

High resolution terrain mapping of the NSW Central and Hunter coasts to help prepare for climate change – New South Wales

SUMMARY

The NSW Government carried out a project to identify low-lying areas on the Hunter and Central coasts at risk of sea level rise resulting from climate change. The project used cutting-edge airborne laser technology to map low-lying areas in the Wyong, Lake Macquarie, Newcastle City and Port Stephens council areas. It also included terrain data which had already been collected by Gosford City Council. The project allows councils and the NSW Government to consider the likely impacts of sea level rise on low lying coastal areas both for existing and future development.

PROJECT OVERVIEW

The project was designed to demonstrate how high resolution terrain data can be used by state government agencies, councils and Catchment Management Authorities in examining the potential impacts of any climate change scenario on coastal communities. The approach taken was to apply spatial modelling techniques to identify the elevation of a selected range of built, natural and cultural assets in order to assess their potential vulnerability to climate change related sea level rise and coastal inundation.

A high resolution terrain survey using Light Detection and Ranging (LiDAR) technology was conducted over 1400 square kilometres of land in the Central and Hunter Coasts. LiDAR is a technology used to remotely measure elevation by reflecting laser light from a passing plane.

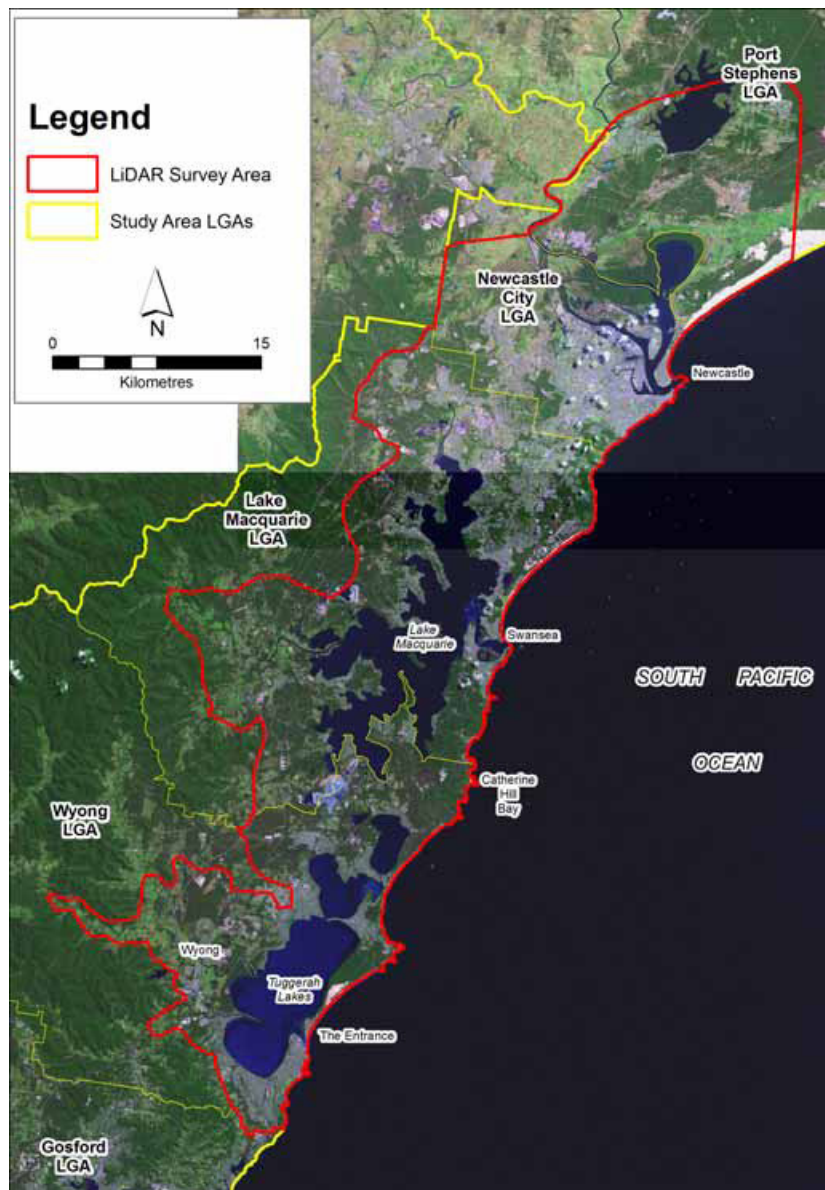
The project identified a range of infrastructure and land use categories below one metre elevation that could be affected by rising sea levels. These include:

- Over 160 hectares of residentially zoned land
- Some 73km of roads (as well as other public infrastructure)
- Over 3,000 hectares of rural zoned land
- Over 6,000 hectares of conservation lands
- More than 1,500 existing addresses

The study area (see Figure 1) takes in low lying areas (<10m above mean sea level) including Port Stephens, Newcastle City, Lake Macquarie City, Wyong and Gosford City Local Government Areas. The LiDAR survey footprint (red outline) was determined by project funding and takes in low lying areas of the Port Stephens, Newcastle City, Lake Macquarie City and Wyong Local Government Areas. Gosford City LGA LiDAR data was collected independently of this project in 2005.

**GARNAUT CLIMATE CHANGE REVIEW
- CASE STUDY -**

Figure 1 – Climate change impacts and adaptation pilot study area on the NSW Central and Hunter Coasts.



Source: NSW Department of Planning (2008)

BACKGROUND

A fundamental driver for the project is that realistic and defensible adaptive responses to changed coastal hazards must use the best information available. The NSW Government's Comprehensive Coastal Assessment in 2007 highlighted this issue in relation to the available topographic information for the coast and the general inadequacy of this information for quantifying risk related to coastal hazards modified by climate change.

GARNAUT CLIMATE CHANGE REVIEW - CASE STUDY -

OPPORTUNITIES AND BENEFITS

This project has successfully demonstrated the utility of LiDAR technology in examining the implications of potential climate change related sea level rise for land use planning in the Central and Hunter Coasts. LiDAR terrain data has proven to be suited to the spatial information requirements of all levels of government and a valuable tool with which councils can prioritise adaptation strategies for assets potentially at risk from inundation under current and future climates.

Project partners are already using the LiDAR data for a variety of planning applications, including flood studies, flood risk modelling, reviews of major flood events and emergency response, climate change associated coastal inundation analysis, tsunami risk modelling, vegetation mapping, remote sensing validation, storm water harvesting strategies and ecological risk assessment. Further applications in auditing and monitoring changes in the built environment are also anticipated.

CONSTRAINTS AND COSTS

The \$500,000 project was funded by the NSW Government's Climate Change Impacts and Adaptation Research Program.

PROGRESS AND FUTURE PLANNING

It is hoped this work and related research into potential climate change impacts of sea level rise on coastal areas will help build consensus on practical adaptation responses with net economic, social and environmental benefits.

REFERENCES

This case study has been compiled from the following report:

NSW DoP (Department of Planning) 2008, *High resolution terrain mapping of the NSW Central and Hunter coasts for assessments of potential climate change impacts*, Department of Planning, Sydney. Available online at: http://www.planning.nsw.gov.au/plansforaction/climatechange_mapping.asp