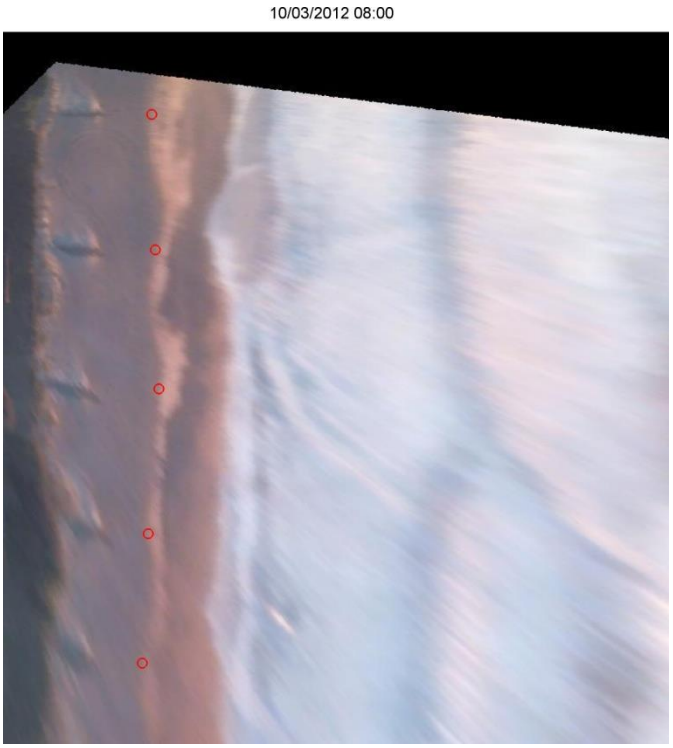
Wooli Coast-Cams Image Analysis

March 2012 – March 2013



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Executive Summary

Introduction

The attached document from Dr. Shaw Mead of eCoast is the first annual report on results produced by the automated camera system monitoring Wooli beach, which considers daily and monthly beach changes for the southern part of Wooli Village beach.

CCPA set up the system as an initial step in addressing a lack of detailed data about Wooli beach and the processes that shape it. The photographs and analysis from this and future years will provide information that can contribute to an evidence-based long term beach management and protection strategy for Wooli (see Note 1 below).

Objectives

The primary objective in this first year was to measure changes in “beach position”.

This was done by monitoring the high tide mark on a daily and monthly basis for the area of the beach being photographed.

Examples of other valuable objectives for which the system can be used (subject to available funding) are:

- Measuring the impact of particular storms and recovery time from them.
- Identifying trends from La Nina and El Nino weather cycles.
- Contributing to an overall model of Wooli bay in conjunction with information from beach surveys, offshore data gathering, and other available data.
- Gaining an understanding of nearshore bar/trough formations.
- Calibration of wave and morphological (Note 2) models.
- Increasing our understanding of processes within the whole embayment

Results

The camera system's headline results from this first year are:

- The expected pattern of winter-erosion and summer-accretion was confirmed by all three cameras although the rates of change varied markedly by area (refer eCoast report p17, para2).
- The pictures from early March 2013 indicated that the overall beach position was more eroded than a year earlier primarily as a result of the storms in January and February (P17, para3). However, the beach has the ability to recover just as fast as it can be eroded. This is shown by the large fluctuations in daily beach position (Note 3 below)
- There is good agreement in beach position between the data from the camera system and that from the beach surveys (p18, paragraph 2)
- In its first year the camera system was operational for approximately 85% of the time. The power problems which caused outages have been fixed and a daily monitoring process has been implemented to avoid loss of data due to delays in recognising and fixing problems. Maintenance difficulties will need addressing in year 2.

Notes

1. The camera system is a part of the monitoring process aimed at supporting a beach management and protection strategy. It provides hourly high resolution data for a defined part of the beach (see Figure 1.1). This data can then be put into the context of the whole beach by combining it with results from the 3-monthly beach surveys of the whole beach. This monitoring plan includes developing an understanding of how the beach 'works' (e.g. what are the extents of retreat and advance, and what conditions drive these processes?) and the tools to apply to future projections of beach evolution, to consider the design and impact of particular beach management and protection strategies (e.g. dune planting, renourishment, sand retention structures, etc.; what has been the impact of the training walls on Wooli Beach?), and other factors that together will underpin a long-term beach management and protection strategy.

2. Coastal (geo)morphology is the scientific study of coastlines and the processes that shape them. It aims to understand why beaches currently look the way they do and to predict future changes through a combination of field observations, physical experiments, and computer modelling.

3. The beach position (high tide location) varies on average 3.2 m each day (either seawards – advance or shore-wards – retreat) (Table 3.1, page 6). Maximum daily retreat is similar to maximum daily advance, 21.5 m and 18.4 m, respectively (Table 3.1, page 6). While there are a number of variables that affect the location of the high tide mark it is a useful proxy for the width of the beach. These variations are seen as 'noise' in the data without significant impact on the overall trends.