama Aboriginal community;	Completed by end Jan 2015
Design and implement an engagement approach to engage with the Kowanyama Aboriginal Community;	Completed by end Jan 2015
Develop mapping products to help communicate possible sea level rise and/or storm surge impacts;	Completed by April 2015
Work with the Kowanyama Lands Office and NGRMG staff to develop communication products such as posters, maps, website information and/or videos to communicate possible climate change impacts.	Drafts completed by April Finished products End June 2015
In field research, working with Traditional Owners, rangers and relevant staff to observe and discuss current and future concerns of climate impacts.	Field work from 9th May
Information and data contribution for final report	Completed by end June 2015

5. Key staff and partners

This project was developed and delivered with the important support and input from the Kowanyama Lands Office staff and researcher Dr Jeff Shellberg and the support from key NGRMG staff. This project sought to benefit and 'value add' to existing projects and programs namely the community engagement process underpinning the development of the revised Northern Gulf NRM Plan and the ongoing Kowanyama Lands Office project *Wetlands of the Mitchell River Delta - Assessing biological and cultural diversity values of coastal wetland complexes.*

Key Staff from Kowanyama Lands Office	NGRMG	Traditional Owners
Chris Hannock (Manager) Viv Sinnamon (Previous Manager and Cultural & Research Centre Manager) Dr Jeff Shellberg (researcher) Rangers Gary, Fitzroy, Maxwell, Dale, Daniel & Phillip.	Sarah Rizvi Frederico Vanni	Francine Gilbert Freida Gilbert Colin Lawrence Fitzroy Lawrence

Using maps, images and graphics from the posters to discuss historic and possible future changes to Land and Sea country

6. Project outcomes & outputs

Researcher Dr Jeff Shellberg discussing the historic changes to sea country and the effects of storm surge and increased risk of storm surge under the latest climate change projections.

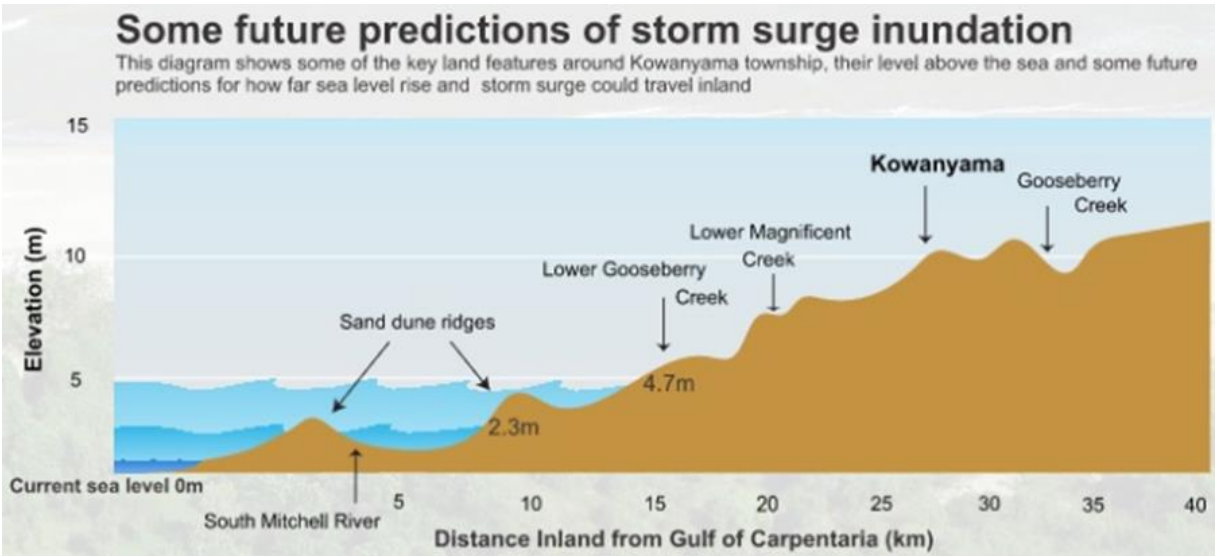
As mentioned above it was decided that the best approach to the project and workshop component would be develop a series of posters combining both western science and local knowledge and using these as a catalyst for discussion during a visit to country with Traditional Owners and Indigenous rangers. These posters would then be finalised with Traditional Owner and Indigenous ranger input to ensure their use as educational tools for the Kowanyama Lands Office. Western science and information was sourced primarily from:

- CSIRO Climate Change in Australia Projections for Australian NRM Regions – Monsoonal North Cluster Report 2015
- Report for Gulf of Carpentaria Storm Tide and Inundation Study Stages 1 and 2 Final Report prepared by GHD Pty Ltd for the Queensland Department of Science, Information Technology, Innovation and the Arts (2014)

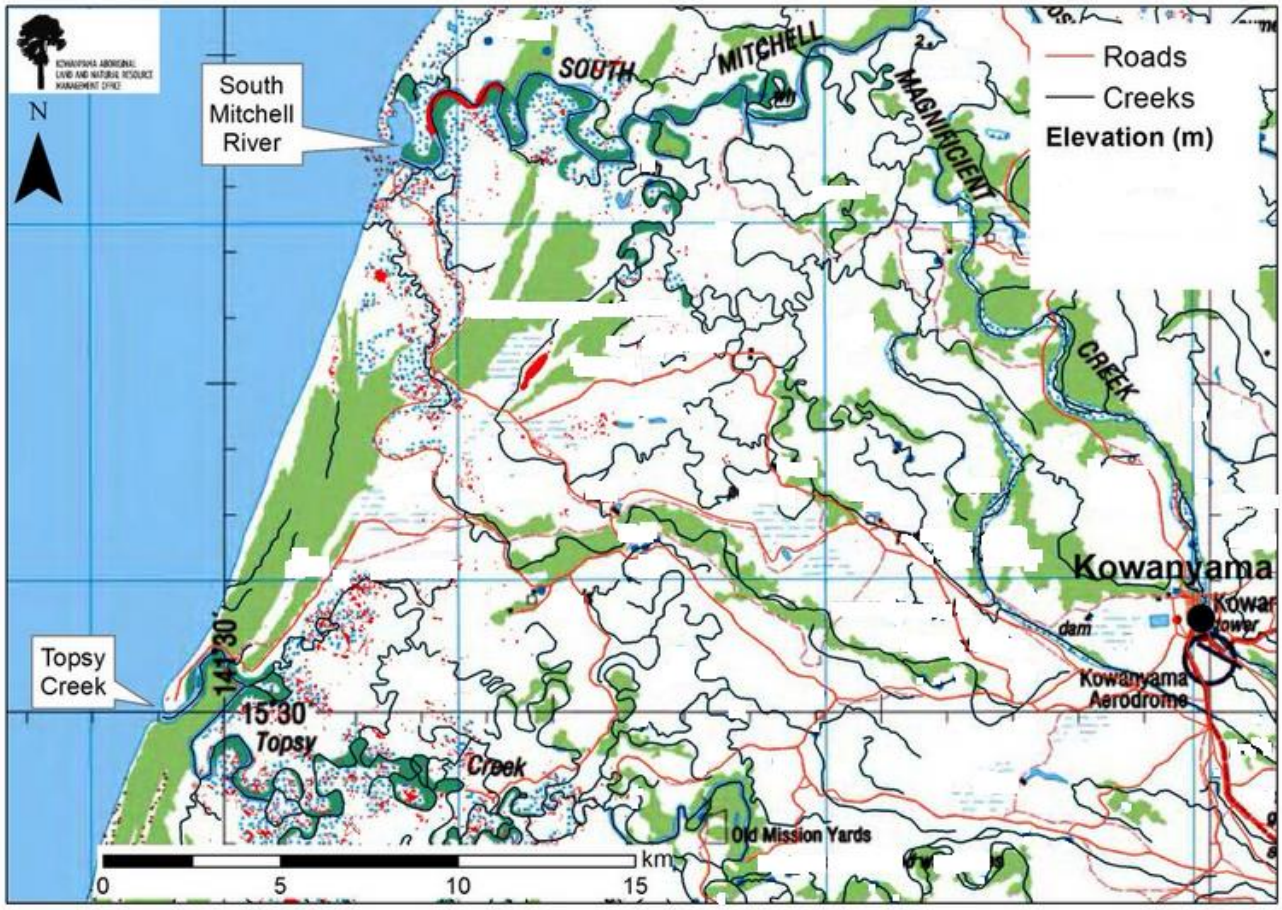
- Nanson, R.A. Vakarelov, B.K. Ainsworth, R.B. Williams F.M. Price, F.M. 2013. Evolution of a Holocene, mixed-process, forced regressive shoreline: The Mitchell River delta, Queensland, Australia. Marine Geology 339 (22-43)
- NOTT, J., 2006. Tropical cyclones and the evolution of the sedimentary coast of northern Australia Journal of Coastal Research, 22(1), 49–62. West Palm Beach (Florida), ISSN 0749-0208
- A Preliminary Geomorphic, Habitat, and Vegetative Reconnaissance Survey of the Beach Ridge and Dune Woodland System Near Topsy Creek, Mitchell River Delta, Queensland By Jeffrey Shellberg, Vivian Sinnamon, Aaron Crosby, Gary Drewien & Kowanyama Lands Office
- Data and research generated from the ongoing project Wetlands of the Mitchell River Delta - Assessing biological and cultural diversity values of coastal wetland complexes. Kowanyama Lands Office.

Workshop with rangers, researcher Dr Jeff Shellberg, NGRMG staff and consultant discussing climate change projections, and the best methods to communicate those projections.

Incorporating traditional and local knowledge is vital in producing posters that will be 'owned' and used by the community. Visitors to the area will be able to learn about the cultural and environmental significance of Kowanyama Land and Sea country and the community itself will gain an insight into how their country may be at risk under a changing climate and how to identity adaptation pathways. This knowledge was sought during a field visit in early May, and using the draft posters demonstrating western science climate change projections as a catalyst for discussion about the possible risk to cultural sites, the environment and community in general. Much emphasis was placed in describing this science and relating it to the Kowanyama community and its country. For example, this diagram from Poster 3 displays an elevation transect (developed from researcher Dr Jeff Shellberg's work), combined with predicted storm surge inundation (GHD's data) into a graphic showing the location of the township and major land features:

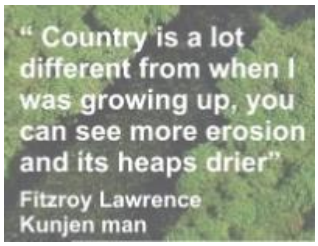


Part of the field visit included an opportunity to go out on country with Traditional Owners to visit sites of cultural significance which may be at risk under a changing climate. Traditional Owners from the Kokoberra and Kunjen clans accompanied the consultant, Kowanyama Lands Office and NGRMG staff to visit sites west of Kowanyama (wetlands and Lagoons), all the way to Topsy Creek and north along the Gulf of Carpentaria Coast (south of South Mitchell River and north of Topsy Creek).



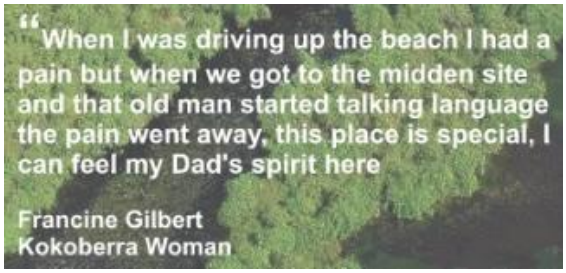
Location map

The following issues were of the most concern to the Traditional Owners:



- Erosion seems to be getting worse particularly along areas of Topsy Creek and other waterways exposing cultural artefacts and even burial sites.
- Some cultural sites particularly along the coast are being exposed and damaged i.e. midden sites
- Cyclones like Cyclone Dora caused a lot of damage in the past, could the community get more cyclones in the future?
- Kowanyama people, particularly children, need to learn about the new cultural sites that are found and they should be recorded and protected before they are further damaged
- The country is a lot drier and hotter than it used to be

- There is much concern about a proposed bituminised road from the township to the coast. A road would mean people could access fresh food via a barge and be able to travel out of town and get back on country during the wet season. Many like the concept of a new road but are concerned that it needs to be constructed in the right location, if the climate is changing and causing more erosion then the road needs to be put in the right place.



7. Discussion & Conclusions

Indigenous Australians and their representatives from various ranger groups have expressed concerns about the climate change impacts on Land and Sea country in Northern Australia for some time. Likewise the Kowanyama people share their own concerns and observations around climate change, weather and environment. Their knowledge, skills and belief systems should influence NRM planning and future decision making for climate change adaptation strategies to build climate change resilience.

This project is part of the overall Stream 2 project: *Indigenous knowledge of climate change to improve adaptation planning* and was developed to assist Natural Resource Management (NRM) groups in Australia's Monsoonal north improve the way in which both Indigenous peoples' knowledge and scientific understandings of climate change are incorporated into NRM planning. NRM groups were also keen to investigate methods and tools for communicating climate change impacts and adaptation strategies to Indigenous communities in the Monsoonal north. As the Queensland component of this project the consultant focussed efforts on;

- Synthesising existing knowledge of climate projections which could affect Kowanyama Land and Sea country specifically;
- Communicate these projections and risks effectively;
- Consult the community of their perceptions of climate change and observations and;
- Introduce the concept of adaptation planning and the importance of Traditional Ecological Knowledge[1] in the identification of pathways to adaptation to be incorporated into NRM planning.

This project emphasized the need to tailor communication products to the target audience to ensure relevance and usefulness. The subject of climate change is often a misunderstood and contentious issue hence the western science component of the posters required the careful interpretation of data to ensure complex terms and methodologies could be easily understood. Data and information also needed to be related to Kowanyama Land and Sea country especially as climate change is often perceived as a 'global issue'. The projects participatory approach and the successful input of knowledge and observations from the Kowanyama Rangers and Traditional Owners is in large part due to the local relevance of the information in the posters. At every opportunity images, stories and cultural references from the Kowanyama community as well as individual observations were used.

In conclusion, NRM Planning which successfully incorporates Indigenous knowledge of climate change is built upon a participatory approach integrating western science and Traditional Ecological Knowledge. What underpins this is good communication, localising issues with local area examples where possible and simplifying and relating complex climate change concepts and terminology. Traditional communication

[1] Leonard, S, Mackenzie, J, Kofod, F, Parsons, M, Langton, M, Russ, P, Ormond-Parker, L, Smith, K & Smith, M 2013, Indigenous climate change adaptation in the Kimberley region of North-western Australia. Learning from the past, adapting in the future: Identifying pathways to successful adaptation in Indigenous communities, National Climate Change Adaptation Research Facility, Gold Coast, 131 p

methods such as power point displays and organised workshops are often not successful, whereas 'going out on country', visiting areas and sites important to the local people and engaging in 'one to one' conversations are often more appropriate to achieve meaningful engagement. Similarly, this approach enhances the scientific and planning community's understanding of Traditional Ecological Knowledge to ensure Indigenous concerns and values are reflected in their priorities and target setting.

Furthermore, initially focussing on an issue of particular importance to the Indigenous group is a good starting point and then expanding to incorporate broader climate change impacts. This small project was forced to do so simply for logistical reasons but it meant choosing a focus area which not only was an important issue for the community but could also be supported by western scientific information. The coastal country near Kowanyama is an area which is highly valued by the Kowanyama people who have long expressed their concerns about its health and vulnerability to landscape change. But there are many issues (and indeed the community themselves) that are potentially at risk from climate change and they were more open to discussing these after discussing the potential impacts to the focus coastal area, for example salt water intrusion into freshwater wetlands and disaster management. Hopefully this project has established a firm foundation to further explore the concept of climate change adaptation planning by the Kowanyama Lands Office and Kowanyama Aboriginal Council in the future as well as give some insight into how NRM groups aim to incorporate Indigenous knowledge of climate change into NRM planning.

Attachment 1: Posters

Poster 1

Poster 2

A history of change to Land and Sea Country

Some of the biggest changes to the coast on Kowanyama Aboriginal land has been caused by big weather events like Cyclone Dora (1964). Scientists have recorded past changes in the number and size of cyclones, with fewer in the last 200 years. More powerful cyclones are predicted with future climate change.

Cyclone Dora 1964

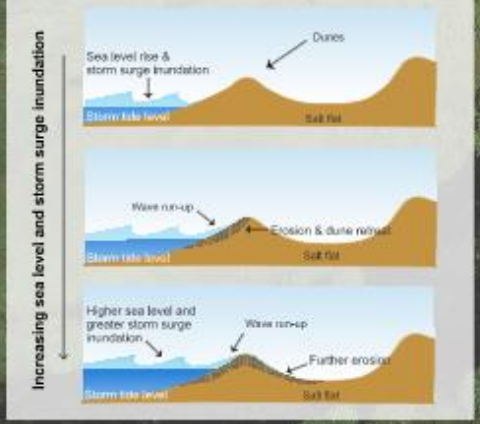
This map shows the path of Cyclone Dora
Damage was seen as far north as Aurukun and south to Karumba.

Cyclone Dora almost completely destroyed the original Mitchell River Mission and as a result the township was rebuilt in its current location

Changes to the coast

This map shows changes to the South Mitchell River Mouth over the last 50 years. River sediment has been moved around by tides and storms, washing land away in some areas and creating new land in others.

What is storm surge?



"When I was driving up the beach I had a pain but when we got to the midden site and that old man started talking language the pain went away, this place is special, I can feel my Dad's spirit here."

Francine Gilbert
Kokoberra Woman

Sand splay from storm surge on the South Mitchell coast.

This poster series was created by Sarah Connor & Dr Jeffrey Shellberg with invaluable input from the rangers of the Kowanyama Aboriginal Lands and Natural Resource Management Office, Kowanyama Traditional Owners Francine Gilbert, Colin Lawrence and Fitzroy Lawrence, Viv Stinnerton & Chris Hennodis. Data and information sourced from research and reports by Dr Rachel Nanson, Tess Lane and Prof Jonathan Nott. Images supplied by the Kowanyama Lands and Natural Resource Management Office, Kowanyama Cultural and Research Centre and State Library of Queensland.

Poster 3

Future Changes to the Mitchell Delta & Sea Country

We know that human activities are changing the climate faster than what nature has done in the past. Over the past 100 years the average daily temperature as risen nearly 1°C due to humans polluting the skies with carbon and greenhouse gases. Scientists have predicted future changes based on recent observations and trends. Communities needs to learn how to adapt to these changes.

What are some of the changes we could see?

The CSIRO recently completed the most up to date climate change projections for regions across Australia (Climate Change in Australia: *Monsoonal North 2015*).

Projections for the region including Kowanyama include:

- Mean sea level will continue to rise by 0.3m to 0.5m which means that storm surge height during big weather events could be higher
- Kowanyama will experience more extreme hot days and warm spells
- Average temperatures across the seasons will increase
- Cyclones will be more powerful but occur less often
- Rainfall could become more variable

Some future predictions of storm surge inundation

This diagram shows some of the key land features around Kowanyama township, their level above the sea and some future predictions for how far sea level rise and storm surge could travel inland

Scientists predict that future high tides over the next 50 years could reach 2.3m from the highest astronomical tides (1.98m) plus sea level rise (0.3m) as a result of climate change.

4.7m is the predicted storm surge during an extreme cyclone (like Cyclone Dora) in the next 50 years as a result of predicted climate change impacts like more intense cyclones.

This aerial map shows the 4.7m predicted storm surge during an extreme cyclone (like Cyclone Dora) in the next 50 years as a result of predicted climate change impacts like more intense cyclones and sea level rise.

"Country is a lot different from when I was growing up, you can see more erosion and its heaps drier"

Fitzroy Lawrence
Kunjen man

How can we better prepare?

ADAPTATION PLANNING

Adaptation planning is a term used to explain how communities can plan for the actions needed to adapt to a changing climate. These actions need to be specific to each community and reflect the communitys' values and priorities.

Adaptation planning needs to be done with the Traditional Owners of Kowanyama land and sea country to record the changes they've seen and the story places, special sites, waterholes and food sources they want to protect and pass on to future generations.

This project is just the beginning, Kowanyama town planning should also be addressed to examine the future changes due to freshwater flooding and wet season access to the town and surrounding country.

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