Underwater digital still images taken with cameras operated from a surface vessel in the Point Addis Marine National Park south of Geelong, Victoria. Clockwise from left: Vast rhodolith fields lie 2 km offshore at 33 m depth. Deep sponges at 50–55 m and approximately 4–5 km from the coast. Diverse sponge colonies lie at 40–45 m depth, approximately 3.5 km offshore.

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Sounding out the seabed

Using new sonar technology, scientists are discovering, mapping and monitoring the seabed off Victoria and have been astounded by some of the underwater features they have found, including old laval flows, dune fields, ancient lakes, rivers and coastlines, rare marine plants and other intriguing wonders of the deep.

The project involves mapping the six largest of Victoria's 13 marine national parks, using state-of-the-art sonar mapping equipment and expertise, as well as underwater towed video cameras and still images.

Scientists from the Coastal Cooperative Research Centre (CRC), including the international Fugro Survey Pty Ltd (whose R&D centre is based in Perth), and the University of Western Australia (UWA) are producing the high-resolution images and maps for Parks Victoria. The aim is to build on our currently limited knowledge of marine habitats and other seabed structures in coastal waters of about 15–80 metres depth – those too deep and dark for aerial survey.

Dr Anthony Boxshall, Manager of Marine Research for Parks Victoria, says the surveys have been a revelation. 'The detail in the habitat data is unprecedented and will allow us to improve and refine our management of marine habitats, which is, after all, a bread and butter issue for us.'

'For example,' he told *Ecos*, 'if we know the location and extent of various underwater habitats, whether sponge gardens, rocky reefs, kelp beds or sand sediment areas, we can respond appropriately to a crisis like an oil spill; or if, say, recreational divers might damage a delicate habitat with boat anchors, we can provide a permanent anchor point.

'Not least, the survey images will provide a powerful means of increasing awareness of marine habitats in parks, and educating school students and others of the value and significance of coastal habitats,' Boxshall says. 'How many people using our beaches are aware that just beyond the break there might be a reef that is teeming with life?'

As a case-in-point, the surveys have discovered several square kilometres of rhodoliths – fields of small red rocks – lying on the sea floor off Point Addis, a habitat type previously unknown off the outer coast of Victoria, let alone at Point Addis Marine National Park. The colouration is due to coral-like red algae and the rhodoliths are a valuable habitat regarded as a nursery ground for many fish and other species.

'We can now differentiate between depths of just a few centimetres when surveying the shape of the seabed using sound waves, and we can generate accurate coloured images from sonar in real-time.'

Oceanographer, Professor Des Lord of UWA and the Coastal Water Mapping group of the Coastal CRC, says the actual process of conducting a sonar survey is much like mowing a huge lawn. 'You ply up and down in the research vessel for thousands of kilometres, collecting data day and night, all of which may sound a bit routine but it results in images and maps that are scientifically exciting and very useful in many different ways, ranging from conservation and resource management to coastal navigation.

'Compared to just five years ago, the technological advances have been huge,' says Lord. 'We can now differentiate between depths of just a few centimetres when surveying the shape of the seabed using sound waves, and we can generate accurate coloured images from sonar in real-time. We can even email depth-shaded maps and reports off the research vessel within 24 hours, whereas a few years ago it could take six months to get the data processed.'

Des Lord says the success of the work in Victoria, which involves numerous partner organisations, has led to similar mapping exercises beginning in other parts of Australia from Queensland to Western Australia and is attracting international interest too.

Meanwhile the Victorian project has already been expanded, with funding from the Natural Heritage Trust. Deakin University, now a Coastal CRC research partner, has joined the mapping partnership to survey the seabed outside marine protected areas as well, covering some 800 square kilometres off the coast of Victoria in less than one year. Other projects are in the pipeline.

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