

Using drone technology to monitor coastal change

Summary

Aerial imagery provides useful additional information that can supplement on-ground monitoring of coastal change. Use of drones for acquiring aerial photography and video capture can be a cost effective monitoring tool for coastal environments. Regular aerial photography can highlight areas of concern to supplement on-ground observations. Wattle Range Council, in the south-east of South Australia, has commissioned a local company with drone capabilities to acquire high-resolution photos of the coastline and coastal infrastructure.

Keywords

Imagery, drone, monitoring, aerial photography

Aerial imagery provides useful additional information that can supplement on-ground monitoring of coastal change. However, traditional aerial photography has been cost prohibitive for most organisations. The recent introduction of drones to capture high quality aerial imagery now provides an opportunity to small and regional councils to monitor the coastline for a fraction of the cost compared to traditional aerial photography.

Wattle Range Council, in the south-east of South Australia, has commissioned a local company with drone capabilities to acquire high-resolution photos of the coastline and coastal infrastructure. For around \$1,200, Council was able to acquire ortho-rectified¹ images that can be overlaid with mapping software for two separate sections of coast. These images provide a "point in time" record of the coastline and, as the images are low cost, Council plans to replicate the collection on an annual basis to monitor changes in coastal condition.

Hundreds of digital images were overlaid to give a complete picture of the area. One series of images shows the Beachport boat ramp and the surrounding groynes, seawall and artificial reef (Figure 1). These will assist in sand management and give a clear picture of the deterioration of the artificial reef.

¹ Because of the earth's curvature, photos taken from the air do not fit exactly over a map of the same area. Ortho-rectification adjusts the photo to match the coordinates in a map, effectively creating a flat-earth version of the photo.

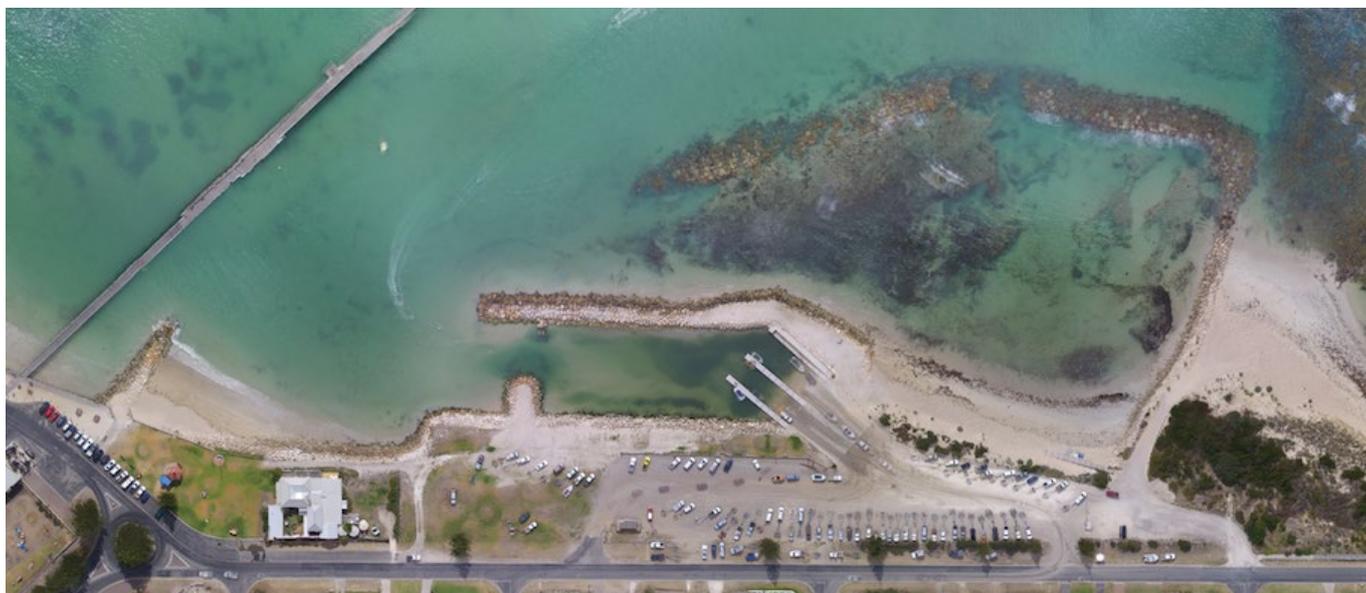


Figure 1: Aerial image of Beachport boat ramp and the surrounding groynes, seawall and artificial reef. Photo: © Wattle Range Council, 2016.

A second series of images shows the coastal erosion at Post Office Rock and the Salmon Hole, north of Beachport (Figure 2). While on-ground monitoring has been undertaken annually for a number of years, the recent imagery at the Salmon Hole shows the risk of erosion undermining a key tourist route. From the ground, the dune swales are visibly lower than the dunes, leading people to expect that any breach by the ocean through the dunes would be at this low point. However, the aerial imagery shows that the dune is most likely to undermine the road first. This is a poignant image that is likely to assist in gaining public and political support for investigation and investment in addressing the risk.

Factors that Wattle Range Council considered when acquiring aerial imagery by drone were:

- Does the company have Civil Aviation Safety Authority (CASA) certification to legally fly an unmanned aerial vehicle for commercial purposes?
- Are there any local rules or regulations relating to drones?
- Does the company have public liability insurance?
- Are we looking for oblique shots or direct overheads?
- Do the images need to be rectified so that they can be used with our mapping software?
- Do we need permission to access land or for use of the photos?

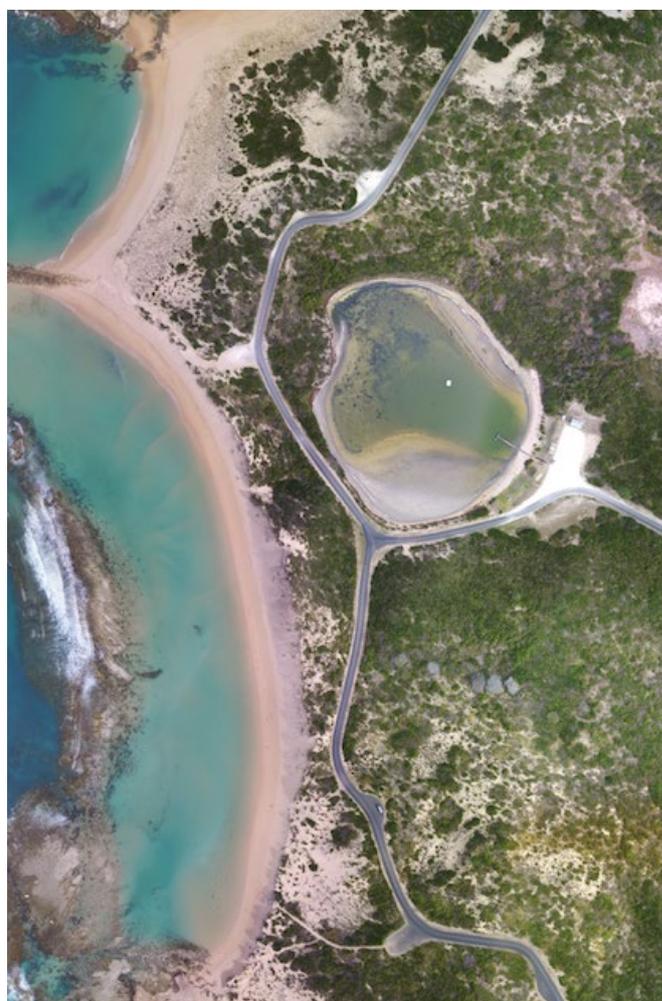


Figure 2: Aerial image of Wattle Range Council's touristic attraction – Salmon Hole. Photo: © Wattle Range Council, 2016.

Further reading

Klemas, V.V., 2015: Coastal and environmental remote sensing from unmanned aerial vehicles: An overview. *Journal of Coastal Research*, **31**(5), 1260 - 1267.

Use of citizen science - phones and drones in California. Accessed 15 June 2017.

This Snapshot was prepared by Lauren Oxlade from Wattle Range Council. Please cite as:

Oxlade, L., 2016: Using drone technology to monitor coastal change. Snapshot for CoastAdapt, National Climate Change Adaptation Research Facility, Gold Coast.



Australian Government
Department of the Environment and Energy