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Shallow Habitat Mapping in Victorian Marine National Parks and Sanctuaries

Volume 2: Eastern Victoria

David Ball and Sean Blake

Primary Industries Research Victoria – Marine and Freshwater Systems

June 2007

Executive Summary

This report presents shallow habitat mapping at Victorian Marine National Parks (MNPs) and Marine Sanctuaries (MS) along the Bass Strait coast and at Corner Inlet. This volume covers sites east of (and including) Point Lonsdale. Parks within Port Phillip Bay, Western Port and at Bunurong and Wilsons Promontory were mapped in previous studies. Ninety Mile Beach MNP was omitted from this study due to difficulties in acquiring suitable aerial photography.

The project mapped shallow habitats up to depths of about 10 m from aerial photography. An underwater video system was deployed to ground-truth habitat types and to identify dominant macroalgae and seagrasses. The underwater video and mapping data were integrated in a Geographic Information System (GIS).

The outer region of Port Phillip Heads MNP – Point Lonsdale featured flat rock platforms extending into mostly solid low profile reef, becoming patchy near its seaward boundary. The Nepean Bay region of Port Phillip Heads MNP – Point Nepean was dominated by patchy reef and extensive beds of *Amphibolis antarctica.* The outer region featured a wide rocky platform extending into solid high profile reef, becoming patchy further offshore. Mushroom Reef MS had a distinctively shaped low profile platform and was mostly surrounded by reef being replaced inshore by mixed reef/sediment with seagrass. The northern site at Corner Inlet MNP was dominated by the seagrass *Posidonia australis* on the shallow sand flats around Granite Island and adjacent to the Wilsons Promontory coast. The southern site was shallower and dominated by Zostera spp. Point Hicks MNP was mostly sandy sediment with a band of high profile reef extending from a rock platform around the base of Point Hicks itself. Cape Howe MNP was also mostly sandy sediment with a band of high profile reef extending from the shore at its eastern boundary with NSW.

Beware Reef MS was mostly beyond the depths that could be mapped from aerial photography and as an alternative we collected depth soundings at this site. The resulting depth model showed a narrow ridge of reef running in a southeast direction and descending to a relatively flat seabed.

The dominant reef biota displayed a broad zonation pattern along the depth gradient. *Hormosira banksii* was the dominant biota observed on the intertidal rock platforms. *Durvillaea potatorum* with mixed brown and green algaes inhabited the seaward edge of the intertidal platforms. Extensive beds of *Phyllospora comosa* became dominant at depths of around 3–5 m. *Ecklonia radiata* was typically observed at depths >7 m at the more exposed areas and often growing with *P. comosa*. The giant kelp *Macrocystis angustifolia* was observed at Port Phillip Heads MNP - Point Lonsdale and Point Nepean. Urchin barrens were observed at Cape Howe MNP.

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1 INTRODUCTION

Primary Industries Research Victoria (PIRVic) – Marine and Freshwater Systems was commissioned by Parks Victoria to map shallow marine habitats at Marine National Parks and Sanctuaries along the Bass Strait coast and in Corner Inlet. The primary method for mapping shallow habitats in this study was aerial photography interpretation and ground-truthing with underwater video.

1.1 Study objectives

The study objectives were:

1. To review, compare and document the relationship of Victoria's interim marine habitat classifications to relevant Australian marine habitat classification systems.
2. To develop digital mapping data layers (incorporating aerial photography) that will provide information products for shallow water (<15 m) habitat mapping for 16 Marine National Parks and Sanctuaries in Victoria at a nominal scale of ~1:25 000 (or larger).

A separate report (Ball *et al.* 2005) addressed the first objective and the outcomes of this review provided the classification system adopted for the shallow habitat mapping (Section 2.4).

1.2 study sites

The study sites are listed in the following table (includes sites from western Victoria, see Shallow habitat mapping in Victorian Marine National Parks and Marine Sanctuaries. Volume 1: Western Victoria).

Table 1. Shallow habitat mapping study sites.

Marine National Parks	Marine Sanctuaries
Discovery Bay	Merri
Point Addis	Marengo Reefs
Port Phillip Heads - Point Lonsdale	Eagle Rock
Port Phillip Heads - Point Nepean	Point Danger
Corner Inlet	Barwon Bluff
Point Hicks	Mushroom Reef
Cape Howe	Beware Reef

Marine National Parks and Sanctuaries in Port Phillip Bay, Western Port, Wilsons Promontory and Bunurong were mapped in previous studies (Roob *et al*. 1998; Blake & Ball 2001a, b; Ferns & Hough 2002; Sutherland 2003; Vuyovich 2003) and were not included in this study.

The Twelve Apostles MNP and Ninety Mile Beach MNP were included in the initial study scope, but were subsequently omitted due to difficulties in acquiring suitable aerial photography for these sites. The Arches MS was also omitted from the project scope as its seabed is >10 m in depth and was beyond the depth that could be mapped from aerial photography.

The majority of Beware Reef MS was too deep to map with aerial photography, apart from a small area of reef exposed at low tide. As an alternative we collected depth soundings at this site.

2 METHODOLOGY

2.1 Mapping approach

Techniques for mapping seabed habitats from aerial photography have been described in numerous studies (*e.g.*, Barrett *et al*. 2001; Blake & Ball 2001a, 2001b; Chauvaud *et al*. 1998; Jordan *et al*. 2001; Kendall *et al*. 2001; Pasqualini *et al*. 1998). The US National Oceanographic and Atmospheric Administration (NOAA) and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) both published guidelines for benthic habitat mapping from aerial photography (Finkbeiner *et al*. 2001; Green *et al*. 2000). We reviewed these guidelines and past studies to develop the mapping approach adopted in this study.

Seabed habitat mapping with optical remote sensors (*e.g.,* aerial photography) is restricted to depths where light can penetrate the water column and effectively be reflected to the optical sensor. In the Victorian Bass Strait marine environment this is typically up to depths of approximately 5–10 m, depending on weather and sea conditions. As a consequence, while the entire area of the Marine Sanctuaries was capable of being mapped from aerial photography, only the shallow regions of the Marine National Parks could be mapped.

Deep marine habitats (>15 m) at Discovery Bay MNP, Point Addis MNP, The Twelve Apostles MNP, Ninety Mile Beach MNP, Point Hicks MNP and Cape Howe MNP were mapped with a multi-beam sonar and underwater video as part of a separate study. The deep water mapping project was undertaken through a partnership between Parks Victoria and the Cooperative Research Centre for Coastal Zone, Estuary and Waterway Management (Coastal CRC).

Underwater video was selected as the ground-truthing method for this study. SCUBA surveys can provide more detailed and quantitative observations of seabed habitats, but is restricted by the number of dives that can be completed in a day. Underwater video had the advantage of being able to survey a far greater area of the seabed in a day and required a smaller field-crew. Most of the sites investigated in this study were also potentially hazardous for divers and the video could operate under conditions that may have been unsafe for divers. The underwater video provided a permanent record of the observed seabed habitats.

2.2 Aerial imagery

2.2.1 Aerial Photography

A key study task was to capture high-resolution colour aerial photography under optimal conditions for interpretation of seabed habitats. Optimal conditions include:

- Clear sunny conditions with minimal or no cloud and/or haze.
- As close as possible to low-tide, and preferably within 1 hour either side of low-tide.
- Optimum sun angle of 20–30° to avoid solar flaring on the sea surface.
- Light wind to avoid surface ripples and waves (typically in the morning during summer to avoid sea-breezes).
- Calm seas on the day of photography and on the preceding day to minimise suspended sediment in water column.

Most of the study sites were located along the exposed Bass Strait coast and there were limited days in any year in which the right combination of sunny conditions, low swell, light winds and a morning low-tide occurred. The difficulties in predicting when the right conditions would occur and ensuring that aircraft were available to capture photography on these days proved to be one of the most difficult aspects of this study.

Following an extended period of unsuitable weather conditions during summer 2004-05 when we were unable to fly any photography, the requirement for photography to be flown at low-tide was dropped to increase the potential days for capturing imagery. Capturing photography at low-tide was important for differentiating intertidal rock platforms, but was not as critical for shallow habitat mapping as the requirements for calm seas and clear water. Despite removing the requirement for low-tide, persistent poor weather combined with difficulties in ensuring availability of aircraft meant that photography could not be flown at some sites. As a consequence we sourced the best available existing aerial photography that had been flown at the sites for other purposes in recent years.

The study sites were located in highly dynamic coastal environments and we sought photography from more than one time period wherever possible to assist in interpreting the habitat features. Comparing photography from more than one time period was invaluable for the mapping at some sites.

Point Addis MNP and Eagle Rock MS highlighted the value of working with photography from more than one time period in marine habitat mapping. Figure 1 (left image) shows an extensive area of drift algae and/or other detritus offshore from Addiscot Beach at Point Addis MNP that could be mistaken for seagrass or patchy reef. An earlier image shows that the seabed is in reality mostly bare sediment and the drift algae in the later image can be seen accumulated on the shore (Figure 1, right image). A subsequent video survey confirmed this area as being bare sediment (Section 3.7.2). Figure 2 shows the erosion and accretion of sand on a rocky shore between Split Point and Eagle Rock at Eagle Rock MS over a 12 month period in 2002-03.

2.1.2 Satellite Imagery

Following the difficulties in flying photography at some of the study sites we searched high-resolution satellite archives (*i.e.,* Quickbird and IKONOS) for suitable images as an alternative to the photography. We were unable to find suitable satellite imagery for The Twelve Apostles MNP or Ninety Mile Beach MNP which presented the greatest difficulties for capturing suitable aerial photography. The search identified suitable IKONOS imagery for Point Hicks MNP and Cape Howe MNP captured in 2004 and these images were acquired to supplement the aerial photography at these sites.

IKONOS collects panchromatic (black and white) imagery at 1 metre resolution and multispectral (red, green, blue and near infrared) imagery at 4 metre resolution (Space Imaging 2004). We acquired the highest resolution colour imagery which was created using a pan-sharpening process to combine the 1 metre panchromatic and 4 metre multispectral bands to produce 1 metre resolution colour images.

Figure 1. Addiscot Beach, east of Point Addis headland. Left image shows drift algae with a similar appearance to seagrass or patchy reef (QASCO 28/3/04). Right image shows drift algae accumulated in the shore zone and confirms habitat as bare sediment (QASCO 3/3/04).

Figure 2. Split Point to Eagle Rock coastline at Eagle Rock MS. Left image shows sand eroded from shore to reveal underlying rock platform/boulders (Geomatic Technology March 2002). Right image shows sand accretion to form a beach with rocky intrusions still visible (Geomatic Technology 13/12/2003).

2.1.3 Digital Ortho-rectification

The aerial photography was digitally scanned and supplied to PIRVic as either raw tiff images or as ortho-rectified geotiff images produced by the aerial photography consultants. PIRVic ortho-rectified the raw tiff images with ER Mapper.

Ground-control points for the ortho-rectification were derived from the Vicmap 1:25,000 GIS data (*e.g.,* roads, hydrography etc.) and cadastral data. The potential ground-control points from the Vicmap and cadastral data were limited at some sites (*e.g.,* Point Nepean and Point Addis MNP) and additional ground-control points from coastal structures and tracks were acquired in the field by PIRVic scientists with a hand-held GPS.

Digital elevation models (DEMs) for the ortho-rectification were produced from Vicmap elevation data. The lack of precise elevation data along the Victorian coastline presented a limitation on the accuracy of the ortho-rectification for some sites. This mainly caused problems at sites with steep coastal cliffs where the elevation changed rapidly over short distances (*e.g.,* Point Addis MNP, Point Nepean MNP). PIRVic edited the available elevation data as far as possible to account for steep cliff faces prior to creating the DEM grids to improve the accuracy of the ortho-rectification process.

The IKONOS imagery was supplied in a geo-corrected format with a positional accuracy of approximately 15 m, excluding the effects of terrain (Space Imaging 2004). We subsequently used Imagine OrthoBase to ortho-rectify the imagery with its rational polynomial coefficient (rpc) file and a DEM derived from the VicMap topographic data. At Point Hicks we were able to use the position of the lighthouse, roads and other buildings as ground-control points to further improve the positional accuracy of the ortho-rectification.

The ortho-rectified photography had pixel sizes of 0.25–0.5 m depending on the flying height of the source imagery and the scanning resolution. Positional accuracy of the ortho-rectified photography varied depending on the ground-control points and DEM but was typically <5 m.

The aerial photography was initially ortho-rectified to a Transverse Mercator projection and the AGD66 datum. The imagery was subsequently projected to a geographic projection and the GDA94 datum in ER Mapper using the Victorian NTv2 grid file.

2.3 Ground truthing

2.3.1 Underwater Video System

The primary tool for ground-truthing the shallow habitats was a towed underwater video. The video system was designed and built by PIRVic and featured a high-resolution Kongsberg-Simrad video camera mounted on a towed sled to provide high quality colour imagery of the seabed.

The camera frame was constructed of aluminium with a triangular profile (Figure 3). The camera frame body was packed with buoyant material to keep it upright in the water column. Stabilising cables attached to small lengths of chain held the camera to the seabed. The combined effect of the weight of the chains and buoyancy in the camera frame acted to keep the frame at a constant height of approximately 1.5 m above the seabed as the terrain or depth changed. This ensured that the camera remained at an optimum viewing height for the camera relative to the seabed. The camera was towed at an average speed of approximately 1 knot to allow clear footage of the habitat and to prevent the camera frame rising too high above the seabed.

The camera system was tested over a number of marine habitats outside the parks prior to the marine park surveys. A PIRVic diver with a hand-held video camera was towed behind the video frame to assess any impact of the stabilising cables and chains on different types of habitat and seabed biota. No visible damage to the biota was observed during this testing and no snagging of the chains on macroalgae or plants was reported during the video surveys in the parks.

Corner Inlet MNP was the only sheltered marine environment surveyed in this study. As Corner Inlet was characterised by seagrass growing in soft sediment the towed video frame was not used at this site, apart from a single transect through the deeper unvegetated regions of Bennison Channel. To prevent the video system coming into contact with the seagrass beds at Corner Inlet, the video camera was attached to a pole and then lowered to approximately 0.5 m above the seabed and video footage recorded while the survey vessel drifted.

The camera was connected via an umbilical cable to a DVD recorder and LCD screen on the vessel which recorded the video footage and enabled an observer to view a live-feed from the camera (Figure 3). Position information (latitude/longitude), date, time, vessel speed and bearing were measured from a Differential GPS, while a depth sounder provided depth in metres. A software program developed by PIRVic allowed these parameters to be overlayed as text on the video footage. All video footage was subsequently saved to DVD. Examples of still images extracted from the video are shown in Figure 5.

Position information (latitude/longitude), date, time, vessel speed and bearing were also logged to a text file every two seconds providing a permanent record of the position information for the video. These video position log files were imported to ArcGIS and converted to point shapefiles for each site. The position information recorded on the vessel was in geographic coordinates and the AGD66 datum. The shapefiles were subsequently projected to GDA94 in ArcGIS using the Victorian NTv2 grid file. The coordinates in the shapefile attributes were then re-calculated to the GDA94 coordinates.

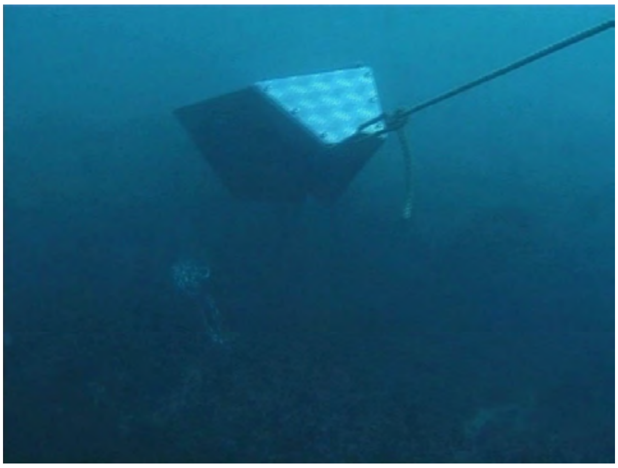


Figure 3. Towed underwater video system: towed video frame in operation (left) on-board integrated video recording equipment (right).

2.3.2 Video Site Selection

It was originally proposed to select ground-truthing sites from the aerial photography and then run 50–100 m video transects across these sites to confirm the substratum type and identify dominant biota. However, due to delays in receiving the aerial photography we had to commence the ground-truthing before we received the imagery. As a result, we opted to run a series of continuous video transects through each park and then select sites from within these transects once the photography was received.

We used local knowledge and historic photography to select the location of video transects to ensure that most of the reef habitat in each park was captured by the video survey. Video transects were typically run perpendicular to the shore and were evenly spaced apart along the shore. We started each transect as close to shore as the vessel could safely approach and then ran the video out to depths of approximately 15–20 m to ensure that all of the habitats likely to be interpreted from the aerial photography would be covered.

When the ortho-rectified photography was received, we overlayed the position of the video transects on the imagery in the GIS. We then viewed the video footage on a PC while also tracking its position along the transect in the GIS. Sites were then selected from along each transect to represent different types of habitat identified from the aerial photography, locations of changes in habitat types or habitat features of interest. Short sections of the video transect (typically 10-20 seconds) were then extracted for each site and saved as a separate video clip. All clips were then saved to a separate DVD for each park or sanctuary.

The video sites for each park were assigned a unique id based on the park name, transect number and sequence of sites. The location of the start of each video clip was extracted from the transect log file and saved to a new shapefile to represent the position of each video site as a single point. The positions of these video sites were corrected to account for the layback of the towed video frame from the vessel and the method calculating the layback is described in the following section.

2.3.3 Video Layback and Offset Calculations

The positional information recorded during the video surveys was measured by a Differential GPS beacon located on the survey vessel. As a result there was an offset between the recorded position and the actual position of the video camera due to the layback of the towed camera frame from the vessel. We tested a number of approaches to correct for the offset between the vessel and the towed video frame and adopted the approach outlined below.

The length of video cable versus the depth of the survey site was typically at a ratio of approximately 3:1 (*i.e.,* 30 m of video cable was layed out behind the vessel when surveying at depths of approximately 10 m). This ratio provided the best balance between minimising the distance of the video frame from the vessel while also keeping the video frame at the correct height above the seabed. The video operator would adjust the amount of cable deployed as the depth changed along a transect using the depth values from the vessel sounder as a guide to maintain the 3:1 ratio.

The position (latitude/longitude), depth and bearing along each video transect was recorded to a log file every two seconds. Given the 3:1 ratio of video cable to depth, it was then possible to use trigonometry to calculate the offset distance between the DGPS beacon on the vessel to the video frame. However, the bearing values derived directly from the differential GPS were often inaccurate. To overcome this, ArcGIS was used to calculate an accurate bearing between each data point.

Before calculating the bearing between data points, a filter was run on the log files in MS Access to remove any duplicate coordinates and to then remove every second data point. The GPS recorded the XY data as degrees, minutes and decimals of a minute which meant that the smallest spatial increase that the GPS could record was 1 thousandth of a minute, which equated to approximately 1.8 m over the ground. As a consequence, if the boat was relatively stationary (*e.g.*, turning or being held by a wave or wind) and did not cover 1.8 m in

2 seconds, the GPS would record the same latitude and longitude as the last point hence leading to duplication. Alternatively, there may have been only sufficient movement of the vessel to register on the GPS in either the X or the Y field only. This lead to data points being recorded at 90° to one another, which again proved problematic when calculating the bearings. Filtering the data to remove every second point and "clean-up" the data minimised these problems.

Using the depth and approximate length of video cable layed out, the distance from the vessel to the camera frame was calculated using the Pythagorean Theorem:

$$\text{Vessel to camera frame distance} = \sqrt{(\text{Cable length}^2 - \text{Depth}^2)}$$

When the vessel to camera frame distance was known, and an accurate bearing field calculated, the new coordinates for the camera frame location were calculated in ArcGIS using the following equations:

X camera sled = X boat – (Bearing.AsRadians.Sin x Map distance)

Y camera sled = Y boat – (Bearing.AsRadians.Cos x Map distance)

A limitation of this method was that it assumed that the camera was always being towed directly behind the boat, and thus the bearing of the sled relative to the boat was always at 180 degrees. However, once the vessel began to turn, particularly if in a tight arc, the camera was no longer being towed directly behind the vessel, and the offset calculations could not take this into account and would produce misleading offset values.

As a result, once the offset values for the location of the camera sled were calculated they were overlayed on the vessel position logs in the GIS before these values were accepted. Where offset position calculations were obviously incorrect, a corrected vessel bearing value was entered manually to bring the points back into a line behind the vessel. As the majority of transects run during the survey were relatively straight this issue was not a significant problem and only affected a limited number of the selected video sites.

The following table gives examples of offset distances calculated for the depths 5, 10 and 15 m.

Table 2. Example offset distances for the video frame layback from the vessel.

Depth (m)	Cable Length (m)	Offset Distance (m)
5	15	14.1
10	30	28.3
15	45	42.4

2.3.4 Intertidal Ground-truthing

Intertidal ground-truthing was undertaken at some of the parks to confirm the classification of rock platforms versus sandy beaches and the presence of cobble/boulder on the rocky platforms. Ground-truthing of the intertidal zone was undertaken as close as possible to low-tide on days with relatively calm seas. A palmtop computer loaded with ArcPad and connected to a GPS was used to record positions of intertidal ground-truthing sites. A PIRVic scientist selected sites in the field representative of distinct intertidal habitats with a dimension of at least 10 m, and then recorded the position of these sites on the palmtop.

Information about the dominant habitat type and biota was also recorded and a digital photograph was taken at most sites.

2.4 Habitat classification scheme

A review of marine habitat classification systems, both in Australia and internationally, was undertaken to support development of a shallow habitat classification scheme for this study (Ball *et al.* 2005). The level of habitat information that could be derived in this study from the primary ground-truthing method (underwater video) was greater than could be defined spatially by the primary mapping technique (aerial photography interpretation). As a consequence, we adopted a classification approach that allowed us to work at the scale covered by the field of view for the underwater video and also allow us to extrapolate or "scale-up" this information to the level of habitat differentiation possible from aerial photography interpretation.

This two-stage approach involved a primary habitat classification scheme (Table 4) to classify observations from the underwater video and a reduced set of modifiers to classify the habitats mapped in a GIS from aerial photography (Table 5). The primary habitat classification scheme (Table 4) was a modification of the interim marine habitat classification (MHC) scheme presented in Ferns & Hough (2000). The GIS mapping classification scheme (Table 5) included those categories from the primary classification scheme that could be interpreted from aerial photography.

2.4.1 Primary Shallow Habitat Classification Scheme

The primary shallow habitat classification scheme was divided into five levels of modifiers (Table 4). The first level (substratum type) was a simple differentiation between rock/reef and sediment, with the additional category of rock/reef – sediment for patchy reef. The second level differentiated between substratum types based on relief for rocky reef and presence of vegetation for sediment. The third level was substratum structure and discriminated between continuous and patchy for reef systems and physical profile for sediment. The fourth level described the substratum texture for both reef and sediment. The fifth level related to dominant biota and provided two modifiers for reef (biota type and dominant canopy species) and three modifiers for sediment (biota type, density and dominant species). The key elements of the primary classification scheme are outlined below.

2.4.2 GIS Mapping Shallow Habitat Classification Scheme

We were only able to consistently classify aerial photography for the Marine National Parks to the first level of the primary classification scheme (Table 4). However, there were elements of the lower levels of the primary classification scheme that could be applied to the aerial photography (*e.g.,* intertidal substratum categories and subtidal seagrass categories). As we could not consistently apply all levels of the primary classification scheme to mapping from the aerial photography, we devised a second classification table (Table 5) that only included those elements that could be classified from the imagery.

The GIS mapping shallow habitat classification scheme (Table 5) consisted of two levels of modifiers. The first level (substratum type) was consistent with the primary classification table. The second level was divided into intertidal and subtidal habitats and features elements of the substratum category and texture for reef and dominant biota for sediments. The habitat polygons mapped from the aerial photography were only classified according to these modifiers. These habitat polygons could be further classified in the future with shallow acoustic mapping systems and additional ground-truthing to include all levels of the primary habitat matrix.

The categories in the GIS mapping classification scheme are consistent with classification systems for existing mapping at Victorian Marine National Parks (Roob *et al*. 1998; Blake & Ball 2001a; 2001b; Ferns & Hough 2002; Sutherland 2003; Vuyovich 2003). The key elements of the GIS mapping classification scheme are outlined below.

2.4.3 Physical Modifiers for Habitat Classification

The following sections provide a description of the main modifiers included in the primary classification scheme (Table 4) and the GIS mapping classification scheme (Table 5). Only substratum type was used to classify both the underwater video and GIS mapping.

2.4.3.1 Substratum Type

- Rock/Reef: consolidated substratum where the substratum structure was *continuous* and the substratum texture was either *solid*, *broken*, *boulders* or *pavement/gutters*.
- Sediment: substratum type was *sediment* (unconsolidated substratum).
- Rock/Reef-Sediment: where the Rock/Reef substratum structure was *patchy* or if the substratum texture was either *cobble* or *rubble*.

2.4.3.2 Substratum Categories

- Low profile reef: flat subtidal rocky reef with a profile predominantly <1 m (low profile category also applied to intertidal platform).
- High profile reef: rugose subtidal rocky reef with a profile predominantly >1 m (high profile category also applied to intertidal platform).
- Bare sediment: no visible vegetation growing in the sediment.
- Vegetated sediment: vegetation visible with at least a sparse coverage growing in the sediment. Primarily seagrass species *Zostera* spp., *Posidonia australis*, *Halophila australis* and *Amphibolis antarctica*.

2.4.3.3 Substratum Structure

For Rock/Reef:

- Continuous: areas of reef visible on the video transect, uninterrupted for distances greater than approximately 20 m*.
- Patchy: small discontinuous areas of reef that often form part of a larger reef complex. Typically no larger than approximately 20 m* in width, separated by bands of sediment and/or cobble/rubble. These reef patches may be highly variable with waves/currents causing the patches to be continually buried and exposed, and for the sand separating them to be washed away on occasion to form continuous reefs.

For Unvegetated Sediment:

- Flat: no discernible patterns present.
- Ripples: sediment shaped into a pattern of ripples, generally no larger that 30 cm in height in the nearshore region.
- Mounds: not observed in the shallow mapping surveys.
- Hills: not observed in the shallow mapping surveys.

* Distance travelled by the underwater video was derived from the GPS position and the time and boat speed recorded in the video log file.

2.4.3.4 Substratum Texture

For Rock/Reef:

- Boulders: rocks with diameter >256 mm.
- Cobble: smooth rounded rocks 64–256 mm in diameter.
- Rubble: irregularly shaped rock fragments up to approximately 256 mm in diameter (often associated with patchy, broken low profile reef).
- Solid: reef that was not broken or fragmented.
- Broken*:* reef that was fractured and fragmented.
- Pavement: describes flat smooth very low profile reef, usually associated with sandstone, limestone and clay reefs.
- Gutters: describe smooth channels eroded into sedimentary reefs such as limestone and sandstone.
- Ripple sand veneer: a category devised to describe an unusual reef structure observed at Point Addis MNP. The habitat was characterised by a relatively flat reef intruding through an overlying veneer of sand ripples (Section 3.7.3.1).

For sediment:

- Gravel/Pebble: loose rocks with a grain size 2–64 mm.
- Shelly sand: sediment dominated by small pieces of broken shell fragments.
- Sand: sediment of a predominantly sandy texture with a grain size of 0.063–2 mm. Very little, if any silty plume was observed when the video sled touched the seabed.
- Silt: very fine sediment with an approximate grain size of 0.004–0.062 mm. Readily formed fine plumes when the video sled touched the seabed.
- Clay: very fine and highly cohesive sediment (grain sizes <0.003 mm).

Where the vegetation cover was too dense to see the underlying sediment, the sediment characteristics were identified from an adjacent area.

2.4.3.5 Substratum Biota Density

Biota density was only applied to seagrass species. Section 2.4.3.6 outlines the approach adopted for classifying macroalgae. Seagrass density categories developed for previous Victorian seagrass mapping studies (Blake & Ball 2001a, 2001b) were adopted for the current study. Density values applied to the *Zostera/Heterozostera* category in the previous studies were applied to the new category of *Zostera* spp. (Section 2.4.3.6).

For *Zostera* spp. and *Posidonia australis*:

- Dense: plants dense enough to hide most of the underlying sediment from view.
- Medium: plants dense enough for leaves to be touching, but underlying sediment was visible through the leaves.
- Sparse: plants present, but at a density where leaves of individual plants did not touch each other.

For *Halophila australis*:

- Dense: leaves were within touching distance of each other.
- Medium: present but leaves did not touch, although within close proximity to each other.
- Sparse: leaves did not touch and individual plants clearly dispersed.

For patchy seagrass:

At some sites seagrass patches or clumps (diameters <10 m) separated by narrow bands of bare or sparsely vegetated sediment (<5 m in width) may form a continuous seagrass bed. The density of seagrass within individual patches may be sparse, medium or dense according to the above definitions. At these sites a classification of dense patchy, medium patchy or sparse patchy was used.

For *Amphibolis antarctica*:

A. antarctica typically grows in association with reef and this presents difficulties in interpreting its distribution and density from aerial photography as an underlying and/or adjacent dark reef substrata can disguise plant densities. As a consequence we did not attempt to interpret *A. antarctica* densities where it was growing in association with reef. At sites where *A. antarctica* was growing on sand it was almost always dense (*i.e.,* leaf canopy hid the underlying sediment).

2.4.3.6 Dominant Biota

Dominant biota species identified with the underwater video were primarily canopy species. The species outlined below represent those observed during the marine mapping field-work or known to occur in the Marine National Parks. Examples of biota types observed with the underwater video are shown in Figure 5.

It was beyond the scope of this project to identify ecological assemblages that occur in association with the dominant biota. Analysis of macroalgae community structure at sites both in and around the Marine National Parks was undertaken as part of the Victorian Subtidal Monitoring Program (Edmunds & Hart 2003).

Only some of the dominant biota was observed in monospecific stands and most of the species were found in complexes with other species. There were limitations on the level of quantitative information that could be extracted from the underwater video on the relative abundance and percentage cover of the different biota species. As a consequence we adopted a simple system based on quartiles for classifying the dominant biota observations from the underwater video. This is best explained with the use of the examples in the following table.

Table 3. Examples of quartile system for classifying dominant biota categories.

Biota category	Description
Phyllospora comosa:	Approximately >75% cover of *P. comosa* (there may be mixed brown algae also present but will be only approximately <25% of the cover).
P. comosa / Mixed brown algae	Approximately 50% of each category
P. comosa with mixed brown algae	Approximately 75% *P. comosa* with approximately 25% mixed brown algae.
Mixed brown algae with *P. comosa*	Approximately 75% mixed brown algae with approximately 25% *P. comosa*.

The above quartiles system resulted in multiple combinations of the following biota categories.

Amphibolis antarctica: This species was generally present over areas of sediment or low profile patchy broken and rubble reef. It tended to form dense monospecific beds over sand and occurred with mixed algaes over reef areas.

Ascidians: While ascidians may have been present, they were not always readily visible in the video because of overlying kelps or difficulties in distinguishing them from the underlying reef.

Cystophora spp. Several species of the genus *Cystophora* are present along Victoria's open coast. It was not possible from the video to differentiate between species so this general class was used.

Durvillaea potatorum: This species mainly occurred in dense bands at the seaward edge of the intertidal zone on both high and low profile reefs exposed to high wave energy. It was, also observed down to depths of 10 m.

Ecklonia radiata: This was one of the more commonly observed species of macroalgae at depths >5 m at Point Addis MNP and parks to the east of this site. It was often associated with *P. comosa*, becoming more dominant in areas of deeper water or greater exposure.

Halophila australis: This species was only recorded at a single location in the northern site of Corner Inlet MNP.

Hormosira banksii: The distribution of this species was restricted to intertidal rock platforms. As a consequence it was only recorded infrequently by the video due to the survey vessels not being able to safely traverse intertidal reef even on high tide.

Macrocystis angustifolia: This species was not observed very frequently and occurred in small stands that were generally sparse.

Mixed algae: represented a mixture of brown, red and green algae where no one class appeared dominant. Also used where the class of algae could not easily be distinguished due to poor water clarity.

Mixed Brown Algae: where brown algaes were the dominant biota type, but it was unclear which species were present or where no species could be identified as being dominant.

Mixed Green Algae: where green algaes were the dominant biota type but it was unclear which species were present.

Mixed Red Algae: where red algaes were the dominant biota type but it was unclear which species were present. Identification of red algae to species level generally requires physical examination of samples, so it was not possible to identify species with the video survey methodology used.

Phyllospora comosa: This was the most commonly observed species of macroalgae during the surveys. It often formed monospecific beds at depths between 3–10 m, but was also associated with *E. radiata* at depths >7 m.

Posidonia australis: This seagrass species was only recorded at the Corner Inlet Marine National Park. It formed dense monospecific beds on the sandbanks in this inlet (predominantly at the northern site).

Sponges: sponges are a diverse class of fauna but these species were mostly observed from the video at depths beyond the limit of the shallow habitat mapping *e.g.,* sponges observed at depths of approximately 20 m in Point Hicks MNP.

Turf algae: categories of algae that form a “mat’ over the reef substratum.

Urchin Barren: sites where large grazing aggregations of urchins denude the reef of erect algal species (Edmunds *et al.* 2005). Urchin barrens were only observed at Cape Howe MNP and had previously been identified by Edmunds *et al.* (2005) as being formed by *Centrostephanus rodgersii*.

Zostera spp. The predominant seagrasses found in Victoria’s sheltered bays and inlets are species of Zosteraceae, commonly known as eelgrass. Recent studies have investigated the taxonomy of Zosteraceae, and particularly *Zostera muelleri* and *Heterozostera tasmanica*.

Les *et al.* (2002) recommended that Zosteraceae comprise two genera (Phyllospadix, Zostera) and that *Heterozostera tasmanica* be reclassified as *Zostera tasmanica*. Les *et al.* (2002) also found that molecular data did not support the distinctiveness of *Z. capriconi, Z. mucronata, Z. muelleri* and *Z. novazelandica* and recommended their taxonomic merger as a single species, which they suggested should, by priority, be called *Z. capriconi*. Jacobs *et al.* (2006) re-stated the recommendations of Les *et al*. (2002), but also stated that *Z. muelleri* had priority, and was the name that should have been recommended rather than *Z. capriconi*.

Kuo (2005) undertook a taxonomic study of *H. tasmanica* and concluded that four distinct taxa could be recognised within the genus. Kuo (2005) found that the species in Port Phillip Bay and Western Port previously classified as *H. tasmanica* was the newly described *Heterozostera nigricaulis*. *H. nigricaulis* was described as being widely distributed in temperate Australia, while *H. tasmanica* was described as only having been so far recorded in Victoria in a shallow creek mouth at Wilsons Promontory and at 12 m depth at Portland (Kuo 2005). Kuo (2005) further asserted that *H. tasmanica* was yet to be collected *in situ* from Port Phillip Bay.

In this study we have followed the species taxonomy for Zosteraceae recommended by Kuo (2005). While *H. nigricaulis* is typically found in the subtidal zone or shallow intertidal pools, and *Zostera muelleri* is found on intertidal flats it was not possible to distinguish the two species by visual observation in the field. As a consequence we adopted the category of *Zostera* spp for this study. This replaces the combined *Zostera/Heterozostera* category adopted in previous Victorian seagrass mapping studies (Blake & Ball 2001a, b).

Zostera spp. primarily inhabits sheltered bays and inlets in Victoria, but very sparse *Zostera tasmanica* was also observed at depths >8 m beyond the surf zone on the open coast at Point Addis MNP.

2.4.3.7 Mapping Categories

The categories for most of the substratum/biota class in the GIS mapping classification scheme (Table 5) were consistent with the modifier descriptions outlined above. Additional mapping categories included:

Artificial rock wall: sea walls constructed to protect the backshore were present at some Marine National Parks and Sanctuaries *e.g.,* Port Phillip Heads MNP - Point Nepean and Merri MS.

Mangroves: the white mangrove *Avicennia marina* is the only mangrove species found in Victoria and forms broad bands seaward of saltmarsh in the intertidal zone. Mangroves were only present at the Corner Inlet (south) MNP in this study.

Patchy reef: where multiple small patches of reef (<20 m diameter) formed continuous spatial features. This category was also used where there was no clear boundary between small areas of reef and the adjacent sediment or reef due to factors such as depth or sediment in the water.

Saltmarsh: Saltmarsh occupies the upper intertidal to middle intertidal zone typically between coastal scrub and mangroves. Saltmarsh only occurred at Corner Inlet (south) MNP in this study. Shrubby Glasswort *Sclerostegia arbuscula* and Beaded Glasswort *Sarcocornia quinqueflora* usually dominate the seaward edge of the Corner Inlet/Nooramunga salt marsh community. Other species in this community include Black-seeded Glasswort *Halsarcia pergranulata*, Trailing Hemicroa *Hemichroa pentrandra* and Austral Seablite *Suaeda australis* (Frood 1986).

Sand flat (beach) / Low profile platform: sites where a rocky intertidal platform is likely to be continually buried or exposed by mobile sand under the influence of strong wave energy. These sites were usually classified where aerial photography was available for more than one time-period allowing comparison of changes to the beach structure or where ground-truthing highlighted changes in platform size relative to the aerial photography.

Seagrass / Reef – Sediment: sites where extensive beds of seagrass grew over reef and amongst sandy sediment between patches of reef. The seagrass in this category was predominantly *A. antarctica*, but small stands of *Zostera* spp. were also observed in sheltered areas at Mushroom Reef and Nepean Bay. This category applied to areas where it was not possible to accurately delineate separate seagrass and reef features from the aerial photography, particularly where the *A. antarctica* extended from the reef into the adjacent sediment.

Seagrass species: the spatial extent of a seagrass species category was assigned with a combination of contextual editing and extrapolation from the ground-truthing.

Table 4. Primary shallow habitat classification scheme. Abbreviated titles in brackets correspond to data fields in the GIS.

<table>
<tr><th colspan="4">Substratum Type (Sub_type)</th></tr>
<tr><td>Rock / Reef</td><td colspan="2">Rock / Reef - Sediment</td><td>Sediment</td></tr>
<tr><th colspan="3">Substratum category (Sub_cat)</th><th>Substratum category (Sub_cat)</th></tr>
<tr><td>Low profile reef/platform (<1 m)
High profile reef/platform (>1 m)</td><td colspan="2">Low profile reef/platform (<1 m)
High profile reef/platform (>1 m)</td><td>Bare sediment
Vegetated sediment
Sand beach
Sand flat
Sand-mud flat</td></tr>
<tr><th colspan="3">Substratum structure (Rock_struc)</th><th>Substratum structure (Sed_struc)</th></tr>
<tr><td>Continuous</td><td>Continuous</td><td>Patchy</td><td>Flat
Ripples
Mounds
Hills</td></tr>
<tr><th colspan="3">Substratum texture (Rock_tex)</th><th>Substratum texture (Sed_tex)</th></tr>
<tr><td>Solid
Boulders
Broken
Gutters</td><td>Cobble
Rubble</td><td>Boulders
Cobble
Rubble
Solid
Broken
Pavement
Gutters
Ripple sand veneer</td><td>Gravel/Pebble
Shelly sand
Sand
Silt
Clay</td></tr>
</table>

Table 4 (continued)

Substratum biota type (Rock_bio)	Dominant biota (Rock_dom)	Substratum biota type (Sed_bio)	Substratum biota density (Sed_dens)	Dominant biota species (Sed_spec)
Bare	*Phyllospora comosa*	Bare	Dense	*Halophila australis*
Seagrass	*Macrocystis angustifolia*	Seagrass	Medium	*Posidonia australis*
Macroalgae	*Durvillaea potatorum*	Macroalgae	Sparse	*Amphibolis antarctica*
Seagrass / Macroalgae	*Ecklonia radiata*	Seagrass / Macroalgae	Dense patchy	*Zostera* spp.
	Cystophora spp.	Mangrove (*Avicennia marina*)	Medium patchy	*Caulerpa* spp.
	Amphibolis antarctica	Saltmarsh	Sparse patchy	Mixed green algae
	Hormosira banksii			Mixed brown algae
	Mixed brown algae			Drift algae
	Mixed green algae			
	Mixed red algae			Combinations of above categories
	Mixed algae			
	Urchin barren			
	Sponges			
	Ascidians			
	Turf algae			
	Combinations of above categories (Section 2.4.3.6)			

Table 5. GIS mapping shallow habitat classification scheme. Abbreviated titles in brackets correspond to data fields in the GIS.

Substratum Type (Sub_type)						
Rock/Reef		Rock/Reef - Sediment		Sediment		
Substratum/Biota category (Map_cat)				**Substratum/Biota category (Map_cat)**		
Subtidal	***Intertidal***	***Subtidal***	***Intertidal***	***Intertidal***	***Subtidal***	
Reef	Low profile platform (<1 m)	Reef – patchy	Low profile platform – cobble	Sand beach	Bare sediment	
	High profile platform (>1 m)	Seagrass/Reef – Sediment	Rock pool	Sand flat		
	High profile platform – boulder		Sand beach/Boulder	Sand beach/flat	***Seagrass density***	***Seagrass species***
	Low profile platform – cobble/boulder		Sand beach/Low profile platform	Sand-mud flat	Dense	*Zostera* spp.
	Rock pile		Sand flat/Low profile platform	Mangrove	Medium	*Posidonia australis*
			Sand flat/Boulder	Saltmarsh	Sparse	*Halophila australis*
				Seagrass	Dense patchy	*Amphibolis antarctica* (no density applied)
				Artificial rock wall	Medium patchy	
					Sparse patchy	

2.5 Classification of video footage:

Once the position of the towed video frame had been corrected for the layback from the vessel DGPS (Section 2.3.3), the corrected video transects were converted to shapefiles. These shapefiles were overlayed on the ortho-rectified aerial imagery in ArcGIS. Each video transect was analysed to identify ground-truthing sites.

Ground-truthing or video sites were selected from each transect to represent key habitat types and biota present, as well as any sites of particular interest, or points where a transition between habitat classes was observed. A short video clip was extracted from the overall video for each of these sites. Video clips typically ran for about 10 seconds, with some being up to 30–40 seconds depending on the type of habitat and water clarity. A separate DVD was produced for each park or sanctuary with the ground-truthing site video clips. The location of each video site was represented by a single point (the start of the video clip) in the GIS and included on the final habitat maps.

For each video site the primary habitat classification table (Table 4) was used to classify the dominant habitat and biota categories present. A PIRVic scientist viewed the video and assigned the initial habitat classification. A second PIRVic scientist then viewed the same footage and verified the accuracy of the habitat classification. During this process a simple set of decision rules for assigning habitat classifications was developed (Section 2.4.3). Double checking the classification of every video site ensured a higher degree of accuracy in the classification.

It is important to note the limitations of interpreting the underwater video footage collected during these surveys. Hazardous conditions close to shore and the dynamic nature of the shallow marine environment made filming very difficult in many places, and there were limited days when conditions were suitable for video surveys. Factors including turbidity, light attenuation due to depth, and maintaining camera stability and a consistent height above the seabed were the primary limiting factors on interpreting the video footage.

Only a limited amount of information could be derived from underwater video compared to diver surveys due to factors including the resolution of the video, movement of the camera frame, water clarity and potential for understorey biota to be obscured by the canopy species. It was often only the canopy species (*e.g.*, kelp) that were clearly visible in the underwater video, so while a reef may also feature an extensive understorey it may not be able to be observed with a towed underwater video. Some algal species could not be clearly differentiated in the video and categories of mixed algae were adopted to account for sites where the dominant species was not obvious or could not be identified in the video (Section 2.4.3.6).

The towed video camera frame was designed to remain upright and at a height of approximately 1.5 m above the seabed, with a forward looking camera mounted at an angle of approximately 45°. While the camera system operated well at most sites, in some places (*e.g.*, Port Phillip Heads) strong tidal currents or swell surges pushed the camera system on its side affecting the clarity of the imagery. At other sites with high profile reef or rapid changes in seabed terrain/slope, the camera frame may have temporarily lifted up from the seabed. In these situations the vessel speed was reduced to allow the camera to settle back to the required height.

Most of the survey areas were within the “surf zone” and even on calm days, wave and tidal energy usually causes some degree of sediment and detritus to be suspended in the water column. While we chose days with as calm conditions as possible, turbidity was still a limiting factor on water clarity.

Water depth also had an impact on clarity of the video footage. Water acts as a filter for light, with reds, yellows and oranges being the first colours to be filtered out, leaving the footage with an overall blue hue. This meant that even in relatively shallow water it was often difficult to pick colour differences between red and brown algaes. This was not such an issue for green algaes, as they tended to be in shallower water where the impact of light filtering was not as great. An attempt was made to compensate for this issue by using 'warming' filters which do not return the short wavelength colours but rather filter out some of the blues, thus reducing the blue hues. The results were negligible and hence the filters were not used further.

2.5.1 Other Video Data Fields

The following data fields (Table 6) were also recorded for each underwater video site, but did not form part of the modifiers in the habitat classification table (Table 4).

Table 6. Additional data fields recorded for video observations.

Attribute	Description
Site id	Unique code assigned to each video clip. Syntax for id is based on a two-letter abbreviation for park name, transect number and sequential clip number (*e.g.*, site id BB_T1_1 corresponds to Barwon Bluff Marine Sanctuary, transect 1, site 1).
Vessel position	Latitude/Longitude of the vessel position. Coordinates were recorded in the field with a DGPS referenced to the AGD66 datum and subsequently converted to GDA94 in ArcGIS.
Sled position	Latitude/Longitude of corrected position of towed video sled relative to vessel position. Coordinates are in the GDA94 datum.
Date/Time	Date/Time of video in UTC format from the GPS.
Depth	Depth in metres measured by the vessel sounder (not corrected for tide or swell).
Comments	Other observations from video that did not fit in the classification table structure.
Observer	Name of PIRVic scientist who completed video interpretation.
DVD/Video file	DVD reference and name of digital video file (mpg or vob format).
Video still	Name of any still images extracted from the video (jpg format).

2.6 Classification of Aerial Imagery

2.6.1 Image Enhancement and Classification

A combination of manual and automated image processing was applied to map habitat areas from the digital imagery. The imagery was visually assessed to firstly identify likely habitat types at the site. A series of image processing steps were then undertaken with ER Mapper.

The aerial imagery typically covered a large area of the land adjacent to the Marine National Park or Sanctuary and this was important for locating ground-control points for the ortho-rectification, but was not required for the marine mapping and could distort the image processing. As a consequence we masked the adjacent land in the imagery at the commencement of the image processing.

The digital aerial photography was scanned to 8-bit red, green and blue (RGB) imagery. In other words, the imagery used values from 0–255 to represent the reflectance intensity for each pixel in each of the three colour bands (0 represented complete absence of a colour, while 255 represented the maximum amount of a colour). This type of imagery is sometimes referred to as 24-bit, reflecting the total number of bits in all three colour bands (Chauvaud *et al*. 1998; D.A. Lord & Associates *et al*. 2000). The Ikonos satellite data was 11-bit RGB imagery, with 2048 levels of tonal variation for each band.

While each colour band could use up to 256 values for the 8-bit imagery, an image does not always use the full range of values. Contrast enhancement or stretching can improve the clarity of seabed features by transforming the reflectance values for a single colour band through the entire 256 possible shades, thereby improving the image contrast and accentuating subtle differences in image. We applied either a linear transform or an auto-clip transform (clips at 99%, excluding the first and last 0.5% of the data) as the first stage in our visual assessment of the imagery.

Following the visual assessment, we applied two alternative approaches to the image processing. The first mapping approach was simply an unsupervised classification, while the second mapping approach involved running a principal component analysis followed by an unsupervised classification on the first or second principal component.

Unsupervised classification is a method to transform a digital image into a thematic map. An unsupervised classification defines those groups of pixels with a similar spectral signature and which are assumed to represent the same type of habitat (Anon. 1998). In the first approach an unsupervised classification was run with all three bands (red, green, blue) in the masked image. The output from this process was a single band image with pixel values typically ranging between about 10–15, representing the number of groups or categories defined by the unsupervised classification.

Unsupervised classification was an effective method to define the initial habitat boundaries at the very shallow sites. This approach was limited though at sites with high depth variability where the effect of light attenuation through the water column resulted in reflectance values for seabed types in shallow depths (approximately 1–3 m) being grouped with different seabed types in deeper water (approximately 5–7 m). In the case of the unsupervised classification approach only, we addressed this problem by stratifying the images into a “deep” and “shallow” region and running a separate classification process on each region. The habitat classification for the “deep” and “shallow” regions was combined in the GIS at the final step of the processing.

To fully account for and remove the influence of depth on seabed reflectance would require depth measurements for each image pixel at a study site and knowledge of the attenuation characteristics of the water column (Mumby *et al*. 1998). This information is not usually available and as a compromise Lyzenga (1981) developed a model to compensate for the influence of variable water depth on multi-spectral data and which produces a depth invariant bottom index from pairs of spectral bands. The Lyzenga (1981) model required good water clarity and that a relatively homogenous seabed exists over a range of depths in the image. Mumby *et al*. (1998) determined that classification accuracy of coral reefs from multi-spectral data (CASI & Landsat) could be significantly improved through application of this model.

The pattern of light attenuation in seawater is that radiations in the blue band penetrate to the greatest depth followed by the green band, while radiations in the red band have only limited penetration. We attempted to apply the depth invariant bottom index approach developed by Lyzenga (1981) using the green and blue bands from aerial photography at Point Addis MNP, but this was unsuccessful. The possible reasons for the poor results may be due to high variability in the images due to the presence of wind ripples, swell lines and sun glitter at places on the water surface and sediment in the water column. The Lyzenga (1981) technique was developed with multi-spectral aerial data and we were unable to find other examples of where the approach had been applied to scanned RGB aerial photography.

In the second mapping approach, we adapted a marine habitat mapping technique developed by Khan *et al.* (1992). As an alternative to the approach presented by Lyzenga (1981), Khan *et al.* (1992) used a principal components transformation based on the assumption that the principal variation in water reflectance in the visible wavelength bands is due to depth, while the secondary variation is due to changes in bottom reflectance. We therefore undertook a principal components analysis (PCA) using the green and blue bands and extracted both the first and second principal components. We then ran an unsupervised classification on the second principal component. Although in some cases the first principal component provided a more accurate representation of the seabed habitat and this was used in preference to the second component.

The pixel sizes for the aerial photography varied between approximately 0.25–0.5 m and as a consequence even the classified images retained isolated pixels or noise in the data. Following the unsupervised classification, a low pass filter was applied to smooth out any image noise and spikes in the data.

Once all the unsupervised classifications were completed for both mapping approaches, the classified images were overlayed on the source aerial imagery. Within each classified image groups of pixel values were assigned to a thematic classification based on the dominant seabed type (*e.g.,* rock/reef, seagrass or sediment). The classified image was then re-calculated so that a single pixel value corresponded to a single habitat type (*e.g.*, if pixel values 1–5 represented reef they would all be re-calculated to equal 1).

The final images from the two mapping approaches were visually compared to identify the image that gave the best representation of the habitat features in the aerial imagery.

The final phase of mapping habitats was to convert the classified raster image to a vector layer in ArcGIS. Classified raster data is made up of a grid of pixels (Figure 4) with each pixel assigned a value representing the habitat feature at that location. Groups of adjacent pixels with the same value represent a single habitat feature such as a rocky reef. A “smoothing” algorithm was applied during the raster to polygon conversion process to smooth out the “stepped” boundaries between polygons caused by the individual square pixels that made up each spatial feature or polygon (Figure 4).

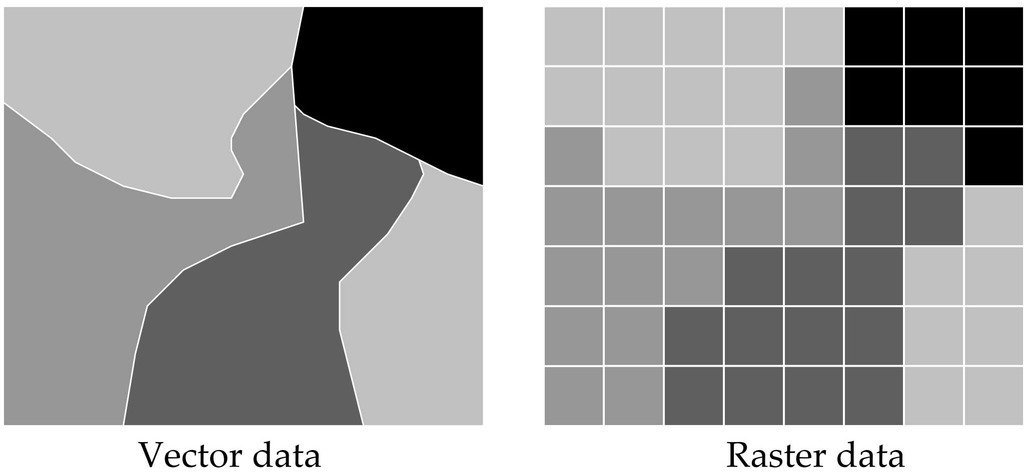


Figure 4. Representation of habitat features in raster versus vector polygon formats.

The unsupervised classification and combined PCA/unsupervised classification mapping approaches succeeded in differentiating most of the habitat boundaries at most sites. At some sites though, factors such as ripples on the sea-surface, sun-glare and depth influences prevented the classification method from delineating clear habitat boundaries at some places within the image. At these sites we found it was simpler to manually digitise the habitat boundaries in the GIS for those areas where the automated approaches did not accurately represent the habitat boundaries. The contrast enhanced imagery was used for the manual mapping.

2.6.2 Assigning Final Mapping Habitat Classifications

The initial habitat boundaries were mapped from the aerial imagery through the automated and manual mapping methods described above. It was not possible to identify dominant biota types from aerial photography, so we classified habitats based on the upper levels of the marine habitat classification hierarchy *(i.e.,* reef, sand, seagrass). Differentiating between some types of habitat classes (*e.g.*, bare reef versus reef with macroalgae or dense seagrass) was problematic even with high-resolution aerial photography due to the possibility of similarity in their reflectance spectra (pixel values).

The initial thematic classification and contextual editing was undertaken using existing knowledge and sampling at the study sites including:

- Parks Victoria subtidal and intertidal reef monitoring program.
- Underwater video, spot dives and grab-samples undertaken as part of the Landsat TM Substrata100 mapping program.
- Coarse-scale seabed characterisation with acoustic sounders undertaken at proposed Marine National Park sites for the LCC/ECC.
- Seagrass mapping by PIRVic at Port Phillip and Corner Inlet.
- Habitat and community type data collected by PIRVic at abalone reef monitoring sites.

Video transects and sites (Section 2.3) were overlayed on the initial habitat polygons from the aerial photographic interpretation and the classifications were corrected where they were inconsistent with the field observations. In some cases, habitat boundaries were manually edited or new habitat polygons were added to account for the field observations.

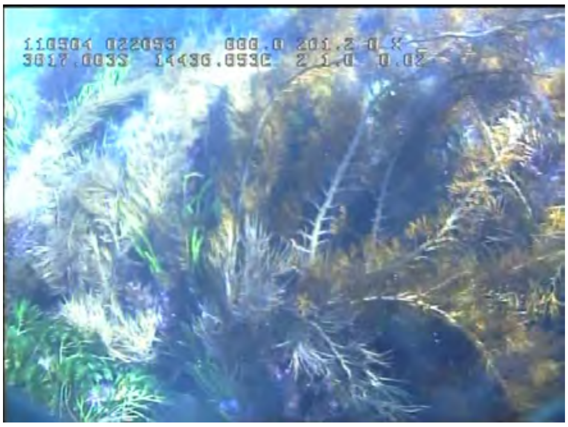
Habitat maps were produced in ArcGIS for each site based on the final habitat polygons and are presented in the following sections for each Marine National Park or Sanctuary. The video sites were overlayed on the habitat polygons in the habitat maps and were classified by substratum type. The video sites were also labelled with a biota code representing the dominant biota (Table 7).

Table 7. Dominant biota categories and codes used to label video sites in habitat maps. See Section 2.4.3.6 and Table 3 for description of biota categories.

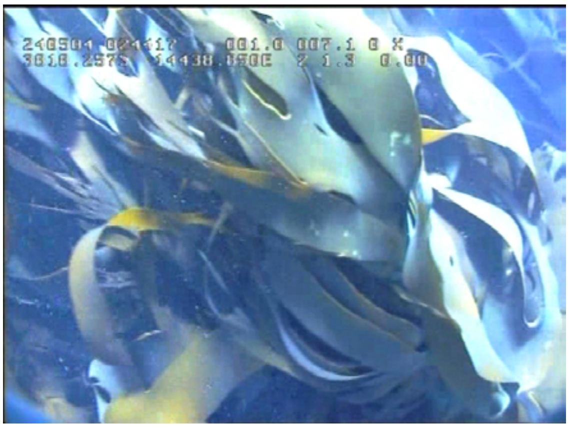
Biota Code	Biota Category
A	*Amphibolis antarctica*
A,ma	*A. antarctica* with mixed algae
A/ma	*A. antarctica* and mixed algae
B	High profile reef
B	Low profile reef
B	Sediment
ba,D	Mixed brown algae with *D. potatorum*
ba,E	Mixed brown algae with *E. radiata*
ba,P	Mixed brown algae with *P. comosa*
ba/H	Mixed brown algae and *H. banksii*
C	*Cystophora* spp.
D	*Durvillaea potatorum*
D,P	*D. potatorum* with *P. comosa*
D/ba	*D. potatorum* and Mixed brown algae
D/H	*D. potatorum* and *H. banksii*
D/ma	*D. potatorum* and Mixed algae
D/P	*D. potatorum* and *P. comosa*
D/ta	*D. potatorum* and Turf algae
E	*Ecklonia radiata*
E,ba	*E. radiata* with mixed brown algae
E,P	*E. radiata* with *P. comosa*
E/ba	*E. radiata* and mixed brown algae
E/M	*E. radiata* and *M. angustifolia*
E/ma	*E. radiata* and mixed algae
H	*Hormosira banksii*
H/M	*H. banksii* and *M. angustifolia*
Ha/Z	*Halophila australis* and *Zostera* spp.
M	*Macrocystis angustifolia*
M,D	*M. angustifolia* with *D. potatorum*
ma	Mixed algae
ma,E	Mixed algae with *E. radiata*
ma,H	Mixed algae with *H. banksii*

Table 7 continued.

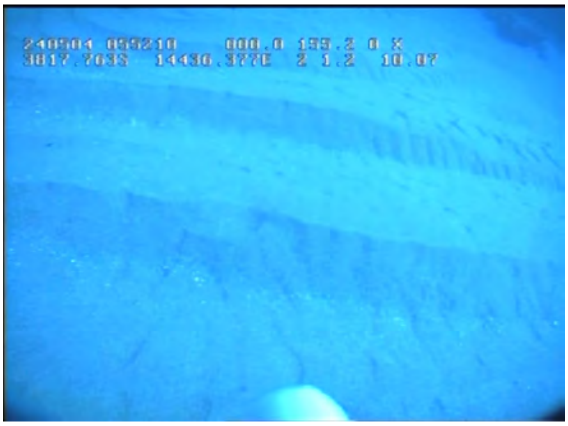
Biota Code	Biota Category
ba	Mixed brown algae
ga	Mixed green algae
ra	Mixed red algae
P	*Phyllospora comosa*
P,A	*P. comosa* with *A. antarctica*
P,ba	*P. comosa* with mixed brown algae
P,D	*P. comosa* with *D. potatorum*
P,E	*P. comosa* with *E. radiata*
P,M	*P. comosa* with *M. angustifolia*
P/ba	*P. comosa* and Mixed brown algae
P/D	*P. comosa* and *D. potatorum*
P/E	*P. comosa* and *E. radiata*
P/M	*P. comosa* and *M. angustifolia*
Pos	*Posidonia australis*
Pos/ma	*P. australis* and mixed algae
S/A	Sponges and ascidians
ta	Turf algae
U	*Ulva* spp.
Ub	Urchin Barren
Z	*Zostera* spp.
Z/ma	*Zostera* spp.and mixed algae



A. antarctica & brown algae (Pt Lonsdale)

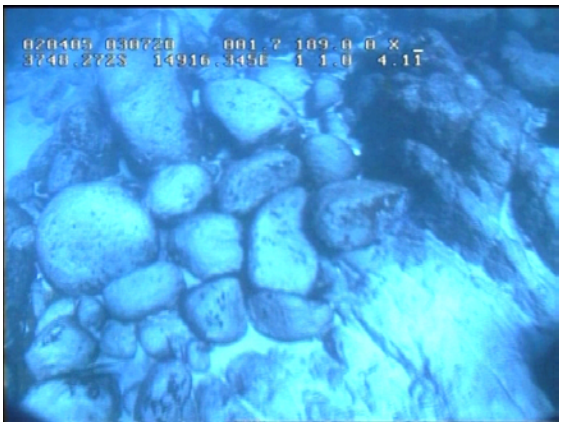


D. potatorum (Point Nepean)



Bare sand (Pt Lonsdale)

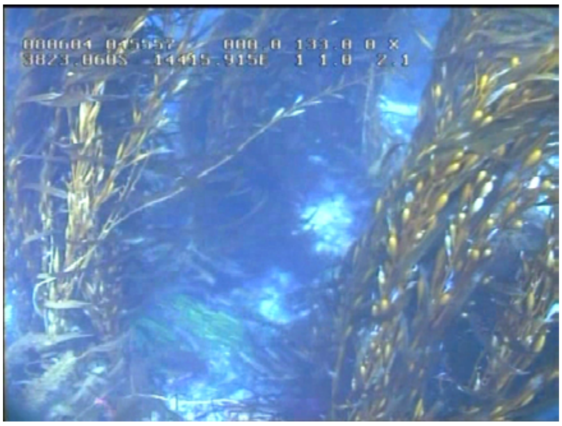
E. radiata (Pt Lonsdale)



Boulders (Pt Hicks MNP)

H. banksii (Pt Lonsdale)

Figure 5. Marine habitat examples from the underwater video.

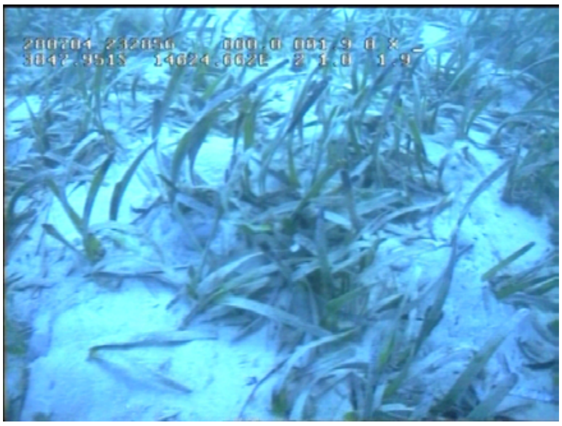


M. angustifolia (Pt Addis MNP)

P. comosa / *E. radiata* (Pt Lonsdale)

P. comosa (Pt Lonsdale)

Zostera sp. (Corner Inlet MNP)



P. australis (Corner Inlet MNP)

Figure 5 continued

3 MARINE NATIONAL PARK MAPPING

3.1 Port Phillip Heads Marine National Park – Point Lonsdale

3.1.1 Aerial Photography

Port Phillip Heads MNP – Point Lonsdale was mapped from aerial photography flown in 1997 and 2004. The 1997 photography (Figure 6) was flown on 12th April, 1997 at about 0925 close to low-tide (Port Phillip Heads – Point Lonsdale low-tide at 0857, 0.11 m, VCA Victorian Tide Tables 1997). The 2004 photography (Figure 7) was flown on 28th March, 2004 at 1005 before low-tide (Port Phillip Heads – Point Lonsdale low-tide at 1126, 0.16 m, POMC Victorian Tide Tables 2004).

A 3-dimensional view of the 1997 photography looking eastward towards the entrance to Port Phillip Bay is given in Figure 8.

3.1.2 Ground-truthing

3.1.2.1 Intertidal

The intertidal zone at Port Phillip Heads MNP – Point Lonsdale was ground-truthed on 6th February, 2004 and the intertidal observations are presented in Table 43 (Appendix 4). The intertidal zone primarily consisted of two distinct rock platforms separated by a sand beach (Figure 10). The eastern rock platform extended from the base of Point Lonsdale and was characterised by flat reef with a dense cover of *H. banksii.* The western rock platform emerged from a sand beach fronting high sand dunes and also had a low profile, but featured a number of relatively deep rock pools joined to the sea with steep sides up to the surface of the rock platform. The rock platform here was also dominated by *H. banksii.*

3.1.2.2 Subtidal

The Port Phillip Heads MNP – Point Lonsdale was surveyed with underwater video over 4 days on the 11th & 24th May, 23rd June and 9th July, 2004. Only the outer area of the Park, from Point Lonsdale Pier around to the western boundary, was surveyed during this study as previous studies had already mapped the Lonsdale Bight region inside the entrance to Port Phillip Bay (Blake & Ball 2001a; Vuyovich 2003). Nine video transects were run, covering a distance of approximately 5.2 km (Figure 9). Maximum depths surveyed were up to approximately 15 m, with the majority of video being recorded up to a depth of approximately 9 m.

3.1.3 Habitat Mapping

A shallow habitat map for the outer area of Port Phillip Heads MNP - Point Lonsdale is presented in Figure 10. The habitat map is overlayed with the position of underwater video sites classified by substratum and labelled with a code for the dominant biota observed at each site.

3.1.3.1 Underwater Video Observations

The locations of video sites at Port Phillip Heads MNP - Point Lonsdale are shown in Figure 10, with location information for each site in Table 14 (Appendix 1). The habitat classification assigned to each video site is given in Table 26 (Appendix 2) and overlayed on the habitat map in Figure 12.

The main substratum type observed in the surveyed area was low profile solid reef (T1_6, T5_30, T9_42). Bare sand was also recorded amongst this reef (T2_13, T5_32). Areas of high profile broken reef were present but generally restricted to the deeper region (10–15 m) to the east of the Park and around Mushroom Rock (T7B_55, T8_57).

On the intertidal platforms the dominant biota was *H. banksii* (T2_9) which gave way to a band of *D. potatorum* on the seaward edge of the platform (T2_11a, T3_16). A mixture of *P. comosa* and *E. radiata* dominated the majority of the subtidal low profile reef (T4_26, T6_37), the *E. radiata* becoming more dominant in deeper water and on the areas of higher profile reef (T9_43, T8_63). Stands of *M. angustifolia* were recorded near Mushroom Rock at the western end of Transect 8 (T8_56, T8_60).

Regions of *A. antarctica* and mixed algae were present down to depths of approximately 8 m in the exposed west of the Park (T2_14, T1_8), but particularly in the shallow more sheltered areas inside Port Phillip Heads (T7_44, T7_49).

3.1.3.2 Depth Profile

A depth profile of video Transect 3 (Figure 9) is presented in Figure 11. The location of video sites from this transect are overlayed on the depth profile.

3.1.3.3 Mapping Limitations

The nearshore region at Point Lonsdale is highly dynamic and a high level of sediment movement can be observed in this Park by comparing aerial photography from different years. As a result, the habitat boundaries between the sand beach and rock platform, as well as the shallow reef and patches of bare sediment, are highly variable as sand encroaches on the reef through deposition or is swept away by wave action. This is particularly evident immediately to the west of the rock platform beneath Point Lonsdale where an area of rock platform was visible in the 1997 imagery, but was mostly buried in 2004. This area was classified as low profile platform/sand flat (Figure 10).

We were unable to map the seabed east of Mushroom Rock as this was beyond the depth that could be interpreted from aerial photography. However, we ran video transects through this area and the substratum and dominant biota at these video sites is shown in Figure. It was not possible to run the towed video to the south-east of Mushroom Rock because of strong currents. It was also not possible to safely run the towed video between Mushroom Rock and the shore, so we were unable to ground-truth the seabed or identify dominant biota in this channel.

Figure 6. Port Phillip Heads MNP - Point Lonsdale 1997 aerial photography (QASCO 12/4/97). Photography ortho-rectified by PIRVic.

Figure 7. Port Phillip Heads MNP - Point Lonsdale 2004 aerial photography (QASCO 28/3/04). Photography ortho-rectified by PIRVic.

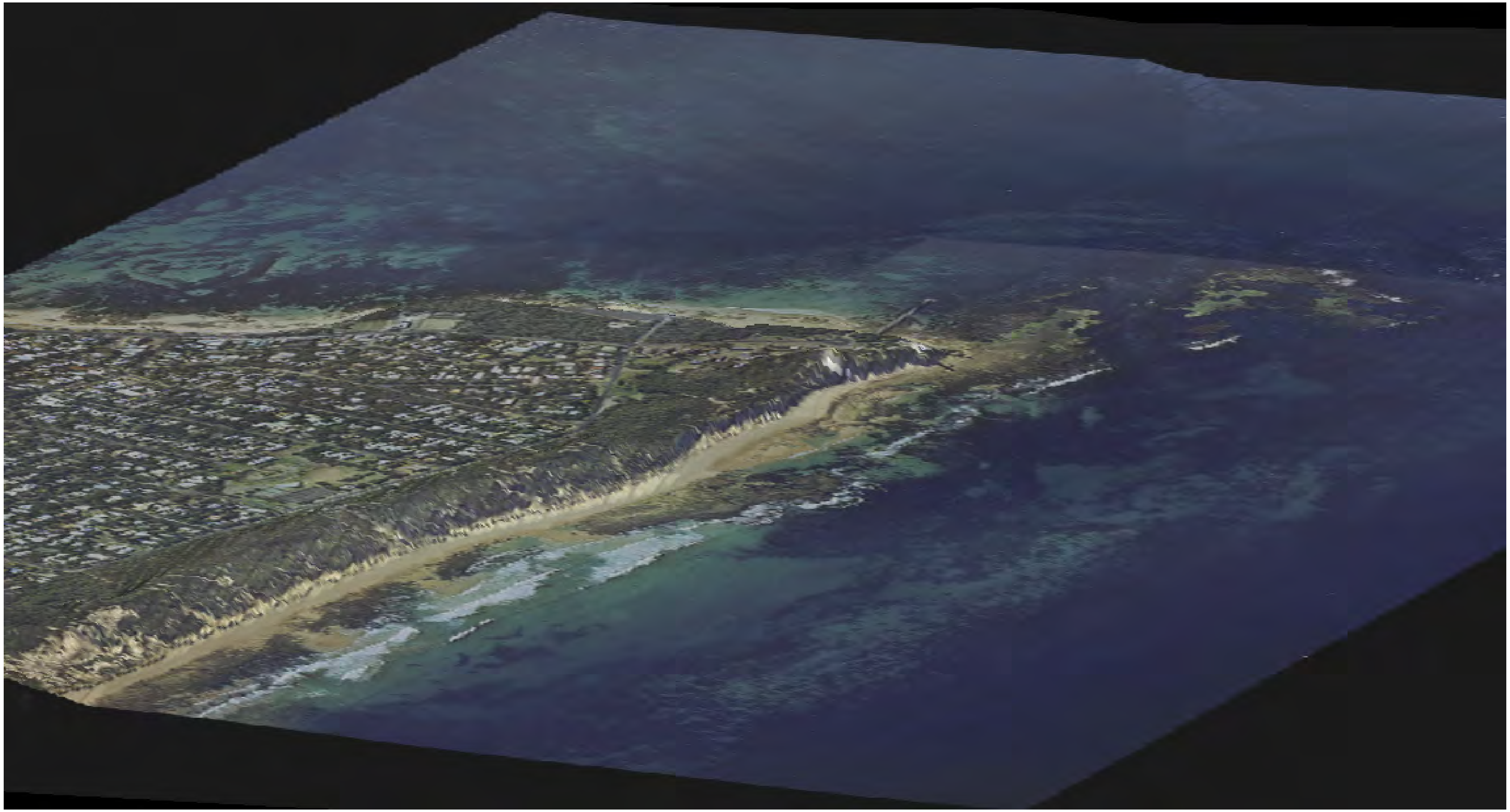


Figure 8. Three-dimensional view of 1997 Port Phillip Heads MNP – Point Lonsdale aerial photography (Figure), looking eastward towards the entrance to Port Phillip Bay.

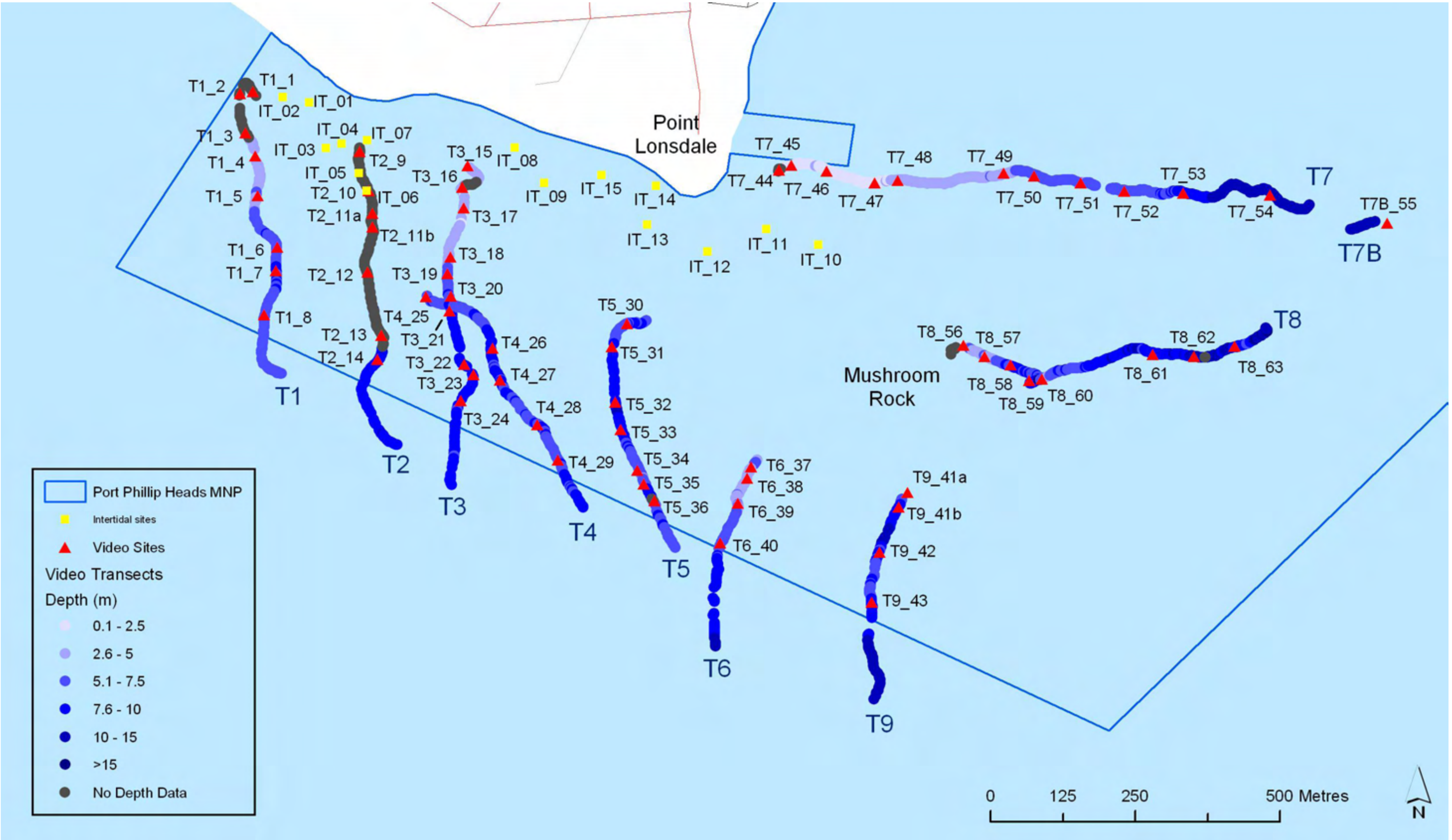


Figure 9. Port Phillip Heads MNP - Point Lonsdale video transects and sites. Note the depth sounder failed on sections of Transects 1 & 2.

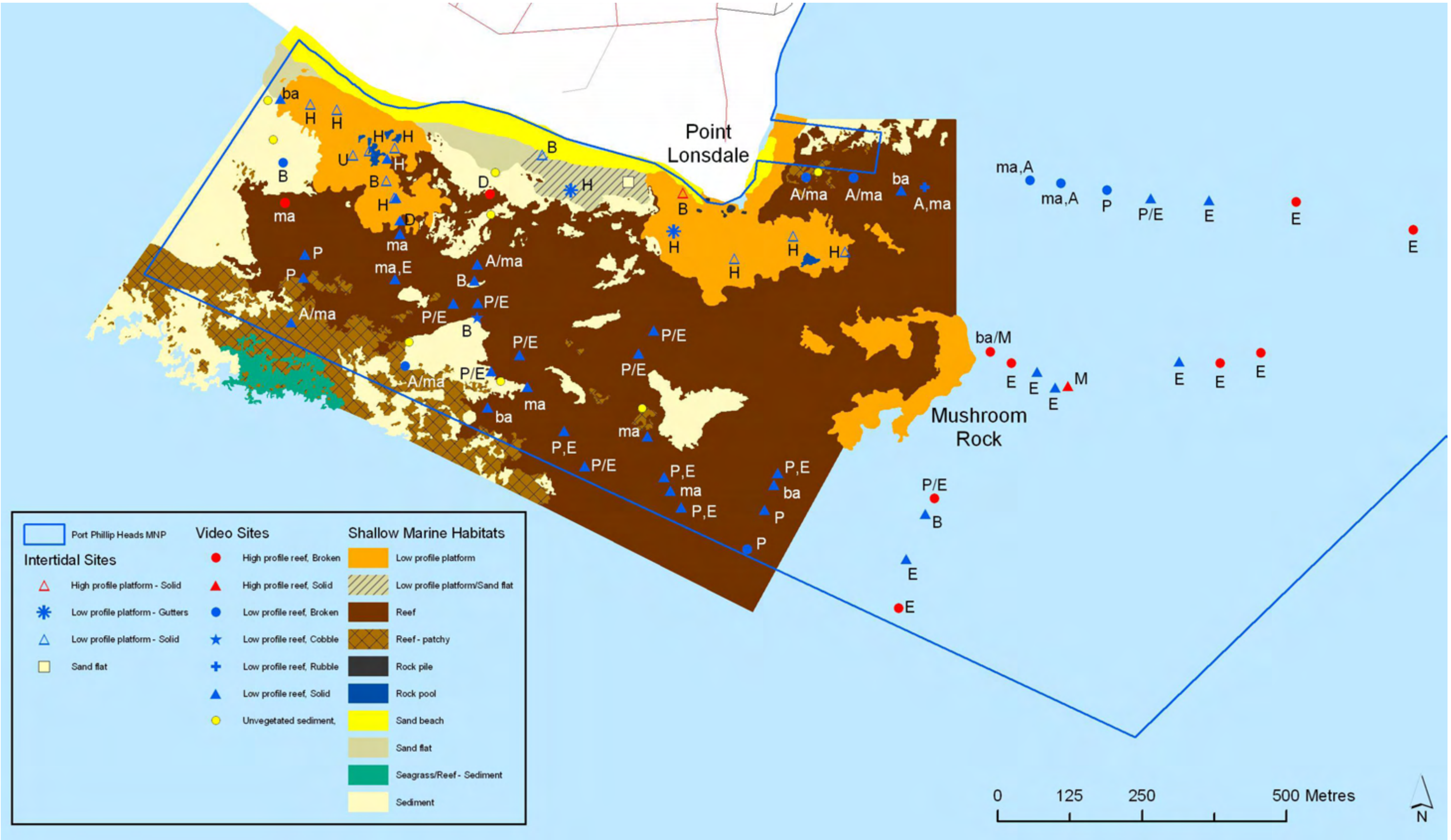


Figure 10. Port Phillip Heads MNP - Point Lonsdale shallow habitats. See Table 7 for biota codes.

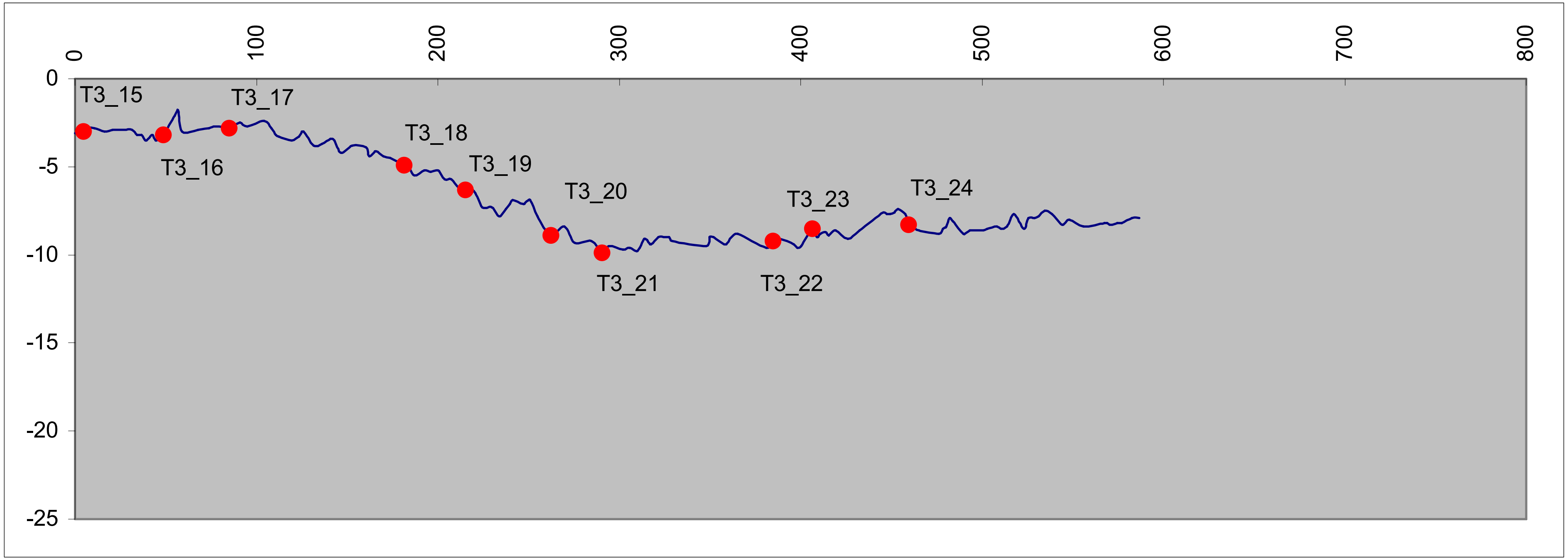


Figure 11. Port Phillip Heads MNP - Point Lonsdale depth profile for Transect 3 (Figure). Video sites extracted from along the transect are labelled on the profile. Depth (y axis) and distance (x axis) are in metres. Note the 0 value on the y axis (depth) represents sea level at the time of the survey.

3.2 Port Phillip Heads Marine National Park – Point Nepean

3.2.1 Aerial Photography

Port Phillip Heads MNP – Point Nepean was primarily mapped from aerial photography flown on 21st July, 2003 (Figure 12). The aerial photography did not include details on the time of day when it was flown, but it would appear from the area of exposed rock platform that it was flown close to low-tide (Port Phillip Heads – Point Lonsdale low-tide at 1042, 0.47 m, VCA Victorian Tide Tables 2003). A 3-dimensional view of the 2003 aerial photography is given in Figure 13).

Whitewater, caused by waves breaking at the seaward edge of the rock platform on the Bass Strait coast, obscured the seabed in places in the 2003 photography. As a consequence, we used additional aerial photography from 2000 and 2001 to map the seabed that could not be seen in the 2003 imagery and to confirm the presence of habitats. The 2000 photography (Figure 14) was flown on 31st December at 1335 close to mid-tide (Port Phillip Heads – Point Lonsdale low-tide at 1023, 0.44 m, VCA Victorian Tide Tables 2000). The 2001 photography (Figure 15) was flown on 8th May, and while no flight times were provided with the photography it appears to have been flown close to high-tide as the rock platforms are submerged.

3.2.2 Ground-truthing

3.2.2.1 Intertidal

The intertidal zone at Port Phillip Heads MNP – Point Nepean was ground-truthed on 5th April, 2005 and the intertidal observations are presented in Table 44 (Appendix 4). The intertidal zone at Point Nepean could be clearly divided into two regions made up of the southern shoreline exposed to Bass Strait and the northern shore inside Port Phillip Bay entrance that is mostly protected from the ocean swell.

The intertidal zone outside Port Phillip Bay was characterised by a wide expanse of low profile platform, backed by steep cliffs. A narrow sand beach lay between the base of the cliff and the rock platform in places along the southern shore. A dense cover of *H. banksii* mostly dominated the rock platform (IT_01, IT_02–09; Figure 16).

The intertidal zone inside Port Phillip Bay was mostly sand beach. The beach changed with distance from the Port Philip Bay entrance, becoming wider as the backshore changed from the cliffy coast at Point Nepean itself to an expansive dune system. An artificial rock wall has been constructed at the base of the cliff to protect the shore inside the entrance to Port Phillip Bay from erosion.

3.2.2.2 Subtidal

Port Phillip Heads MNP – Point Nepean was surveyed with underwater video over 3 days on 7th, 10th and 24th May, 2004. Survey conditions were initially good on the first two days, but an increase in swell size led to higher levels of suspended sediments in the water and reduced visibility. This was most noticeable inside the entrance to Port Phillip Bay where depths were generally shallower. Transects 1–12 inside Port Phillip Bay were affected by strong tidal currents that pushed the towed video frame around. Video footage taken in the outside section of the Park (Bass Strait) was generally clearer.

A total of 23 transects were run covering a distance of approximately 10 km (Figure 16). The inside of the Park was surveyed to depths of approximately 7 m, the exception being offshore from Observatory Point where depths dropped to 20 m. Outside Port Phillip Bay, depths surveyed reached approximately 14 m.

Point Nepean was the first site to be surveyed with the towed video system during this study and as a result ended up being the testing ground for the survey methodology. Technical difficulties experienced while surveying transects 1, 2, 13, 14 and 15 meant that log files were not recorded to the laptop. The data logger also failed at the outer section of Transect 19. However, video footage was still recorded to the DVD recorder and the text strings from the GPS and sounder were overlayed on this footage. As a result, the location of data points along these transects could not be overlayed on the aerial photography. Video sites from T1, T2 and T13 were still extracted from the video footage and coordinates for the location of these sites was taken directly from the screen text. The locations of all video sites are shown in Figure 16. Transects 14 and 15 were run entirely over bare sand and no video sites were extracted from these transects.

3.2.3 Habitat Mapping

A shallow habitat map for Port Phillip Heads MNP – Point Nepean is presented in Figure 17. The habitat map is overlayed with the position of underwater video sites classified by substratum and labelled with a code for the dominant biota observed at each site.

3.2.3.1 Underwater Video Observations

The locations of video sites at Port Phillip Heads MNP – Point Nepean are shown in Figure 16, with location information for each site in Table 15 (Appendix 1). The habitat classification assigned to each video site is given in Table 27 (Appendix 2) and overlayed on the habitat map in Figure 17.

The substratum types and dominant biota observed along Transects 1 to 15, inside Port Phillip Bay, generally fell into one of the following categories:

- *A. antarctica* and mixed brown algae over sediment or low profile broken reef and rubble.
- Monospecific beds of *A. antarctica* over sediment.
- High profile broken reef dominated by *P. comosa* with *E. radiata* and mixed brown algae.

The eastern region of the Park inside Port Phillip Bay was predominantly bare sediment (Transects 1-3), but a large area of patchy rubble was observed offshore from Observatory Point (T2_2).

Extensive areas of patchy reef, intermixed with *A. antarctica* began to appear at Transect 4 and dominated Nepean Bay (Transects 5-12). Along these transects was a mixture of patchy broken reef and sand, the reef being predominantly low profile (T6_8), but with areas of high profile reef also present (T7_10). The dominant biota was *A. antarctica* with mixed algae (T4_5, T5_6). The *A. antarctica* tended to be present on the sand and rubble surrounding areas of rocky reef, with algae being dominant on the reef itself (in places the *A. antarctica* appeared to be growing directly on the rocky reef). Generally closer inshore were areas of sediment dominated by monospecific beds of *A. antarctica* (9_15, 12_23).

A. antarctica on low profile reef and sediment (T9_15, T9_17) dominated the inner and outer sections of Transects 9 and 10. Extensive areas of *P. comosa* and *E. radiata* with mixed brown algae were present at the centre of these transects (T9_16, T10_20) on higher profile reef.

At the entrance to Port Phillip Bay (Transect 13) the reef was higher profile and the dominant *A. antarctica* seen in the transects to the east was replaced by mixed brown and green algaes.

The substratum types and dominant biota observed along Transects 16–22, outside Port Phillip Bay, were different to inside the Bay. Inshore, the reef was generally high profile and broken (T16_28, T19_35), although areas of low profile reef were still present (T17_53, T20_39). The reef was dominated by brown algaes including *D. potatorum*, *P. comosa* and *M. angustifolia.* Dense *D. potatorum* was dominant in the more exposed areas at the seaward edge of the intertidal platforms, while *H banksii* was observed on the intertidal platforms (T19_36) where the vessel was able to travel over the platform at high-tide.

Small stands of *M. angustifolia* were observed amongst high profile reef at the seaward end of Transect 13 (T13_27), at the landward end of Transect 16 (T16_28), at the western tip of Point Nepean, and in front of the rock platform on Transect 19 (T19_35, T19_36) and Transect 21.

Moving further offshore there was generally solid low profile reef extending out to the end of Transects 16–20. The reef was sand scarred and colonised by a mixture of red and brown algae with a species of *Cystophora* also observed (T16_29). Scattered amongst this low profile reef were patchy areas of broken high profile reef (T20_40). These were primarily dominated by *P. comosa*, with *E. radiata* also present. Moving further offshore, at around 13 m, *E. radiata* became the dominant biota type (T16_30).

Transect 17 had more low profile reef with extensive sand veneers and bands of sand and smaller algae species. Extensive *P. comosa* beds began appearing at a depth of approximately 5 m, with *E. radiata* also present amongst the *P. comosa* around 8 m (T17_33). The *P. comosa*/*E. radiata* became sparser as the depth increased past 10 m.

Transect 18 had dense *D. potatorum* inshore and a narrow band of bare sediment extended parallel to the shore (T18_54). Beyond the sediment, the seabed again became low profile reef colonised by *P. comosa*, with *E. radiata* appearing at a depth of approximately 8 m.

Transects 19 and 20 were bisected by a wide band of sand running parallel to the shore which separated the inshore and offshore reef (T20_57, T19_56).

Transects 21 and 22 to the east were characterised by high profile reef with turf algae inshore. The high profile reef became lower in profile with distance from shore before being replaced by an expanse of bare sandy sediment at depths of approximately 7 m (T21_44, T22_58).

3.2.3.2 Depth Profile

A depth profile of video Transect 20 (Figure 16) is presented in Figure 18. The location of video sites along this transect are overlayed on the depth profile.

3.2.3.3 Mapping Limitations

Port Phillip Heads MNP – Point Nepean displayed a complex mosaic of habitats, with considerable variation between the relatively sheltered Nepean Bay and the seabed exposed to swell from Bass Strait outside the Port Phillip Bay entrance. The extensive area of *A. antarctica* and reef habitat in Nepean Bay presented the greatest challenge to mapping the shallow habitats at this site. It was not possible to distinguish *A. antarctica* growing on sediment versus reef in the aerial photography. Similarly, it was not possible to distinguish the reef with *P. comosa*/*E. radiata* at the centre of Nepean Bay from the surrounding reef and *A. antarctica* (Figure 17). As a consequence we classified this region as Seagrass/Reef – Sediment.

We were able to map most of the seabed inside Port Phillip Bay, apart from a small area east of Observatory Point, where the depth changed rapidly, and was beyond the depth that could be mapped with aerial photography. Observations from video Transect 1 showed that this area was most likely to be bare sand.

The Park extends to depths of up to approximately 20 m and up to distances of approximately 1–2 km offshore outside Port Phillip Bay. We were only able to map up to depths of approximately 10–12 m, and up to a distance of approximately 600 m offshore with the aerial photography.

A visual comparison of the aerial photography from different years (2000, 2001 and 2003) indicated that the habitat boundaries were relatively stable in this Park despite the high wave energy outside Port Phillip Bay. Transect 21 revealed the presence of more reef in the inshore region than appeared in the aerial photography (T21_43). However, the reef at this site was patchy and may be subject to periodic burial and exposure by sediment movement. Some small variations in the size of the Seagrass/Reef patches inside Nepean Bay could also be observed, and probably represent changes in area/density of the *A. antarctica* over time.

Figure 12. Port Phillip Heads MNP **-** Point Nepean 2003 aerial photography (Hydro Tasmania 21/07/2003).

Figure 13. Three-dimensional view of Port Phillip Heads MNP – Point Nepean 2003 aerial photography (Figure 12) looking westward towards The Rip.

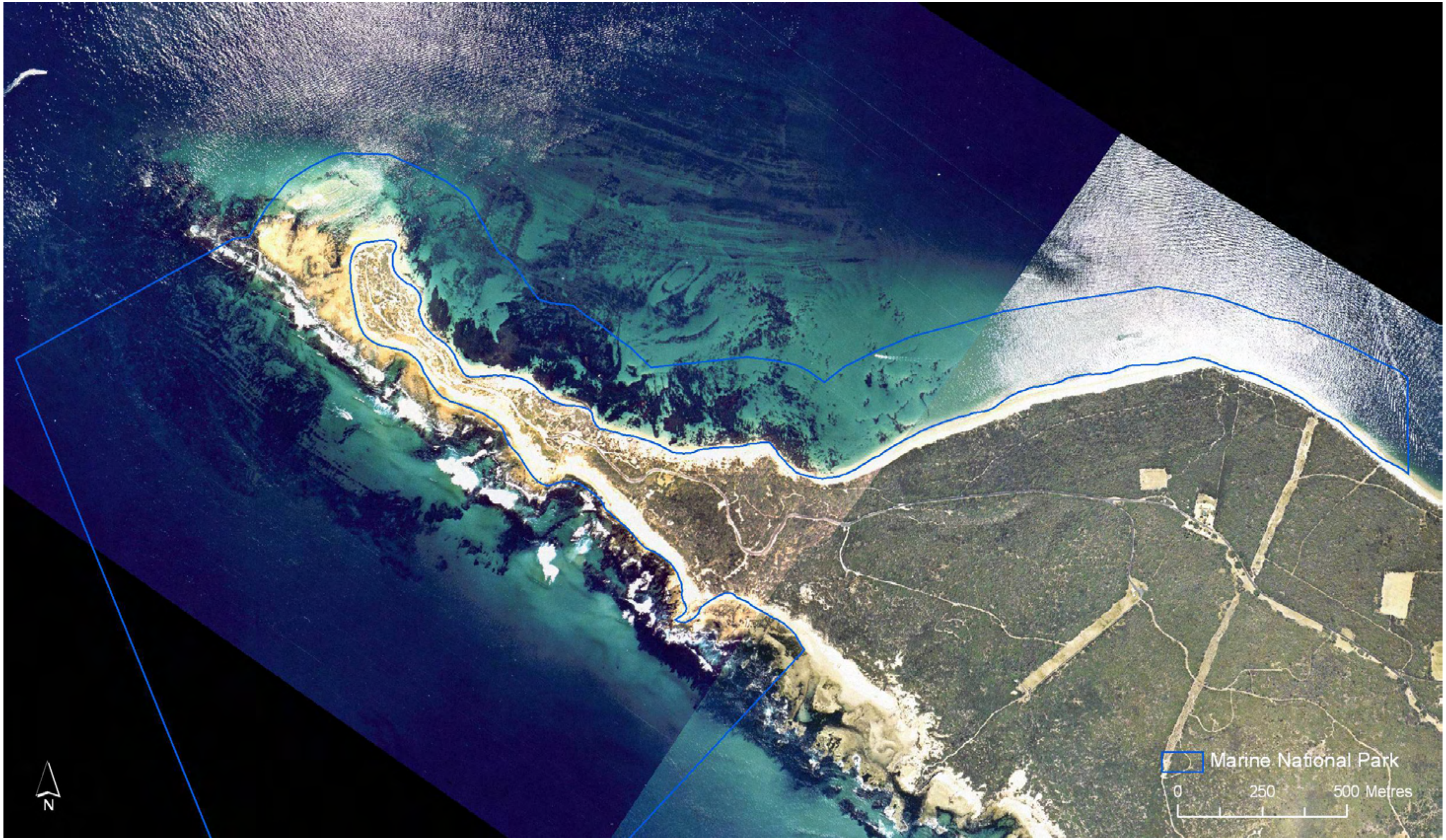


Figure 14. Port Phillip Heads MNP - Point Nepean 2000 aerial photography (QASCO 31/12/2000).

Figure 15. Port Phillip Heads MNP - Point Nepean 2001 aerial photography (Photomapping Services 8/05/2001).

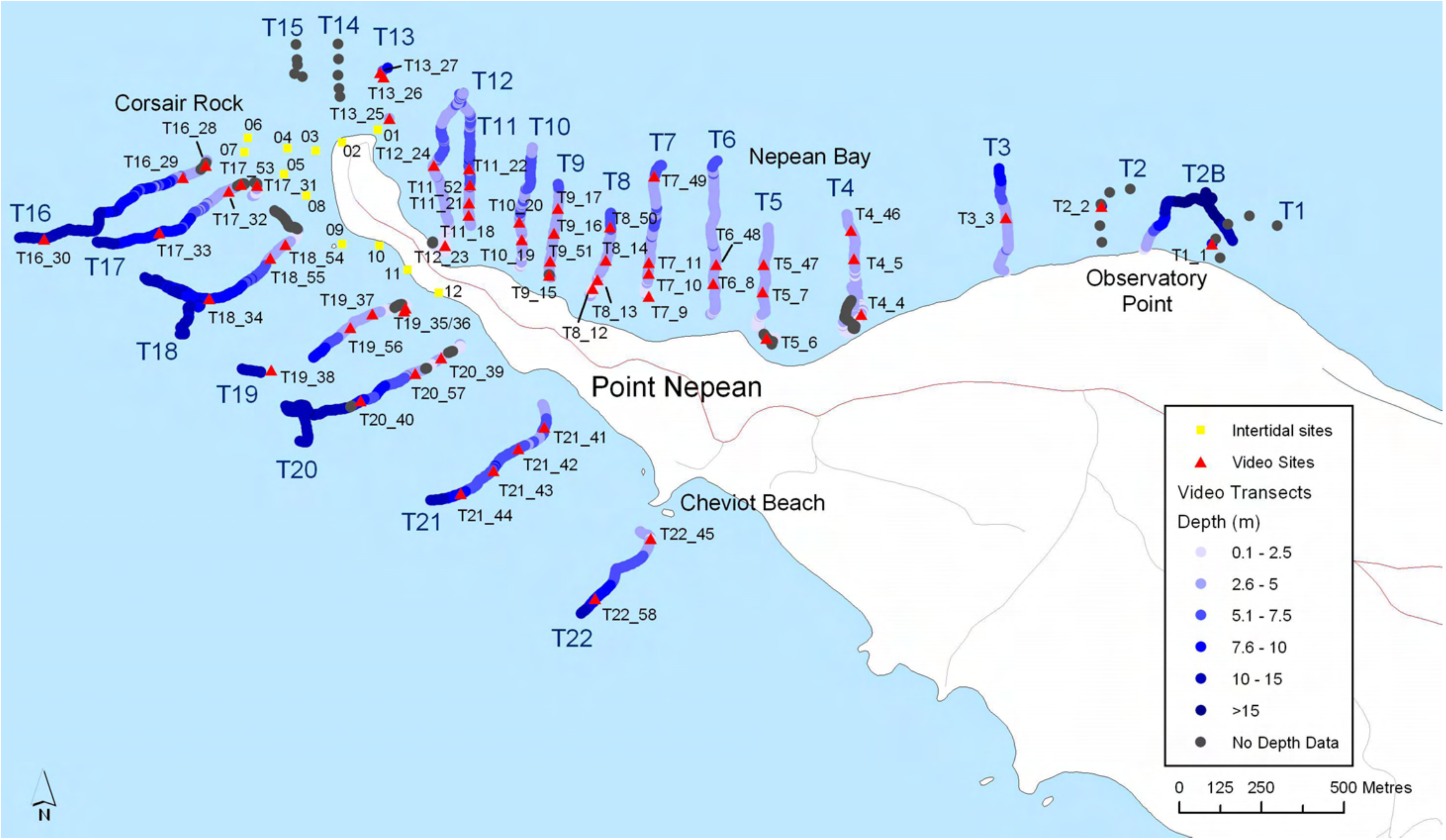


Figure 16. Port Phillip Heads MNP - Point Nepean video transects and sites. Note data logging failed on Transects 1, 2, 13, 14 & 15. Intertidal site labels show site number only.

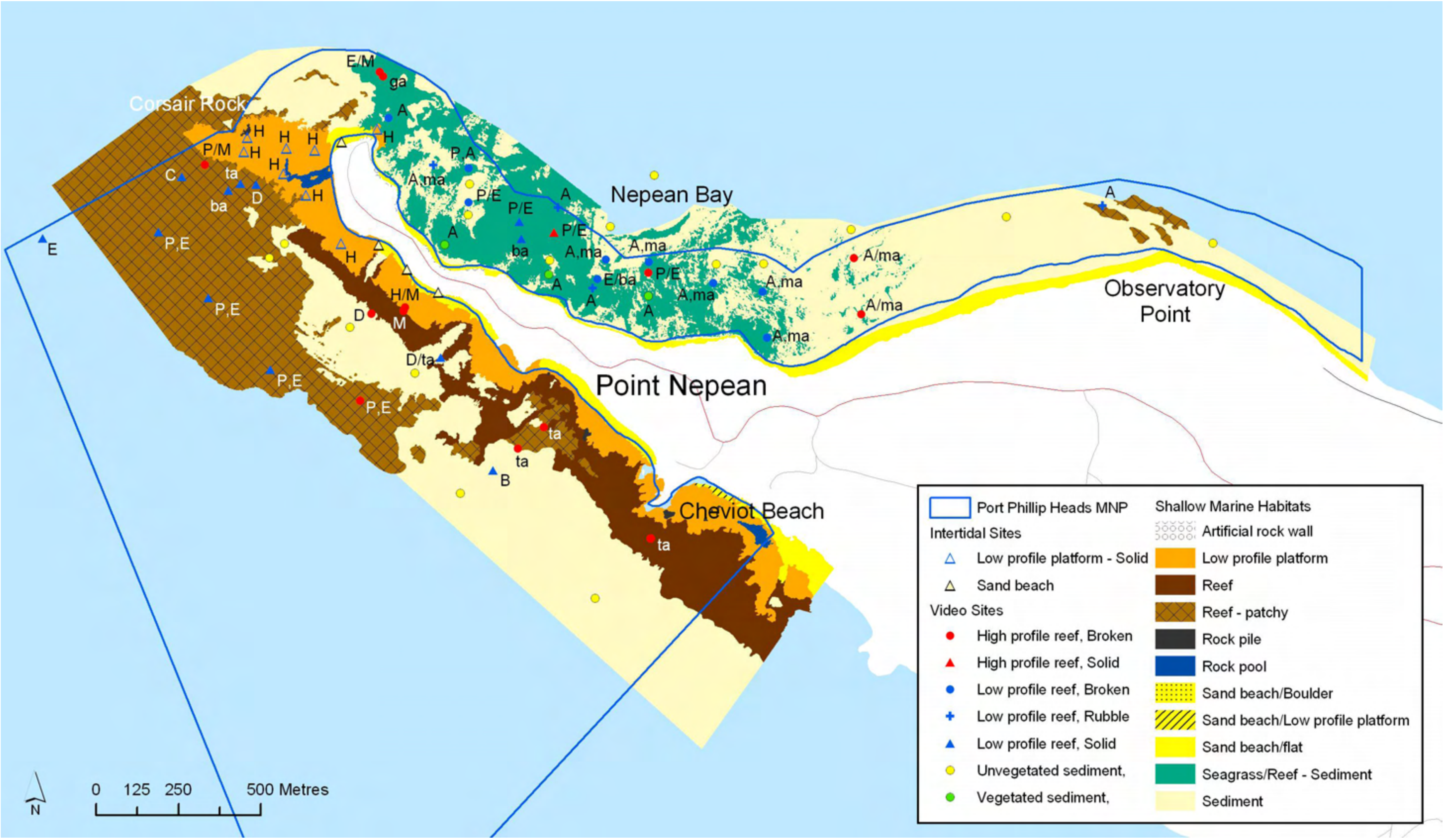


Figure 17. Port Phillip Heads MNP - Point Nepean shallow habitats. See Table 7 for biota codes.

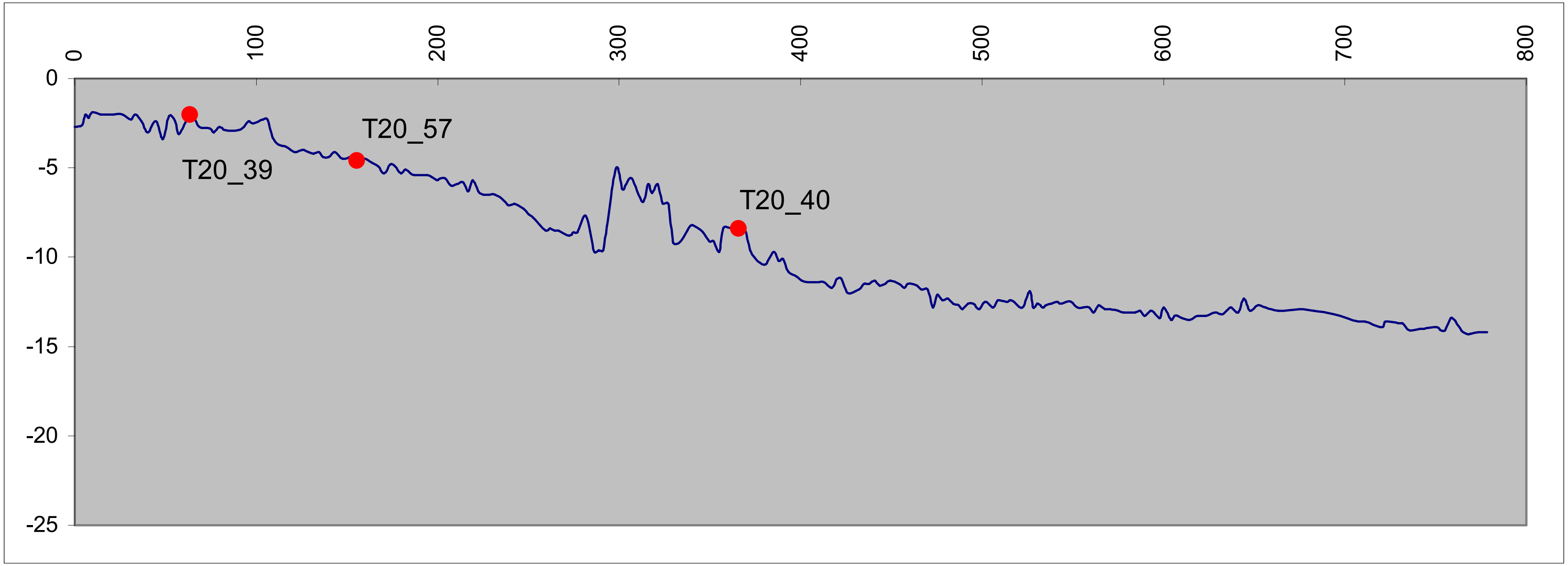


Figure 18. Point Nepean depth profile for Transect 20 (Figure 16). Video sites extracted from along the transect are labelled on the profile. Depth (y axis) and distance (x axis) are in metres. Note the 0 value on the y axis (depth) represents sea level at the time of the survey.

3.3 Mushroom Reef Marine Sanctuary

3.3.1 Aerial Photography

Mushroom Reef MS was mapped from two sets of aerial photography flown in 1998 and 2004. The 1998 photography (Figure 19) was flown on 11th January at 1600 close to low-tide (Port Phillip Heads – Point Lonsdale low-tide was at 1646, 0.23 m, VCA Victorian Tide Tables 1998). The 2004 photography (Figure 20) was flown on 28th March at about 1010 on low-tide (Port Phillip Heads low-tide was at 1026, 0.16 m, POMC Victorian Tide Tables 2004).

3.3.2 Ground-truthing

3.3.2.1 Intertidal

The intertidal zone at Mushroom Reef MS was ground-truthed on 31st January and 6th March, 2004 and the intertidal observations are presented in Table 45 (Appendix 4). The backshore was characterised by a narrow sand beach fronting a small dune system at the base of a steep slope extending down from the Flinders golf course.

Mushroom Reef itself was the dominant intertidal feature at the site and consisted of a large expanse of low profile platform (Figure 22). The platform was connected to the shore by a narrow isthmus of bare cobble (IT_01, IT_02). The centre of Mushroom Reef was mostly bare with some scattered brown algae and *H. banksii* (IT_09, IT_15, IT_20). The outer edges of the platform supported *H. banksii* (IT_12, IT_16, IT_06).

Two smaller intertidal platforms lay to the west of Mushroom Reef. These rock platforms extended seaward directly from the sand beach and had areas of higher profile than Mushroom Reef. These rock platforms were mostly bare (IT_21–33).

3.3.2.2 Subtidal

Mushroom Reef MS was surveyed with underwater video on the 21st September, 2004. Conditions on the day were good with light winds and a small swell. The survey was carried out to coincide with high tide, allowing the vessel access to areas close inshore as well as the shallow ground between Mushroom Reef and the offshore island. Most of the Sanctuary is in very shallow water, even on high-tide, and despite the good conditions there was only a very narrow area of deeper water between the rock platform and Sanctuary boundaries where it was safe for the survey vessel to approach. As a result, a large amount of the video footage is actually outside the Sanctuary boundary, particularly along the southern and eastern boundaries (Figure 21). Two video transects were run covering a distance of 4.3 km. Maximum depths surveyed were approximately 9 m, with the majority of video being recorded at depths less than approximately 6 m.

3.3.3 Habitat Mapping

A shallow habitat map for Mushroom Reef MS is presented in Figure 22. The habitat map is overlayed with the position of underwater video sites classified by substratum and labelled with a code for the dominant biota observed at each site.

3.3.3.1 Underwater Video Observations

The locations of the video sites are shown in Figure, with location information for each site in Table 16 (Appendix 1). The habitat classification assigned to each video site is given in Table 28 (Appendix 2) and overlayed on the habitat map in Figure 22.

The substratum at the shallow (0–4 m) north west corner of the Sanctuary was primarily a mixture of low profile cobble and rubble reef dominated by *A. antarctica* and mixed algae (T1_2, T1_11). Moving further south and into the small bay, the substratum type became sand and was dominated in areas by monospecific beds of *A. antarctica* (T1_6) and *Zostera* sp. (T1_7). Moving out of the bay and towards the south west tip of Mushroom Reef itself, the substratum changed to low profile solid reef dominated by mixed brown algae and *P. comosa* (T1_13).

Between Mushroom Reef and the adjacent offshore island the substratum changed to patchy low profile broken reef and was dominated by a mixture of *A. antarctica* and mixed algae (T1_16). *Cystophora* spp. was also present (T2_18). The shallow bay to the north east of Mushroom Reef was dominated by a mixture of *A. antarctica* and mixed algae over low profile reef (T2_22). Moving south into deeper water (4–9 m) and around the offshore island the substratum became high profile and broken in texture, dominated by *P. comosa* and *E. radiata* (T2_25, T2_29).

3.3.3.2 Depth Profile

A depth profile was not produced for Mushroom Reef MS as the position of the intertidal platforms meant that the video transects had to circle around the exposed reef. As a consequence, the transects did not run across the depth gradient and could not be translated into a meaningful depth profile.

3.3.3.3 Mapping Limitations

The inshore region of Mushroom Reef MS is protected from waves and the sandy sediment has been colonised by *Zostera* sp. in places. The more exposed inshore areas supported *A. antarctica* growing on sediment and patches of reef. We could not differentiate *Zostera* sp. from the *A. antarctica*/reef habitat with the aerial photography and as a consequence we had to classify this region with the combined category Seagrass/Reef – Sediment.

Figure 19. Mushroom Reef 1998 aerial photography (QASCO 11/01/98).

Figure 20. Mushroom Reef MS 2004 aerial photography (QASCO 28/3/04).

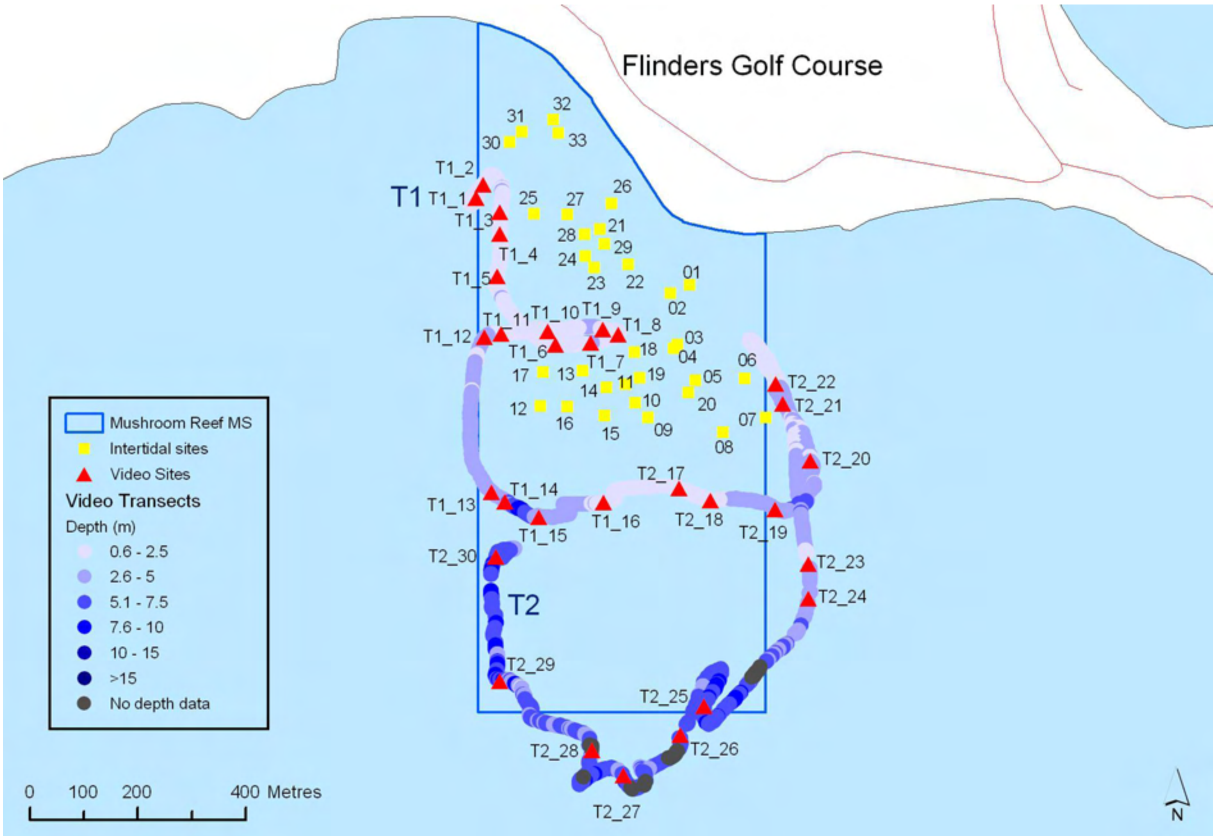


Figure 21. Mushroom Reef MS video transects and sites. Intertidal site labels show site number only.

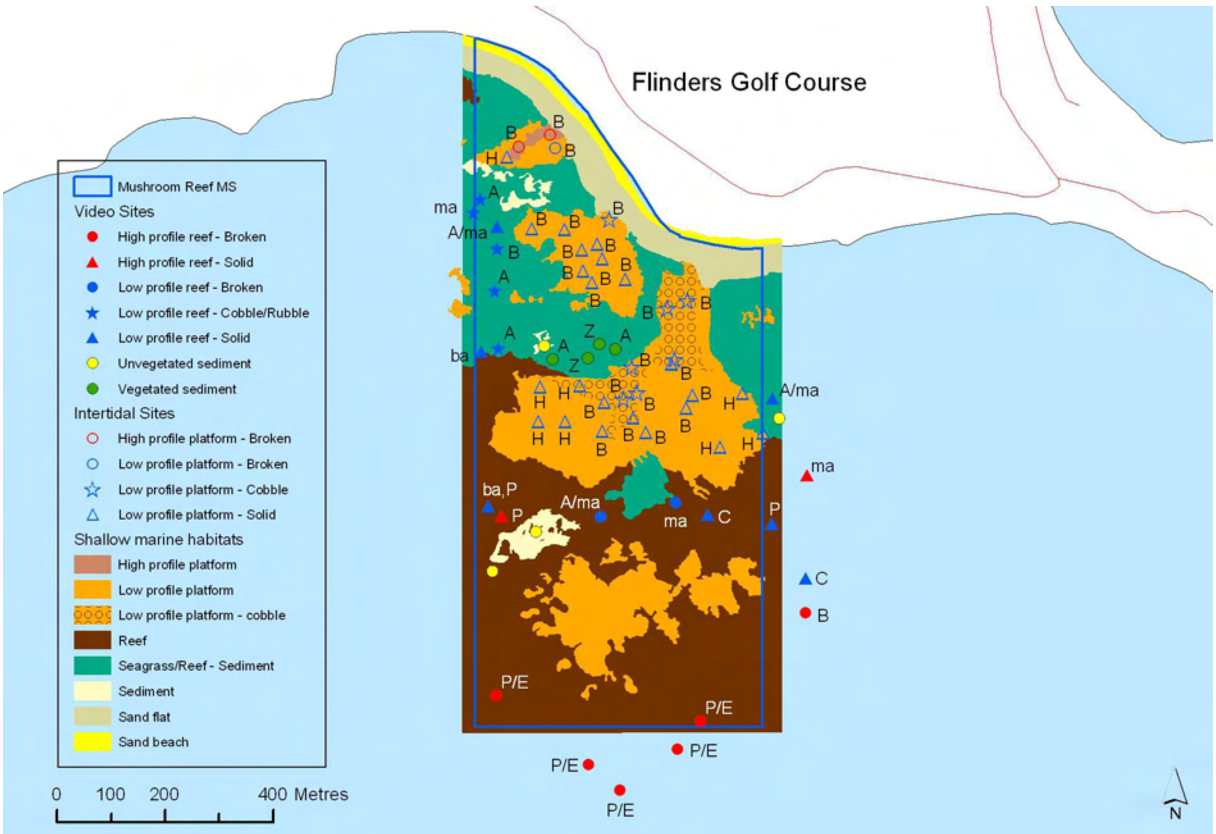


Figure 22. Mushroom Reef MS habitats. See Table 7 for biota codes.

3.4 Corner Inlet Marine National Park

3.4.1 Aerial Photography

Corner Inlet MNP was mapped from aerial photography flown in 2004. The northern site (Figure 23) and southern site (Figure 25) were flown on 18th February, 2004 at about 1550 close to low-tide (Low-tide at Port Welshpool – Rabbit Island 1604, 0.33 m, VCA Tide Tables 2004). A 3-dimensional view of the 2004 aerial photography for the northern site is given in Figure 23.

3.4.2 Ground-truthing

3.4.2.1 Subtidal and Intertidal

Corner Inlet MNP was surveyed with a small vessel over 2 days on the 29th and 30th July, 2004. Conditions over the survey period were excellent with light winds and very good water clarity. Corner Inlet is characterised by seagrass growing in soft sediment, and as a consequence the towed video was not used for the video drops at this site. To prevent the video system becoming entangled with the seagrass beds, the video camera was attached to a pole and then lowered to approximately 0.5 m above the seabed. Video footage was then recorded at each site for approximately 10–15 seconds while the vessel drifted. The towed video system was deployed to run a single transect through the deeper unvegetated regions of Bennison Channel.

A total of 59 sites were surveyed with 31 in the northern site and 28 in the southern site (Figure 26 & Figure 28). The shallower depths at the southern site posed some difficulties in accessing some areas of this site. The majority of video was collected from sites at depths of 0.5–3 m, and depths of up to 20 m were surveyed in the transect across Bennison Channel.

3.4.3 Habitat Mapping

Shallow habitat maps for Corner Inlet MNP are presented in Figure 27 (northern site) and Figure 29 (southern site). The habitat maps are overlayed with the position of underwater video sites classified by the dominant biota type and density observed at each site.

3.4.3.1 Underwater Video Observations

The location of video sites in the northern and southern sites at Corner Inlet MNP are shown in Figure 26 and Figure 28 respectively, with location information for each site in Table 17 (Appendix 1). The habitat classification assigned to each video site is given in Table 39 (Appendix 2) and overlayed on the habitat maps in Figure 27 and Figure 29.

A distinct difference was observed between the northern and southern sites, both in substratum type and dominant biota. Sediment type in the northern site was generally sandy with little fine particulate matter. The southern site was also predominantly a sandy substratum, but there were more areas that appeared silty in texture and particularly to the east in the shallow water.

The northern site was dominated by a medium to dense cover of *P. australis* (CI_6, CI12). East of Bennison Channel around Chinaman Beach and Tin Mine Cove also had dense beds of *P. australis,* but with a high percentage of a white filamentous algae (CI_1, CI_32). It was not clear from the footage if the algae was alive or dead and decaying. Small areas of *Zostera* sp. were also observed, the most extensive bed being in the centre of the sandbank, 600 m to the northwest of Granite Island (CI_11). As this area would be subject to the greatest amount of exposure on low-tide, it is most likely that the *Zostera* sp. is better adapted to surviving in these conditions than *P. australis*.

A subsequent seagrass survey of the area around Granite Island carried out in January 2005 as part of a PIRVic seagrass monitoring program also showed a similar distribution pattern for *P. australis*. However, the above ground biomass was far higher in the summer survey, with leaf lengths being around 50–60 cm, versus 15–20 cm in the winter survey (Ball *et al*. 2006).

The pattern of dominant biota in the southern site was different to the northern site. While sparse patches of *P. australis* were still present, primarily in the deeper channel to the south of Bennison Island (CI_30), the dominant biota was *Zostera* sp. (CI_36, CI_41). The southern site was generally shallower than the northern site and sediments were finer which may explain the change in biota. Blade lengths tended to be shorter (5–10 cm) in the shallower southern areas of the southern site and around 15–20 cm in the deeper water around its northern boundary.

3.4.3.2 Depth Profile

A single continuous video transect was run from west to east across the north of Bennison Channel (Figure 26). The depth profile along this transect is shown in Figure 26, with the location of the extracted video sites overlayed. While some sparse seagrass was present at the western end of the transect (T54b, T54c), the majority of the substratum was bare sand with rubble patches present in the deeper central section of the channel. Depths in the central channel reached 20 m.

3.4.3.3 Mapping Limitations

The aerial photography for Corner Inlet MNP was flown at low-tide under calm conditions and provided a clear view of the seagrass habitat. The northern site was characterised by extensive beds of *P. australis* with small areas of *Zostera* sp. on the very shallow sections of the central bank (Figure 27). The consistent colour and texture of the *P. australis* seagrass beds mapped from the aerial photography supported giving them a single habitat classification and this was confirmed by the ground-truthing. However, it is possible that small patches of *Zostera* sp. exist amongst the medium-dense *P. australis* at this site.

The southern site displayed a more complex mosaic of seagrass patches of varying densities and sizes (Figure 29). It was not possible to ground-truth every patch of seagrass visible in the photography, so we matched different colours, texture and shapes of seagrass patches in the aerial photography with the ground-truthing. We then extrapolated our field observations across the aerial photography to classify the habitat polygons. As a consequence there may be some differences in the species or density of seagrass at specific sites within the Park when compared to the mapping.

The ground-truthing found very little *P. australis* in the southern site and as a consequence most of the seagrass was classified as *Zostera* spp. An area of seagrass on the northern boundary of the southern site, to the east of Bennison Island was classified as *P. australis* in the mapping (Figure 29). Although this area of seagrass was not ground-truthed, it displayed a similar colour and texture in the aerial photography to areas found to be *P. australis* at the northern site.

Figure 23. Corner Inlet MNP (north) 2004 aerial photography (QASCO 18/02/04).

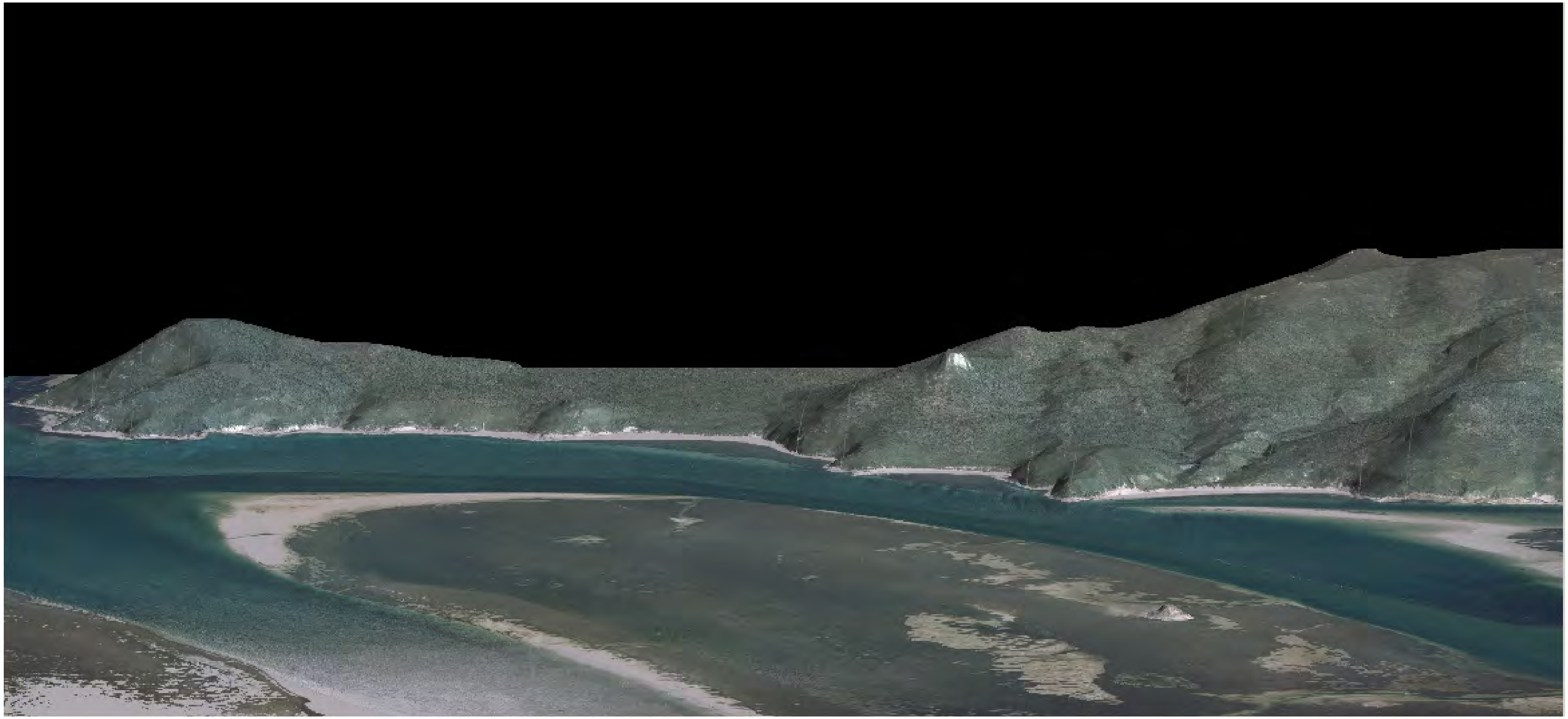


Figure 24. Three-dimensional view of Corner Inlet MNP (north) 2004 aerial photography (Figure 23) looking eastward towards Wilsons Promontory.

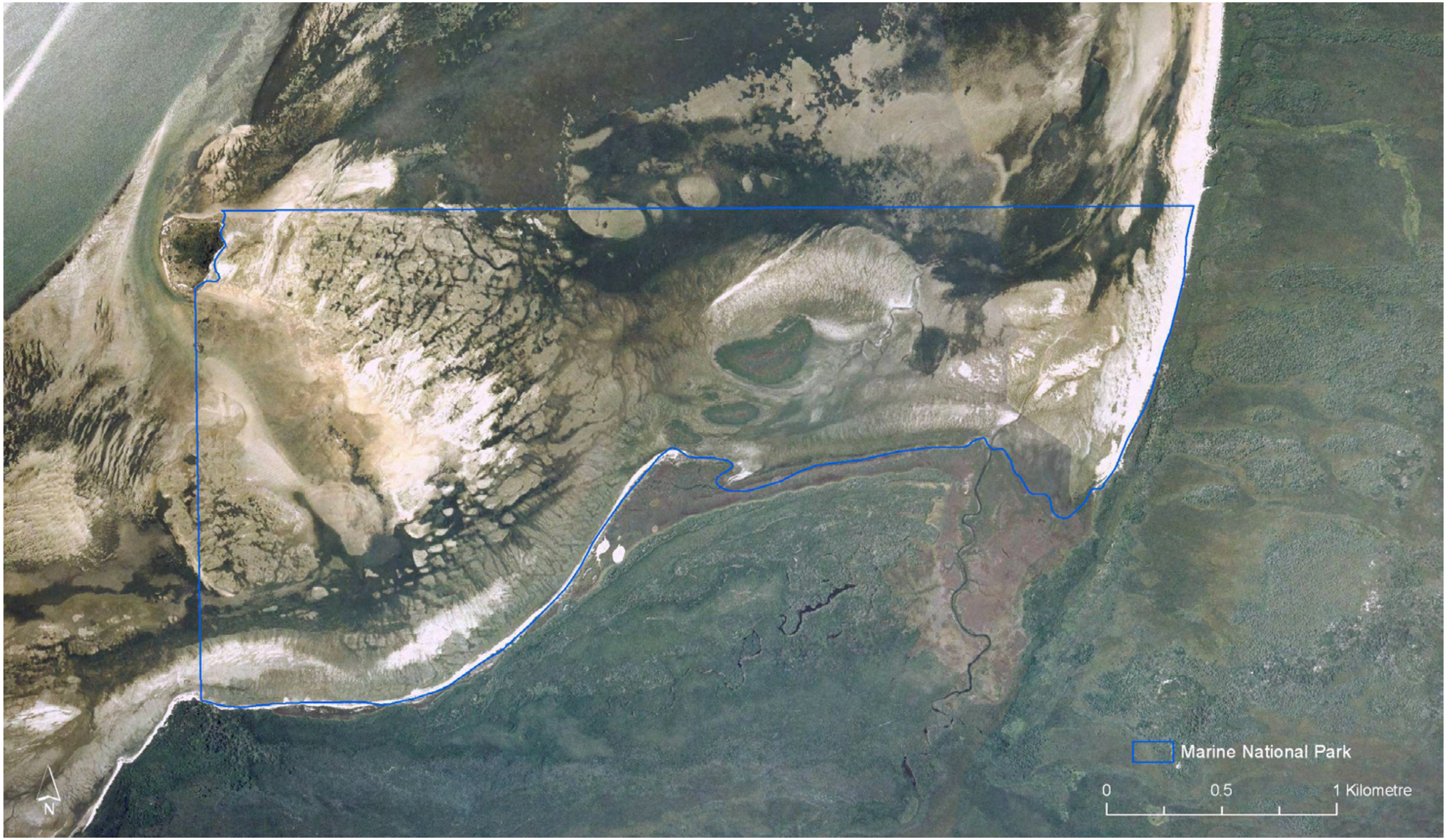


Figure 25. Corner Inlet MNP (south) 2004 aerial photography (QASCO 18/02/04).

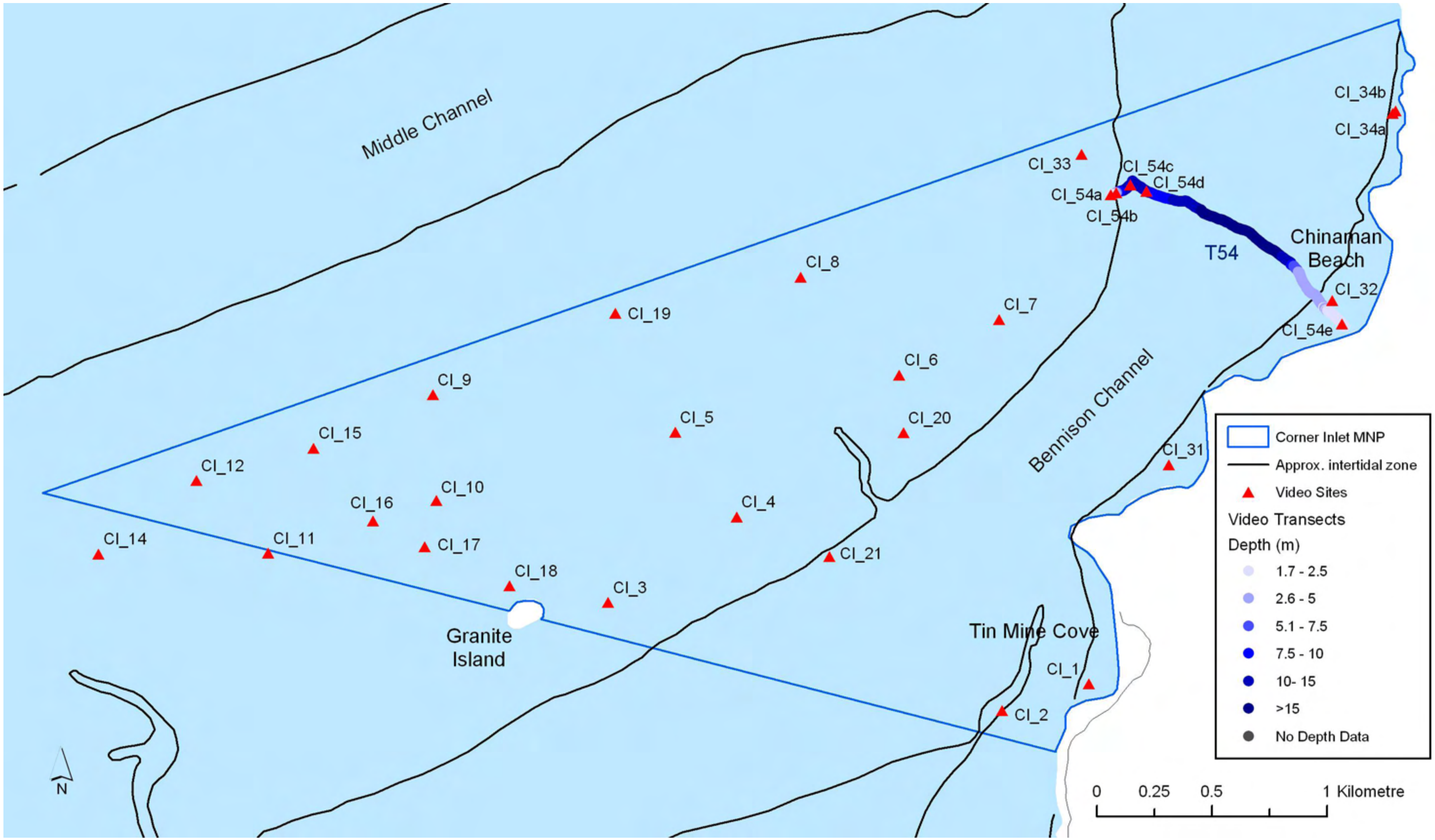


Figure 26. Corner Inlet MNP (north) video transects and sites.

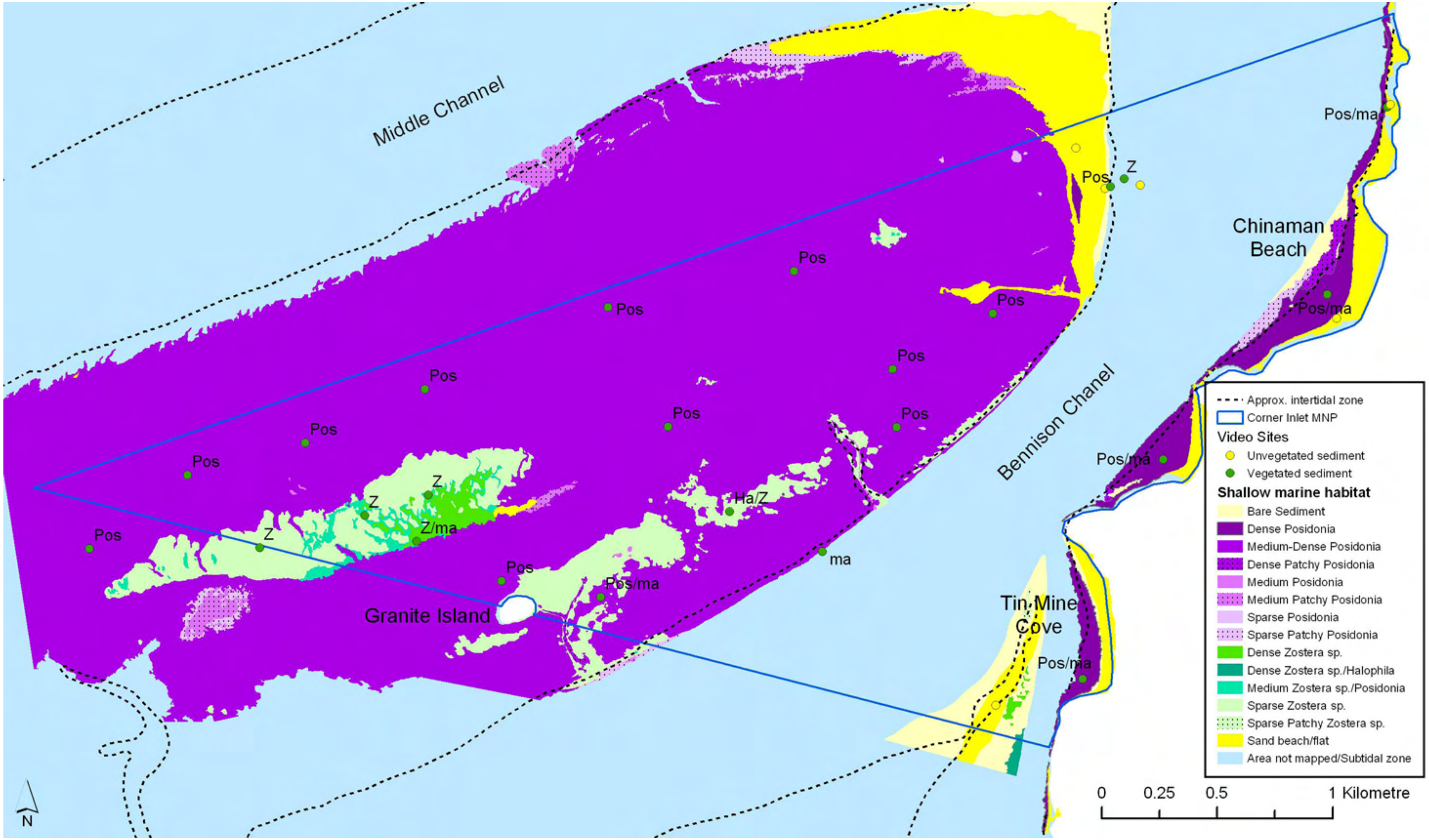


Figure 27. Corner Inlet MNP (north) habitats. See Table 7 for biota codes.

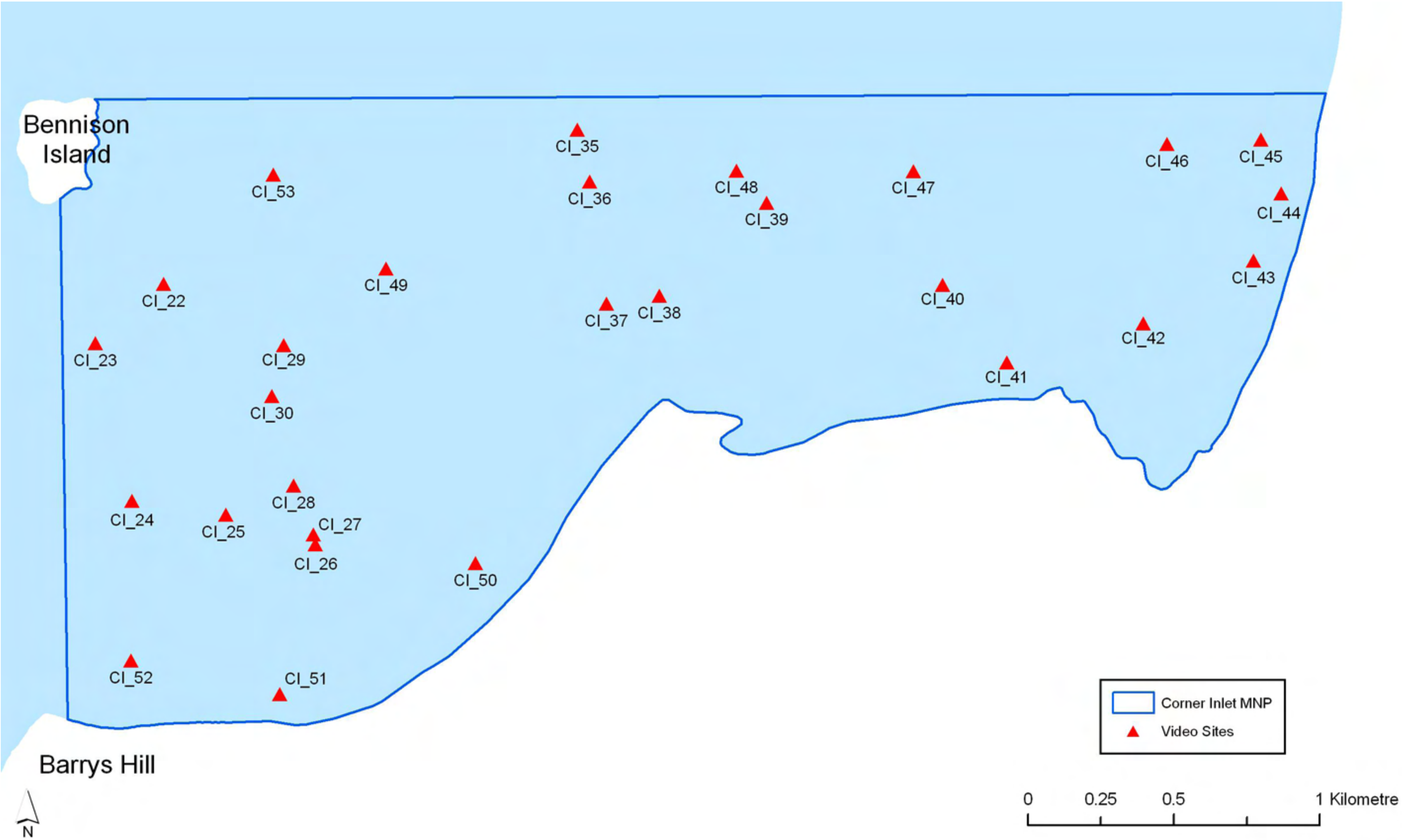


Figure 28. Corner Inlet MNP (south) video sites.

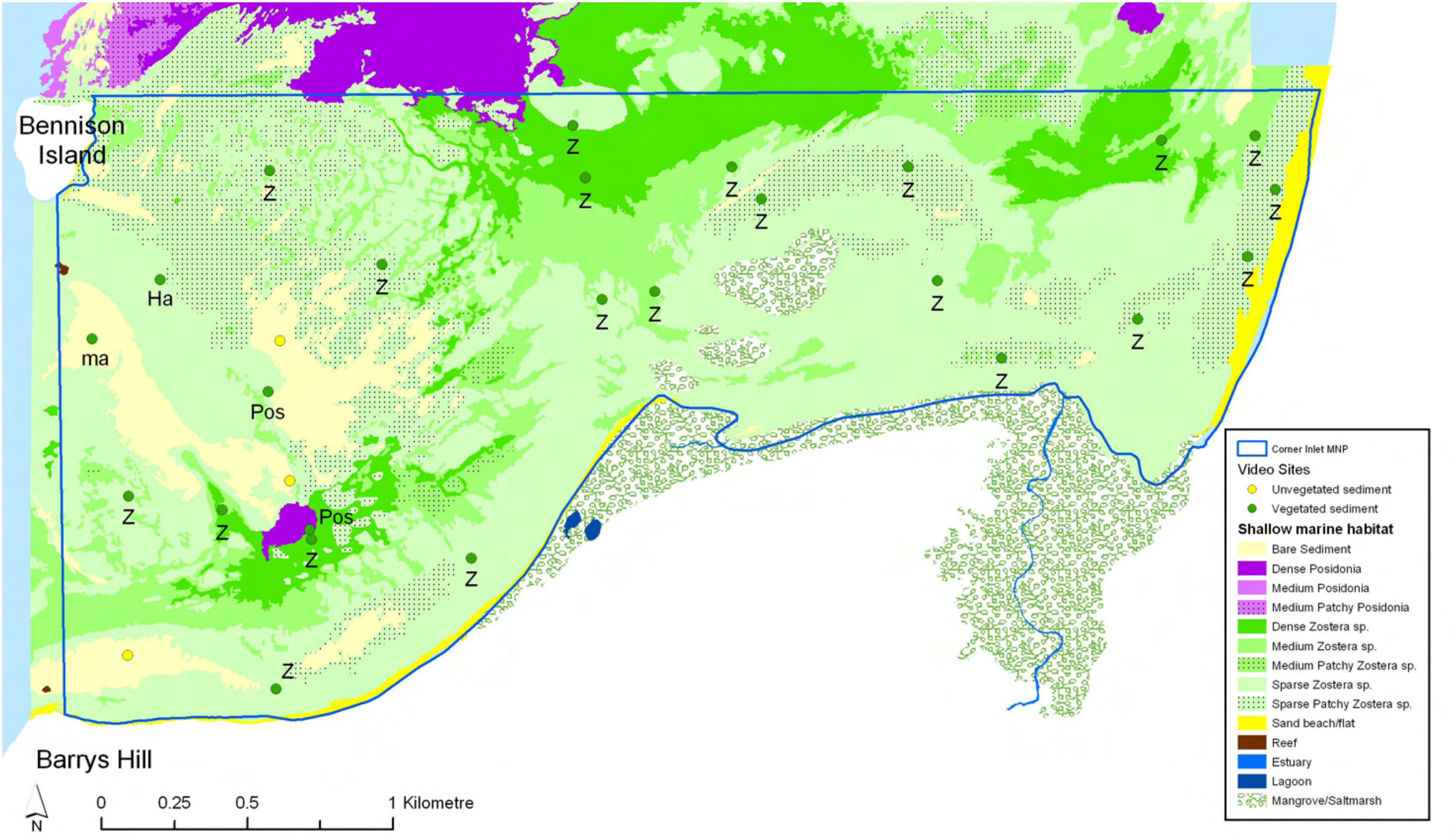


Figure 29. Corner Inlet MNP (south) habitats. See Table 7 for biota codes.

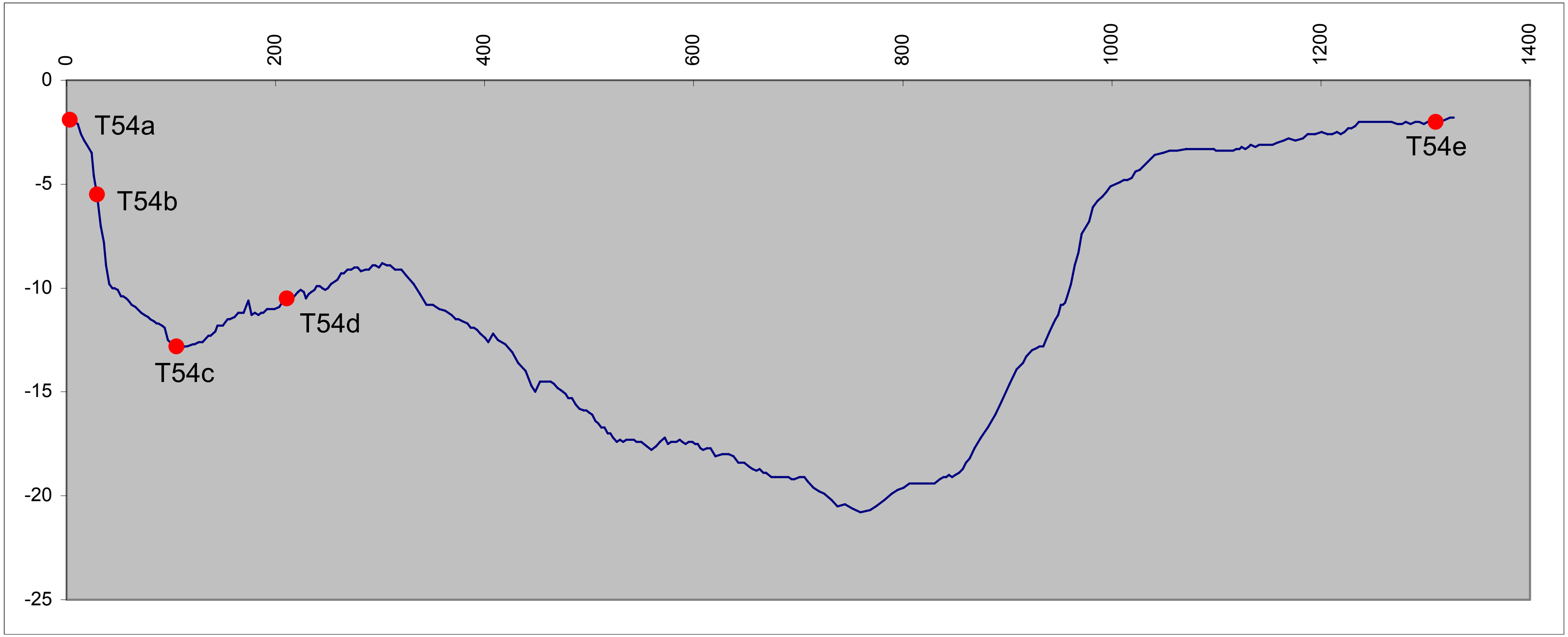


Figure 30. Corner Inlet MNP (north) depth profile for Transect 54 (Figure 26) across Bennison Channel. Video sites extracted from along the transect are labelled on the profile. Depth (y axis) and distance (x axis) are in metres. Note the 0 value on the y axis (depth) represents sea level at the time of the survey.

3.5 Ninety Mile Beach Marine National Park

The nearshore region of Ninety Mile Beach MNP is primarily bare sandy sediment. This site presented considerable difficulties for flying aerial photography for marine habitat mapping due to the impact of waves breaking over the inshore sand banks and the amount of sediment stirred up in the water column. Even on calm days with low-swell, strong cross-shore currents can stir up sediment in the water column obscuring the seabed.

We attempted to fly aerial photography at Ninety Mile Beach MNP on several occasions during the course of the project, but were unable to capture photography suitable for marine mapping. Similarly, this site is regularly hazardous for vessels to approach close to shore to collect underwater video. As a consequence this site was omitted from this study.

3.6 Beware Reef Marine Sanctuary

Beware Reef MS was mostly too deep to map from aerial photography, with only a small area of exposed reef and its shallow surrounds visible at low-tide. As a consequence, we undertook a simple depth survey of the site to produce a 3D depth model.

3.6.1 Depth Soundings and Model

A single beam depth sounder was deployed to record depths along transects spaced approximately 150 m apart over the Sanctuary (Figure 31). Ten transects were run in a pre-determined north-south pattern. The depth survey was conducted on 6th April, 2005 over a 3 hour period. Depths were not corrected for tidal variations and the sounder was not equipped with sensors to compensate for the movement of the vessel.

Depths varied from 3.9–33.5 m and were predominantly >20 m. The location of the shallow and exposed reef can be seen by the diversion in the path of the vessel on the fourth transect from the west (Figure 31).

A depth value was recorded every 2 seconds and logged to a text file with its position (latitude/longitude), time, and vessel speed and direction from a DGPS positioned on the vessel. The depth points were filtered to remove any duplicates or zero depth values indicating a failed depth reading. Before further processing, every second depth value was also filtered to reduce the file size. All filtered data was then imported to Surfer and a kriging extrapolation process was run to produce a continuous surface of the seabed. The sanctuary boundary was used as a “breakline” during the kriging to set the spatial extent of the extrapolation.

The extrapolated seabed surface is shown as a 3D depth model in Figure 32. A ridge of reef can be seen extending to the south-east from the exposed reef in the north-west sector of the Sanctuary. The ridge of reef protrudes from a relatively flat seabed immediately surrounding the reef at depths of approximately 20–30 m.

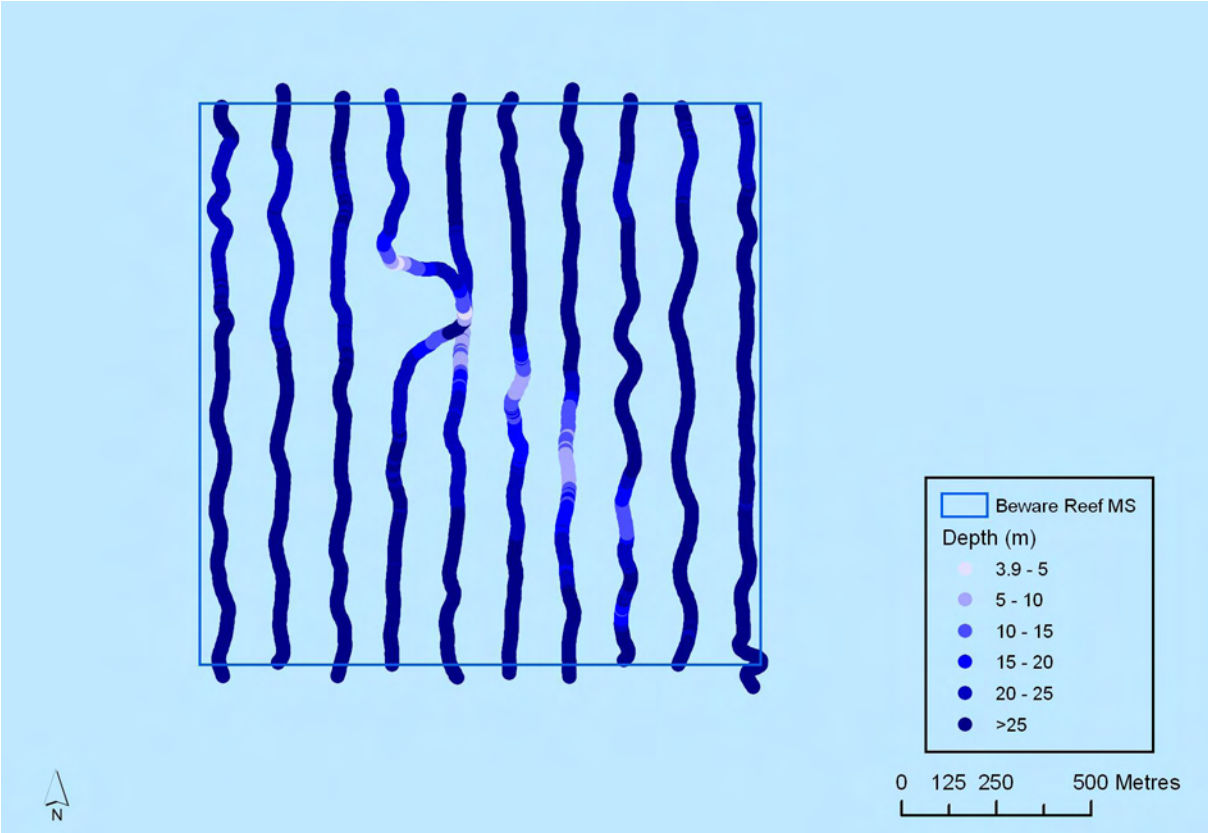


Figure 31. Beware Reef MS depth sounding transects.

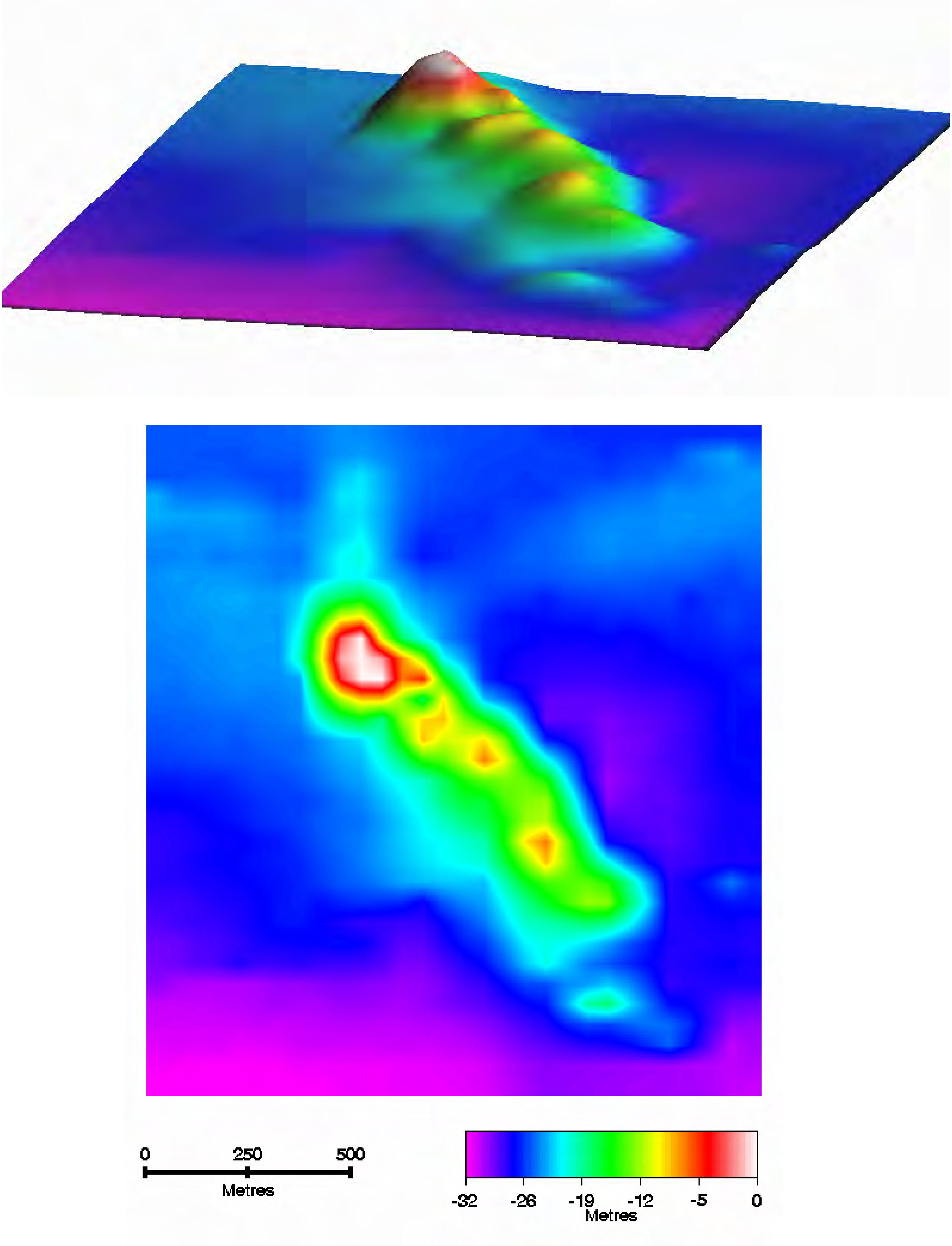


Figure 32. Beware Reef 3D depth model (top), 2D depth model (bottom). Note: 3D depth model is orientated towards the north-east.

3.7 Point Hicks Marine National Park

3.7.1 Aerial Photography and Satellite Imagery

Point Hicks MNP was mapped from 2004 aerial photography and IKONOS satellite imagery. The IKONOS satellite imagery was captured on 12th October, 2004 (Figure 33) at 1008 around mid-tide (low-tide approximately 1310 at Point Hicks, based on tidal difference to Port Welshpool (Rabbit Island), Victorian Tide Tables 2004). The aerial photography was flown on 20th January, 2004 (Figure 34) at 1530 close to low-tide (low-tide approximately 1420 at Point Hicks, based on tidal difference to Port Welshpool (Rabbit Island), Victorian Tide Tables 2004). A 3-dimensional view of the 2004 aerial photography is given in Figure 35.

We ortho-rectified the IKONOS satellite imagery (Figure 33) and then used this as a basemap to ortho-rectify the aerial photography (Figure 34).

3.7.2 Ground-truthing

3.7.2.1 Intertidal

No intertidal ground-truthing was undertaken at Point Hicks MNP. The aerial imagery shows a relatively narrow band of rock platform around the base of Point Hicks itself with rest of the intertidal area to the west being sand beach fronting an extensive dune system.

3.7.2.2 Subtidal

Point Hicks MNP was surveyed with underwater video on the 2nd April, 2005. Conditions on the day were very good with calm seas and light winds. Water clarity was generally good, but a reasonable amount of suspended sediment and particulate matter was still present in the water column. A total of 18 transects were run covering a distance of approximately 10 km (Figure 36 and Figure 37). The maximum depth surveyed was approximately 22 m.

3.7.3 Habitat Mapping

Shallow habitat maps for Point Hicks MNP are presented in Figure 38 and Figure 39. The habitat maps are overlayed with the position of underwater video sites classified by substratum and labelled with a code for the dominant biota observed at each site.

3.7.3.1 Underwater Video Observations

The locations of the video sites are shown in Figure 36 and Figure 37, with location information for each site in Table 18 (Appendix 1). The habitat classification assigned to each video site is given in Table 30 (Appendix 2) and overlayed on the habitat maps in Figure 38 and Figure 39.

The majority of the near shore habitat surveyed in the Park was bare sand (T4_10, T17_48). Rocky reef was restricted to a relatively narrow band around Point Hicks itself. The reef was generally very high profile and broken in texture. The reef was mostly continuous close to shore (T7_18), becoming more patchy moving offshore (T7_20). The seabed had a relatively steep gradient with reef descending into deeper water relatively close to shore (Figure 40).

Cunjevoi *Pyura stolonifera* and red algae was observed on the reef close to shore with some *D. potatorum* in places. Moving slightly deeper, *P. comosa* became the dominant biota type over the reef (T8_23). *E. radiata* began to appear at depths around 5 m forming a lower storey cover beneath the *P. comosa* (T6_15). In the deeper regions *E. radiata* was the dominant biota with very little if any *P. comosa* present (T7_20). The *E. radiata* appeared to have a slightly different morphology to that observed in the western parks and sanctuaries, having a relatively long stipe and short fronds. This observation may have just have been as a result of depth, but *E. radiata* observed in the Point Addis MNP, at similar depths, had shorter stipes and larger fronds.

To the south of Point Hicks, at depths of approximately 20 m, areas of high profile reef were observed dominated by sessile invertebrates such as sponges, ascidians, sea whips and Crinoids (T8_25). These areas were not fully explored during this survey, as they were beyond the depth capable of being mapped from aerial imagery. Schools of butterfly perch *Caesioperca lepidoptera* were observed in these deeper areas (T8_25).

Numerous banded morwong *Cheilodactylus spactabilis* were observed around Point Hicks, and particularly over the deeper reef. Blue morwong *Nemadactylus douglasii* were also recorded, a species not observed during the video surveys at any of the other parks and sanctuaries west of Point Hicks.

3.7.3.2 Depth Profile

A depth profile of underwater video Transect 7 (Figure 37) is presented in Figure 40. The location of video sites from this transect are overlayed on the depth profile.

3.7.3.3 Mapping Limitations

The aerial photography (Figure 34) was party affected by sunglare, but this did not impede the mapping. The IKONOS satellite imagery (Figure 33) was captured under very calm sea conditions and this provided a good comparison with the aerial photography to confirm the habitat classification.

Figure 33. Point Hicks MNP 2004 Ikonos satellite image (Space Imaging 12/10/04).

Figure 34. Point Hicks MNP 2004 aerial photography (QASCO 20/01/04). Photography ortho-rectified by PIRVic.

Figure 35. Three-dimensional view of Point Hicks MNP 2004 aerial photography (Figure 34) looking eastward towards Point Hicks.

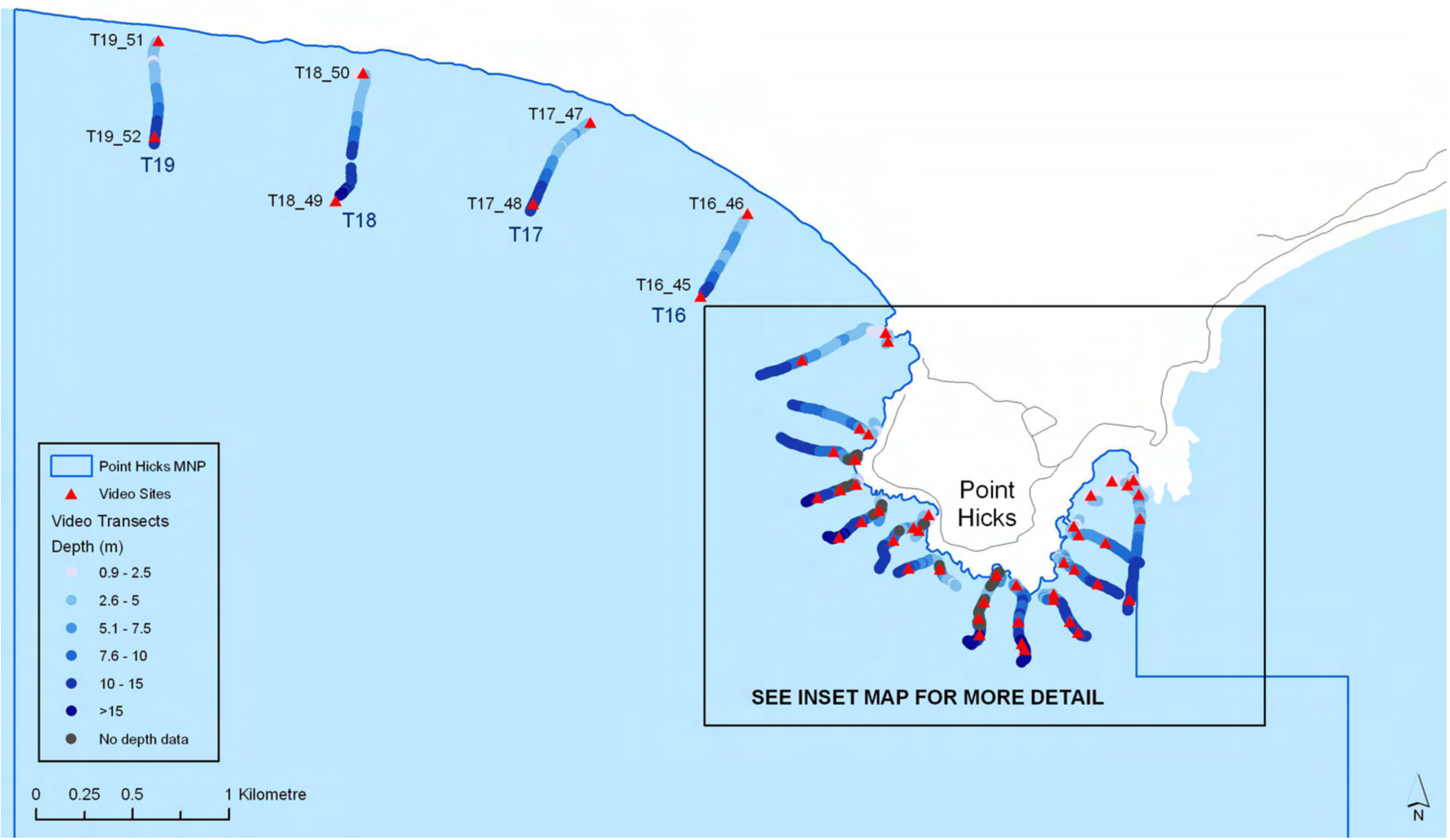


Figure 36. Point Hicks MNP video sites and transects.

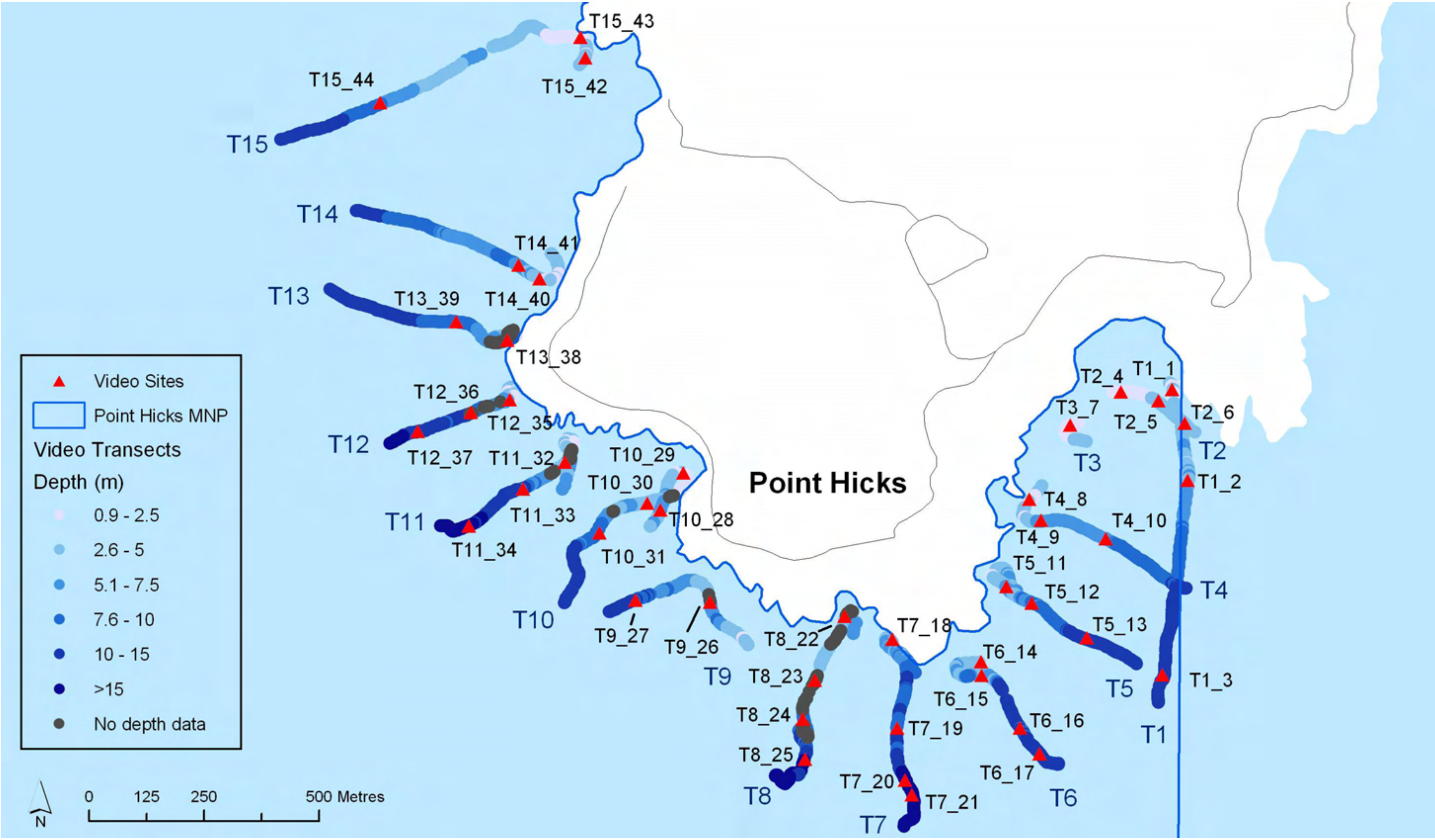


Figure 37. Point Hicks MNP video sites and transects (inset map).

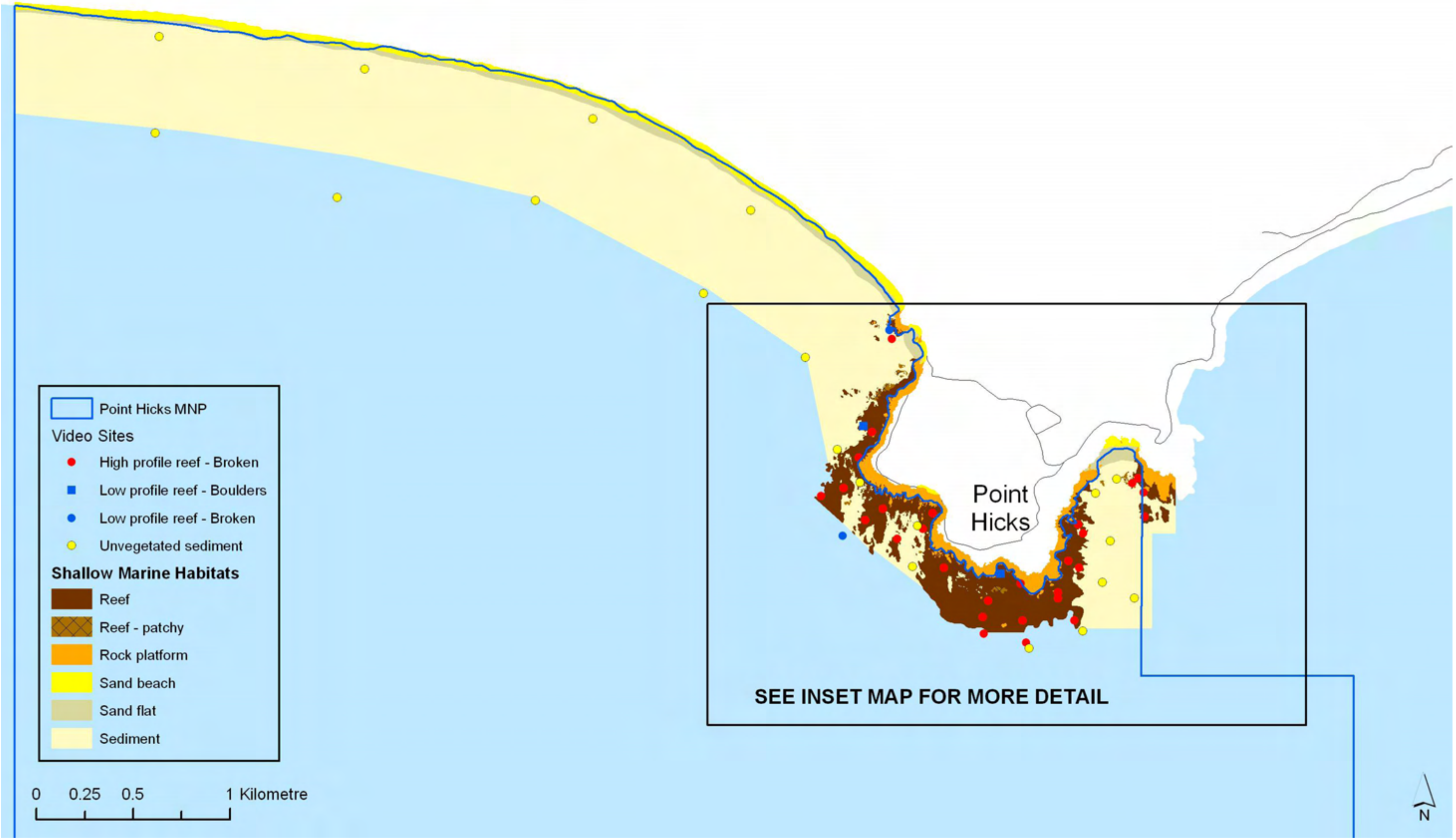


Figure 38. Point Hicks MNP shallow habitats. See Table 7 for biota codes.

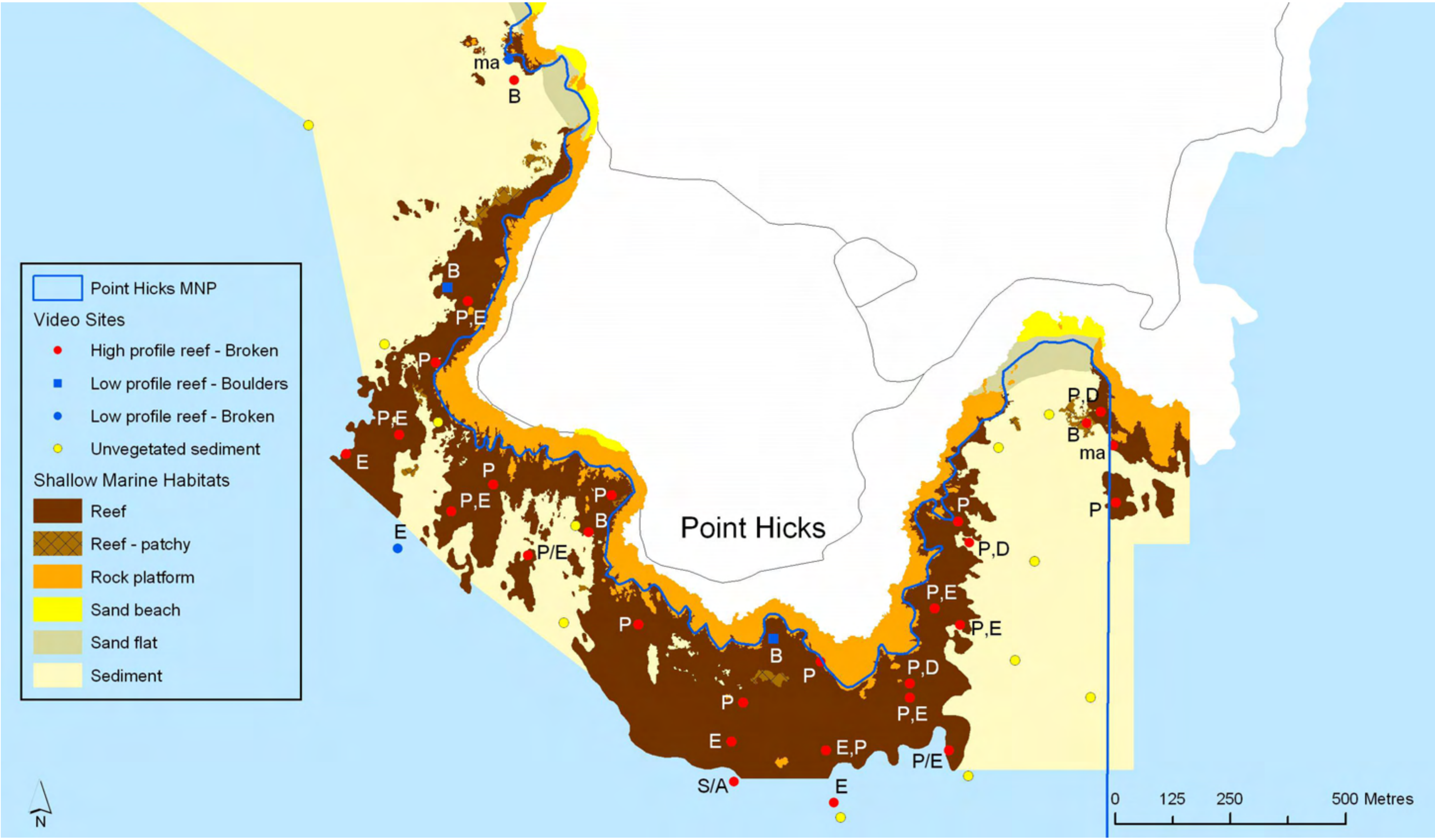


Figure 39. Point Hicks MNP inset map shallow habitats. See Table 7 for biota codes.

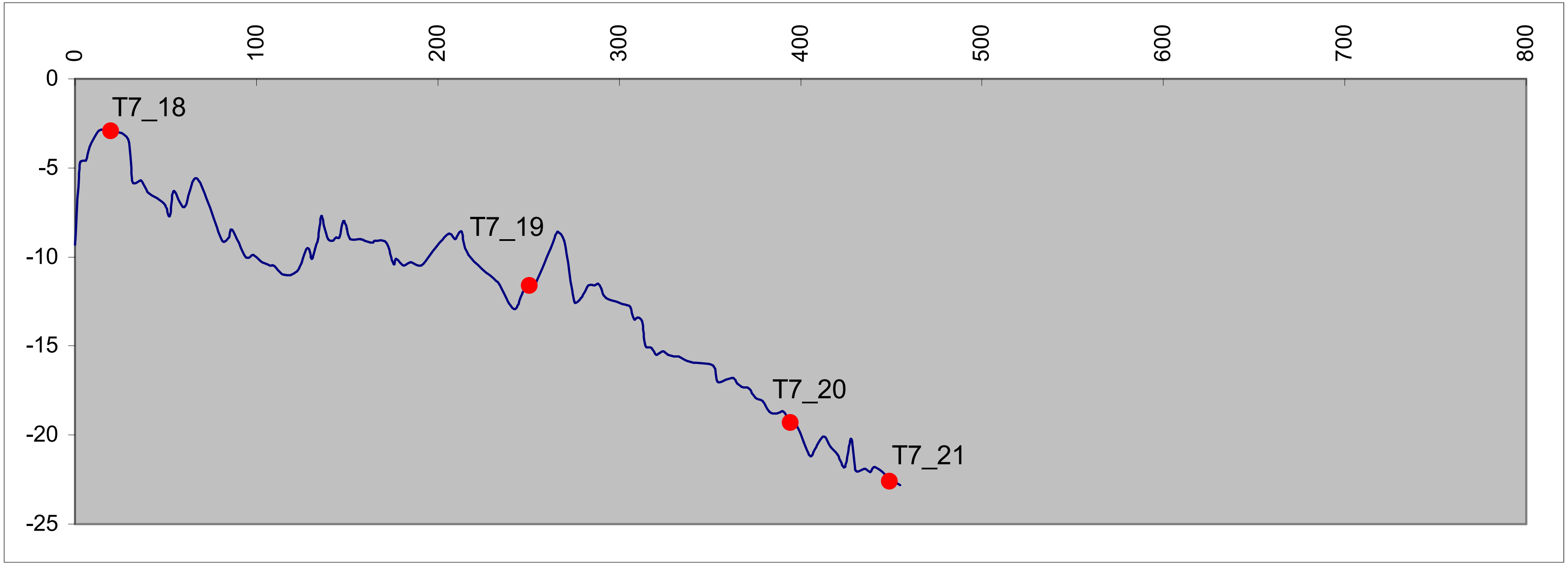


Figure 40. Point Hicks MNP depth profile for Transect 7 (Figure 37). Video sites extracted from along the transect are labelled on the profile. Depth (y axis) and distance (x axis) are in metres. Note the 0 value on the y axis (depth) represents sea level at the time of the survey.

3.8 Cape Howe Marine National Park

3.8.1 Aerial Photography and Satellite Imagery

Cape Howe MNP was mapped from 2004 aerial photography and IKONOS satellite imagery. The IKONOS satellite imagery was captured on 5th September, 2004 (Figure 42). The image was captured at 0957, around low-tide (low-tide approximately 0840 at Mallacoota Inlet, based on tidal difference to Port Welshpool (Rabbit Island), Victorian Tide Tables 2004). The aerial photography was flown on 20th January, 2004 (Figure 43) at 1515 close to low-tide (low-tide approximately 1420 at Point Hicks, based on tidal difference to Port Welshpool (Rabbit Island), Victorian Tide Tables 2004).

The 2004 aerial photography (Figure 43) was orthorectified using the IKONOS imagery (Figure 42) as a base map.

3.8.2 Ground-truthing

3.8.2.1 Intertidal

No intertidal ground-truthing was undertaken at Cape Howe MNP due to the difficulties in gaining access to the shore. The aerial photography (Figure 43) shows a band of rocky shore extending from the east side of Iron Prince to the NSW border, with the rest of the intertidal area being sand beach fronting an extensive dune system.

3.8.2.2 Subtidal

Cape Howe MNP was surveyed with underwater video on the 7th July, 2005. Weather conditions on the day were favourable with light offshore winds. The swell was relatively small, but still prevented the survey vessel getting very close to shore. A total of 13 transects were run covering 6.1 km (Figure 44 and Figure 45). Maximum depths surveyed were approximately 20 m.

3.8.3 Habitat Mapping

Shallow habitat maps for Cape Howe MNP are presented in Figure 46 and Figure 47. The habitat maps are overlayed with the position of underwater video sites classified by substratum and labelled with a code for the dominant biota observed at each site.

3.8.3.1 Underwater Video Observations

The locations of the video sites are shown in Figure 46 and Figure 45, with location information for each site in Table 19 (Appendix 1). The habitat classification assigned to each video site is given in Table 31 (Appendix 2) and overlayed on the habitat maps in Figure 46 and Figure 47.

The reef habitat observed during this survey was restricted to an area running parallel to the shore for a distance of approximately 700 m from the eastern Park boundary (Figure 46). The surveyed reef extended down to depths of approximately 16 m. The rest of the surveyed area was bare sandy substratum with ripples generally present (T3_9, T8_30, T12_38).

The reef was primarily a mixture of high profile broken reef and more solid low profile reef. The inshore reef was generally high profile, broken and patchy and was dominated by a mixture of *P. comosa* and *D. potatorum* (T4_12, T5_18). The reef further offshore tended to be dominated by *P. comosa* (T4_14, T5_20).

Urchin barrens were visible at depths of 11–16 m on areas of both high and low profile reef (T1_2, T2_6, T2_7; Figure 41). Cape Howe MNP was the only site where urchin barrens were observed during this study. While the urchin species could not be identified directly from the video footage, Edmunds *et al.* (2005) reported high abundances of the urchin *Centrostephanus rodgersii* at Cape Howe subtidal monitoring sites, forming extensive areas of urchin barren habitat.

3.8.3.2 Depth Profile

A depth profile of video Transect 3 (Figure 46) is presented in Figure 48. The location of video sites from this transect are overlayed on the depth profile.

3.8.3.3 Mapping Limitations

The seabed immediately in front of the rocky platform on the eastern boundary was partially obscured by sediment stirred up in the water by breaking waves. As a consequence, areas of patchy reef and sediment observed in the underwater video could not be discriminated from the aerial imagery and this area was all classified as reef.

There were no identifiable ground-control points for this area in either the Vicmap or cadastral GIS data which prevented us from improving the positional accuracy of the IKONOS imagery. The aerial photography was orthorectified against the IKONOS imagery and as a result the positional accuracy of this site is lower than other sites in this study where accurate ground control points were available.

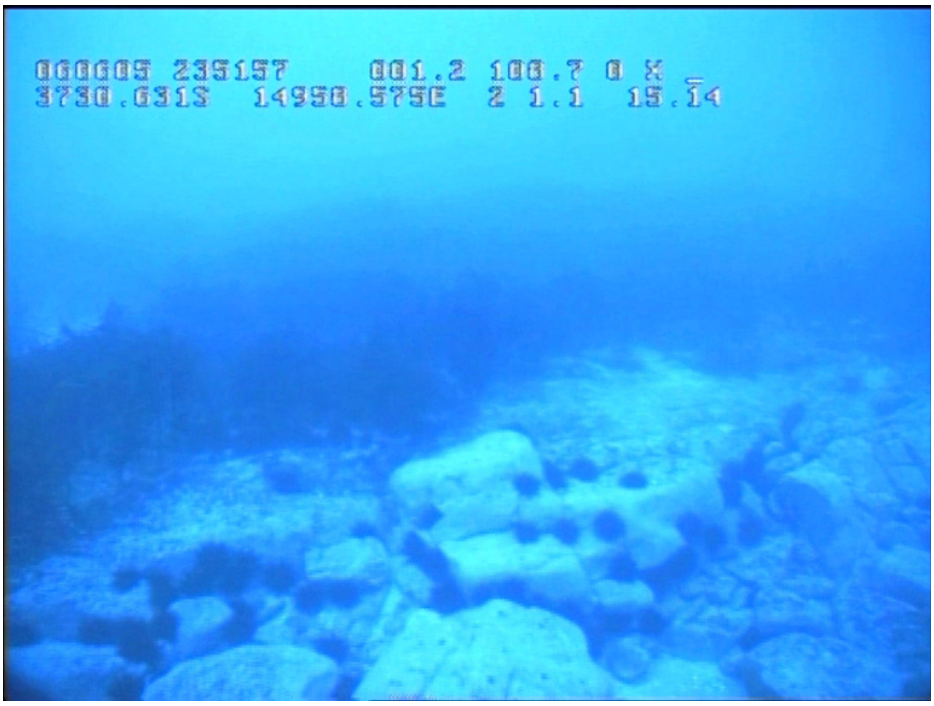


Figure 41. Cape Howe urchin barren (video site T1_2, Figure 44).

Figure 42. Cape Howe MNP 2004 Ikonos satellite image (Space Imaging 5/09/04).

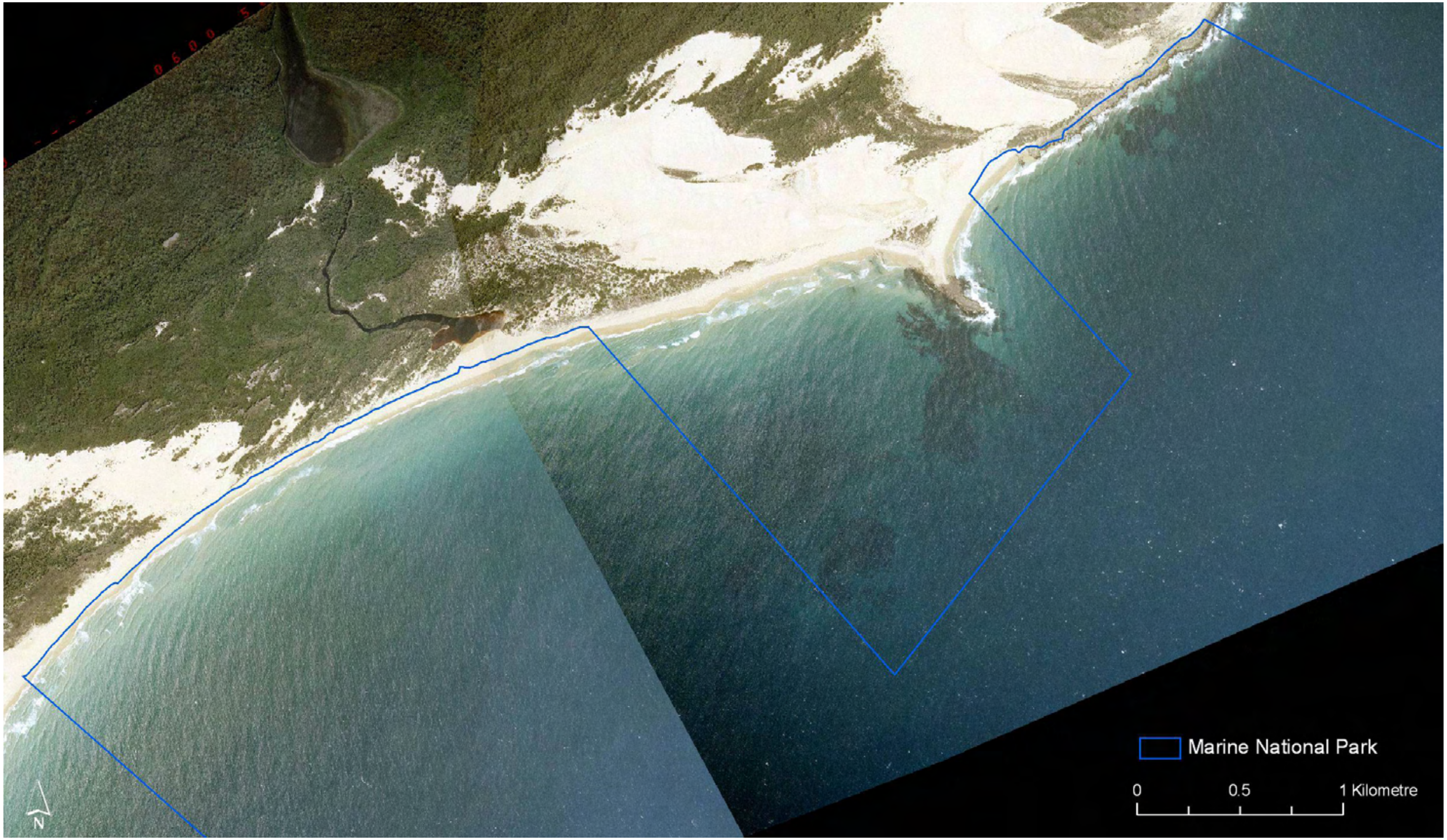


Figure 43. Cape Howe MNP 2004 aerial photography (QASCO 20/01/04). Photography ortho-rectified by PIRVic.

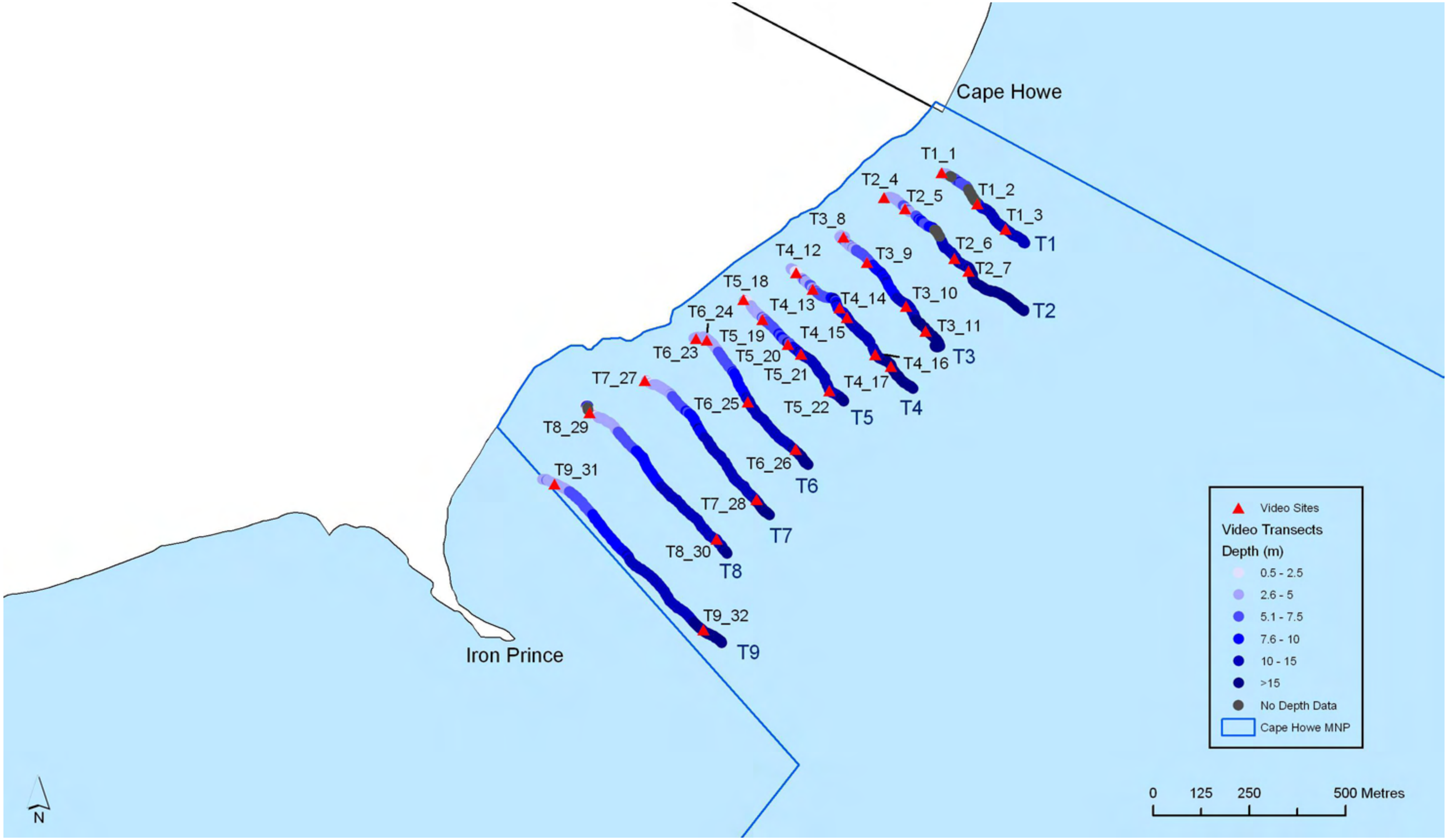


Figure 44. Cape Howe MNP (east) video transects and sites.

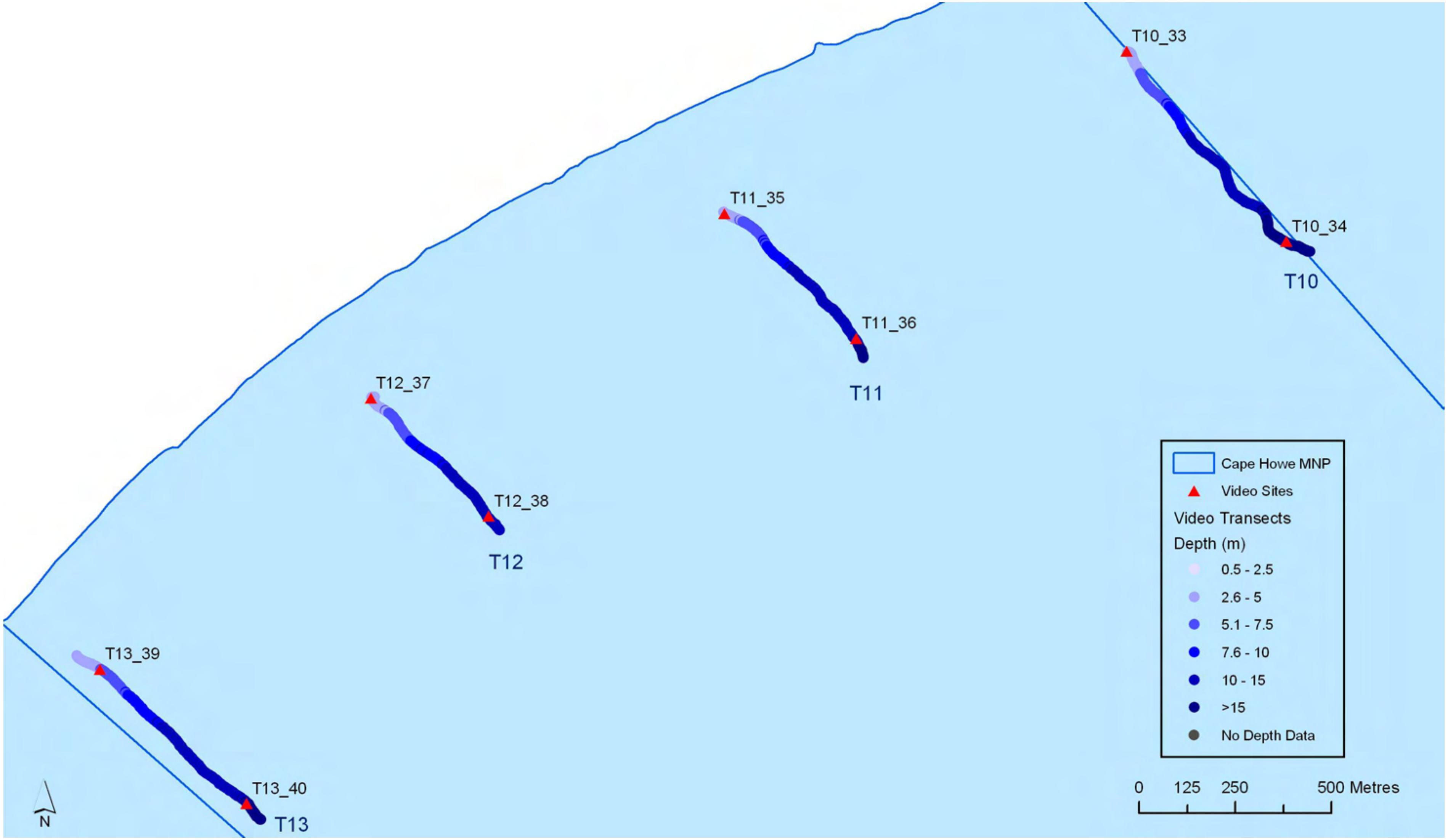


Figure 45. Cape Howe MNP (west) video transects and sites.

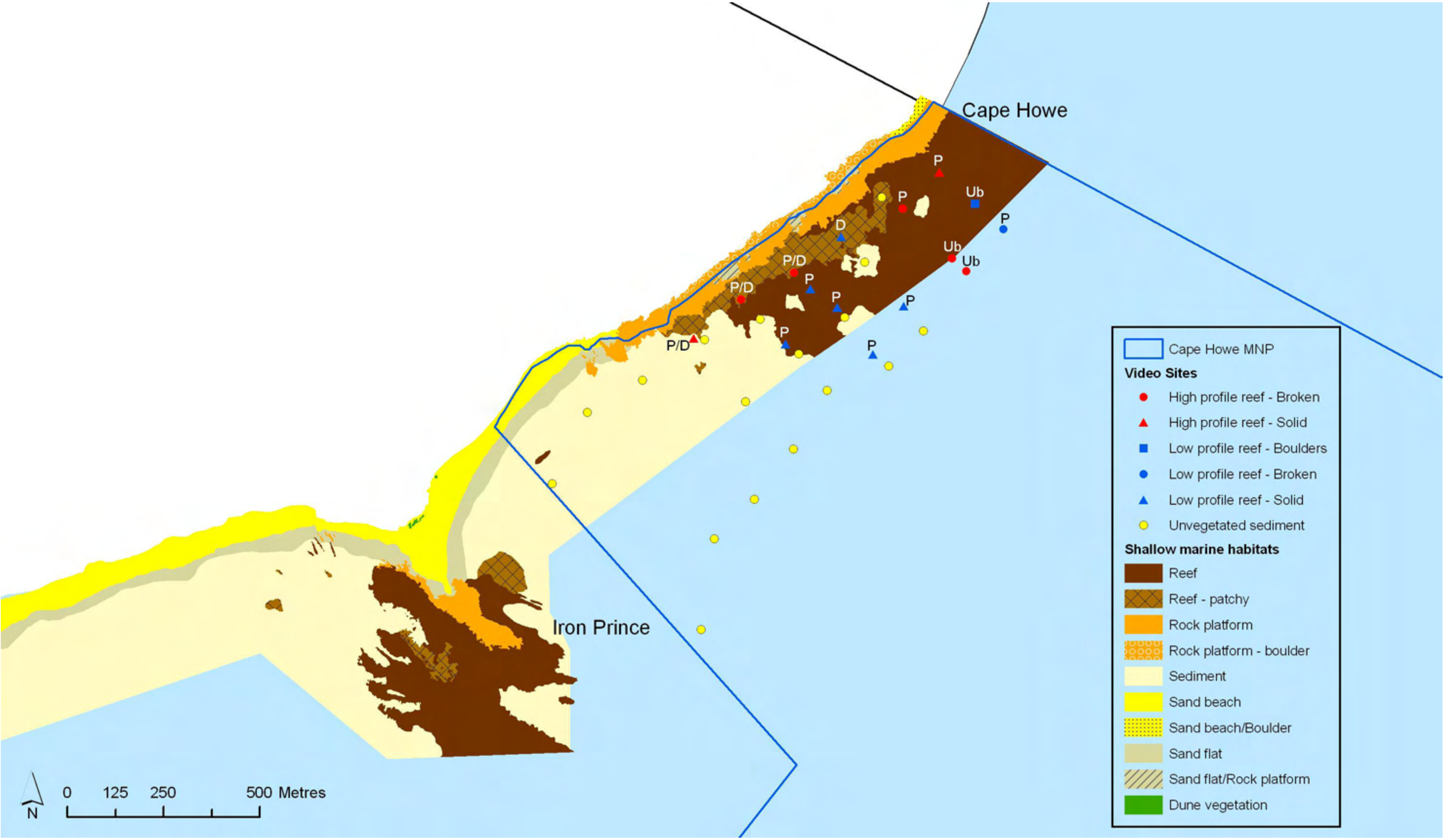


Figure 46. Cape Howe MNP (east) shallow habitats. See Table 7 for biota codes.

Figure 47. Cape Howe MNP (west) shallow habitats. See Table 7 for biota codes.

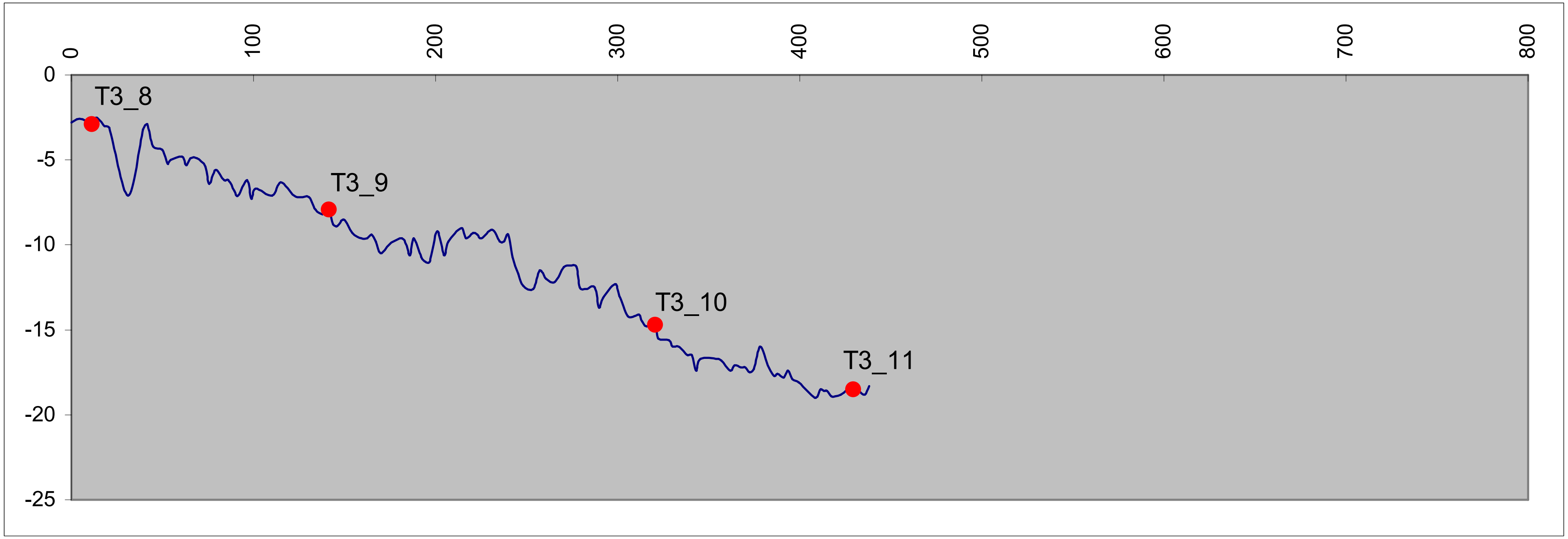


Figure 48. Cape Howe MNP depth profile for Transect 3 (Figure 44). Video sites extracted from along the transect are labelled on the profile. Depth (y axis) and distance (x axis) are in metres. Note the 0 value on the y axis (depth) represents sea level at the time of the survey.

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Appendix 1: Video survey site locations

The tables in Appendix 1 present the locations of video survey sites. Video coordinates represent the position of the video frame corrected for the layback from vessel (Section 2.3.3). The precision of the depth sounder used in these surveys could not accurately measure depths <1 m so depth values of 0 represent depths of approximately 0.5–1 m.

Appendix 2: Video site habitat classification

The tables in Appendix 2 present habitat classifications for the video survey sites. Depth values correspond to values recorded by the vessel sounder at each site. Where the vessel was in depths <1 m or where interference due to the pitch and roll of the vessel prevented the sounder measuring the depth, a value of 0 was recorded.

Appendix 3: Intertidal survey site locations

The tables in Appendix 3 present the locations of intertidal survey sites.

Appendix 4: Intertidal site habitat classification

The tables in Appendix 4 present habitat classifications for the intertidal survey sites.

1 Appendix 1

1.1 VIDEO SURVEY SITE LOCATIONS

The following tables present the locations of video survey sites. Video coordinates represent the position of the video frame corrected for the layback from vessel (Section 2.3.3). The precision of the depth sounder used in these surveys could not accurately measure depths <1 m so depth values of 0 represent depths of approximately 0.5–1 m.

Table 8. Discovery Bay MNP video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
DB_T1_1	T1_1	141.385113	-38.347600	141.385181	-38.347624	2.4	23-Mar-05
DB_T1_2	T1_2	141.384830	-38.347566	141.385124	-38.347606	9.2	23-Mar-05
DB_T1_3a	T1_3a	141.384130	-38.347666	141.384323	-38.347636	6.2	23-Mar-05
DB_T1_3b	T1_3b	141.383730	-38.347633	141.383968	-38.347637	7.2	23-Mar-05
DB_T1_4	T1_4	141.382446	-38.347716	141.382847	-38.347713	12.2	23-Mar-05
DB_T2_5	T2_5	141.382363	-38.346083	141.381946	-38.346085	12.9	23-Mar-05
DB_T2_6	T2_6	141.385763	-38.346116	141.385482	-38.346217	9.4	23-Mar-05
DB_T2_7	T2_7	141.388146	-38.346066	141.388068	-38.346037	2.7	23-Mar-05
DB_T2_8	T2_8	141.389380	-38.346066	141.389270	-38.346106	3.7	23-Mar-05
DB_T3_9	T3_9	141.389280	-38.345816	141.389383	-38.345844	3.5	23-Mar-05
DB_T3_10	T3_10	141.388663	-38.344216	141.388516	-38.344242	4.8	23-Mar-05
DB_T3_11	T3_11	141.387946	-38.344150	141.388207	-38.344189	8.2	23-Mar-05
DB_T3_12	T3_12	141.387030	-38.344166	141.387302	-38.344111	8.6	23-Mar-05
DB_T3_13	T3_13	141.382863	-38.344183	141.383263	-38.344269	12.8	23-Mar-05
DB_T4_14	T4_14	141.384146	-38.342433	141.383746	-38.342492	12.4	23-Mar-05
DB_T4_15	T4_15	141.388146	-38.342433	141.387843	-38.342478	9.4	23-Mar-05
DB_T4_16	T4_16	141.392080	-38.342500	141.391882	-38.342501	6.2	23-Mar-05
DB_T4_17	T4_17	141.393730	-38.341700	141.393652	-38.341783	4.0	23-Mar-05
DB_T5_18	T5_18	141.395330	-38.340666	141.395329	-38.340750	3.3	23-Mar-05
DB_T5_19	T5_19	141.394680	-38.340166	141.394754	-38.340238	3.6	23-Mar-05
DB_T5_20	T5_20	141.394096	-38.340833	141.394231	-38.340835	4.0	23-Mar-05
DB_T5_21	T5_21	141.388413	-38.340800	141.388715	-38.340799	9.4	23-Mar-05
DB_T6_22	T6_22	141.384063	-38.340716	141.384401	-38.340885	12.5	23-Mar-05
DB_T7_23	T7_23	141.391596	-38.338900	141.391383	-38.338961	7.1	23-Mar-05
DB_T7_24	T7_24	141.396113	-38.338600	141.396027	-38.338603	2.5	23-Mar-05
DB_T8_25	T8_25	141.395130	-38.337000	141.395182	-38.336920	3.4	23-Mar-05
DB_T8_26	T8_26	141.387730	-38.337183	141.388032	-38.337187	9.5	23-Mar-05
DB_T9_27	T9_27	141.394513	-38.335250	141.394509	-38.335165	3.3	23-Mar-05
DB_T9_28	T9_28	141.393663	-38.334700	141.393717	-38.334798	4.2	23-Mar-05
DB_T9_29	T9_29	141.390646	-38.335400	141.390849	-38.335403	6.1	23-Mar-05
DB_T10_30	T10_30	141.392813	-38.333516	141.392944	-38.333458	4.6	23-Mar-05
DB_T10_31	T10_31	141.387930	-38.333633	141.388219	-38.333636	8.9	23-Mar-05

DB_T11_32	T11_32	141.388596	-38.346633	141.388677	-38.346630	2.4	23-Mar-05
DB_T11_33	T11_33	141.387230	-38.346066	141.387313	-38.346157	4.4	23-Mar-05
DB_T11_34	T11_34	141.386246	-38.344966	141.386484	-38.345123	9.5	23-Mar-05
DB_T12_35	T12_35	141.385946	-38.347200	141.386037	-38.347288	4.3	23-Mar-05
DB_T12_36	T12_36	141.384896	-38.346283	141.385140	-38.346471	10.6	23-Mar-05
DB_T12_37	T12_37	141.383880	-38.345333	141.384117	-38.345564	11.6	23-Mar-05
DB_T13_38	T13_38	141.384396	-38.348050	141.384531	-38.348086	4.4	23-Mar-05
DB_T13_39	T13_39	141.383696	-38.347700	141.383831	-38.347827	6.3	23-Mar-05
DB_T14_40	T14_40	141.382013	-38.342650	141.381849	-38.342976	13.9	23-Mar-05
DB_T14_41	T14_41	141.385563	-38.336966	141.385401	-38.337241	11.8	23-Mar-05
DB_T15_42	T15_42	141.388180	-38.345216	141.388304	-38.345343	6.1	23-Mar-05
DB_T15_43	T15_43	141.387330	-38.344700	141.387535	-38.344795	7.3	23-Mar-05
DB_T15_44	T15_44	141.385830	-38.343600	141.386133	-38.343701	10.1	23-Mar-05

Table 9. Marengo Reefs MS video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
MO_T1_1	T1_1	143.666574	-38.776094	143.666629	-38.776038	2.8	12-Nov-04
MO_T1_2a	T1_2a	143.667324	-38.776511	143.667326	-38.776509	0.0	12-Nov-04
MO_T1_2b	T1_2b	143.667458	-38.776694	143.667459	-38.776695	0.0	12-Nov-04
MO_T1_3a	T1_3a	143.668574	-38.777594	143.668575	-38.777598	0.0	12-Nov-04
MO_T1_3b	T1_3b	143.668974	-38.777778	143.668823	-38.777772	4.5	12-Nov-04
MO_T1_4	T1_4	143.668791	-38.777344	143.668796	-38.777340	0.0	12-Nov-04
MO_T1_5	T1_5	143.668408	-38.776728	143.668404	-38.776727	0.0	12-Nov-04
MO_T1_6	T1_6	143.668908	-38.776394	143.668751	-38.776440	5.1	12-Nov-04
MO_T1_7a	T1_7a	143.669908	-38.777194	143.669891	-38.777081	4.4	12-Nov-04
MO_T1_7b	T1_7b	143.669774	-38.777311	143.669829	-38.777272	2.4	12-Nov-04
MO_T2_8	T2_8	143.669391	-38.776894	143.669507	-38.776666	9.6	12-Nov-04
MO_T2_9	T2_9	143.669324	-38.777178	143.669347	-38.777012	6.5	12-Nov-04
MO_T2_10	T2_10	143.669358	-38.777761	143.669360	-38.777670	3.7	12-Nov-04
MO_T2_11	T2_11	143.669408	-38.778061	143.669381	-38.777912	6.0	12-Nov-04
MO_T2_12a	T2_12a	143.669858	-38.778044	143.669802	-38.778092	2.5	12-Nov-04
MO_T2_12b	T2_12b	143.670158	-38.778011	143.670156	-38.778012	0.0	12-Nov-04
MO_T2_13	T2_13	143.671258	-38.779378	143.671254	-38.779374	0.0	12-Nov-04
MO_T2_14	T2_14	143.670991	-38.779994	143.671077	-38.779865	5.6	12-Nov-04
MO_T3_15	T3_15	143.673208	-38.780111	143.673147	-38.780142	2.2	12-Nov-04
MO_T3_16	T3_16	143.675774	-38.780444	143.675537	-38.780321	8.6	12-Nov-04
MO_T4_17a	T4_17a	143.667641	-38.775961	143.667603	-38.775926	1.6	12-Nov-04
MO_T4_17b	T4_17b	143.667791	-38.776061	143.667757	-38.776022	1.9	12-Nov-04
MO_T4_18	T4_18	143.668474	-38.776561	143.668407	-38.776493	3.6	12-Nov-04
MO_T5_19	T5_19	143.670391	-38.777294	143.670312	-38.777251	3.0	12-Nov-04
MO_T5_20	T5_20	143.671991	-38.777611	143.671900	-38.777549	3.7	12-Nov-04
MO_T5_21	T5_21	143.672641	-38.778044	143.672643	-38.778045	0.0	12-Nov-04
MO_T5_22	T5_22	143.673924	-38.778761	143.673923	-38.778727	1.3	12-Nov-04
MO_T5_23	T5_23	143.675058	-38.779194	143.675057	-38.779197	0.0	12-Nov-04

Table 10. Eagle Rock MS video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
ER_T1_1	T1_1	144.108144	-38.467022	144.108118	-38.466984	1.8	01-Nov-04
ER_T1_2	T1_2	144.108277	-38.467205	144.108250	-38.467140	2.7	01-Nov-04
ER_T1_3	T1_3	144.108860	-38.467538	144.108774	-38.467496	3.3	01-Nov-04
ER_T1_4	T1_4	144.109560	-38.467738	144.109347	-38.467780	6.6	01-Nov-04
ER_T1_5	T1_5	144.109994	-38.467655	144.109742	-38.467655	7.9	01-Nov-04
ER_T2_6	T2_6	144.107478	-38.468322	144.107447	-38.468292	1.6	01-Nov-04
ER_T2_7	T2_7	144.107945	-38.468505	144.107875	-38.468473	2.5	01-Nov-04
ER_T2_8	T2_8	144.108611	-38.468755	144.108497	-38.468696	4.3	01-Nov-04
ER_T2_9	T2_9	144.108895	-38.468872	144.108789	-38.468838	3.6	01-Nov-04
ER_T2_10	T2_10	144.109360	-38.468888	144.109165	-38.468893	5.9	01-Nov-04
ER_T3_11	T3_11	144.106578	-38.468888	144.106530	-38.468864	1.9	01-Nov-04
ER_T3_12	T3_12	144.106961	-38.469272	144.106906	-38.469215	3.0	01-Nov-04
ER_T3_13	T3_13	144.107161	-38.469372	144.107051	-38.469318	3.8	01-Nov-04
ER_T3_14	T3_14	144.108461	-38.469472	144.108296	-38.469412	5.7	01-Nov-04
ER_T3_15	T3_15	144.108978	-38.469422	144.108798	-38.469469	5.7	01-Nov-04
ER_T3_16	T3_16	144.109410	-38.469222	144.109174	-38.469253	7.4	01-Nov-04
ER_T4_17	T4_17	144.105695	-38.469055	144.105653	-38.469022	1.8	01-Nov-04
ER_T4_18	T4_18	144.106095	-38.469405	144.106096	-38.469402	0.0	01-Nov-04
ER_T4_19	T4_19	144.106311	-38.469655	144.106238	-38.469577	3.9	01-Nov-04
ER_T4_20	T4_20	144.106528	-38.470173	144.106524	-38.470170	0.0	01-Nov-04
ER_T4_21	T4_21	144.106778	-38.470706	144.106682	-38.470525	7.8	01-Nov-04
ER_T5_22	T5_22	144.105078	-38.469639	144.105081	-38.469585	2.0	01-Nov-04
ER_T5_23	T5_23	144.105078	-38.470023	144.105078	-38.469945	2.9	01-Nov-04
ER_T5_24	T5_24	144.105161	-38.470506	144.105129	-38.470388	4.8	01-Nov-04
ER_T5_25	T5_25	144.105195	-38.470689	144.105168	-38.470551	5.5	01-Nov-04
ER_T5_26	T5_26	144.105345	-38.471139	144.105339	-38.471141	0.0	01-Nov-04
ER_T6_27	T6_27	144.104295	-38.469606	144.104291	-38.469565	1.6	01-Nov-04
ER_T6_28	T6_28	144.104128	-38.470189	144.104177	-38.470103	3.7	01-Nov-04
ER_T6_29	T6_29	144.103961	-38.470373	144.104044	-38.470298	3.9	01-Nov-04
ER_T6_30	T6_30	144.103545	-38.470873	144.103658	-38.470775	5.1	01-Nov-04
ER_T6_31	T6_31	144.103378	-38.471106	144.103433	-38.470958	6.2	01-Nov-04
ER_T6_32	T6_32	144.103111	-38.471356	144.103261	-38.471224	7.1	01-Nov-04

ER_T7_33	T7_33	144.102578	-38.469923	144.102628	-38.469875	2.4	01-Nov-04
ER_T7_34	T7_34	144.102395	-38.470089	144.102461	-38.470033	3.0	01-Nov-04
ER_T7_35	T7_35	144.102195	-38.471206	144.102110	-38.471079	5.8	01-Nov-04
ER_T8_36	T8_36	144.102011	-38.469906	144.101986	-38.469877	1.4	01-Nov-04
ER_T8_37	T8_37	144.102061	-38.470273	144.102065	-38.470195	3.2	01-Nov-04
ER_T9_38a	T9_38a	144.107927	-38.466888	144.107891	-38.466924	1.7	01-Nov-04
ER_T9_38b	T9_38b	144.108127	-38.466872	144.108076	-38.466884	1.6	01-Nov-04
ER_T9_39	T9_39	144.108460	-38.466972	144.108362	-38.466909	3.9	01-Nov-04
ER_T9_40	T9_40	144.108727	-38.467122	144.108731	-38.467125	0.0	01-Nov-04
ER_T9_41	T9_41	144.109210	-38.467088	144.109054	-38.467088	5.0	01-Nov-04
ER_T9_42	T9_42	144.109927	-38.467088	144.109761	-38.467160	5.8	01-Nov-04

Table 11 Point Addis MNP video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
PA_T1_1	T1_1	144.209908	-38.404954	144.209912	-38.404917	1.5	07-Jun-04
PA_T1_2	T1_2	144.209775	-38.406371	144.209872	-38.406268	5.0	07-Jun-04
PA_T1_3	T1_3	144.209875	-38.406787	144.209800	-38.406635	6.5	07-Jun-04
PA_T1_4	T1_4	144.209875	-38.407637	144.209781	-38.407437	8.5	07-Jun-04
PA_T1_5	T1_5	144.209725	-38.408187	144.209725	-38.407994	7.5	07-Jun-04
PA_T1_6a	T1_6a	144.210425	-38.408937	144.210431	-38.408705	9.0	07-Jun-04
PA_T1_6b	T1_6b	144.210242	-38.409154	144.210420	-38.408975	9.0	07-Jun-04
PA_T1_7	T1_7	144.210525	-38.410837	144.210656	-38.410593	10.0	07-Jun-04
PA_T1_8	T1_8	144.210692	-38.411987	144.210693	-38.411720	10.0	07-Jun-04
PA_T1_9	T1_9	144.210459	-38.414404	144.210462	-38.414138	11.0	07-Jun-04
PA_T1_10	T1_10	144.210376	-38.415704	144.210378	-38.415443	10.0	07-Jun-04
PA_T1_11	T1_11	144.210043	-38.418237	144.210121	-38.417950	11.5	07-Jun-04
PA_T2_12	T2_12	144.212375	-38.404237	144.212322	-38.404191	2.5	07-Jun-04
PA_T2_13	T2_13	144.212408	-38.405421	144.212487	-38.405267	6.5	07-Jun-04
PA_T2_14	T2_14	144.212692	-38.407104	144.212690	-38.406839	10.5	07-Jun-04
PA_T2_15	T2_15	144.212608	-38.407704	144.212608	-38.407468	10.0	07-Jun-04
PA_T2_16	T2_16	144.212708	-38.408337	144.212711	-38.408056	11.0	07-Jun-04
PA_T2_17	T2_17	144.212558	-38.409937	144.212627	-38.409649	11.5	07-Jun-04
PA_T2_18	T2_18	144.212492	-38.411687	144.212491	-38.411421	10.5	07-Jun-04
PA_T2_19	T2_19	144.212458	-38.413571	144.212497	-38.413340	9.0	07-Jun-04
PA_T2_20	T2_20	144.212508	-38.413987	144.212508	-38.414241	10.0	07-Jun-04
PA_T2_21	T2_21	144.213025	-38.413971	144.213035	-38.413938	1.0	07-Jun-04
PA_T2_22	T2_22	144.212809	-38.415021	144.212807	-38.414798	9.0	07-Jun-04
PA_T2_23	T2_23	144.212893	-38.417721	144.212778	-38.417347	15.0	07-Jun-04
PA_T3_24	T3_24	144.215676	-38.416937	144.215418	-38.417194	13.0	07-Jun-04
PA_T3_25	T3_25	144.215692	-38.415121	144.215659	-38.415379	10.0	07-Jun-04
PA_T3_26	T3_26	144.215392	-38.413587	144.215276	-38.413730	6.5	07-Jun-04
PA_T3_27	T3_27	144.215692	-38.411254	144.215611	-38.411558	12.0	07-Jun-04
PA_T3_28	T3_28	144.215325	-38.409004	144.215321	-38.409281	10.5	07-Jun-04
PA_T3_29	T3_29	144.215658	-38.407154	144.215655	-38.407451	12.0	07-Jun-04
PA_T3_30	T3_30	144.215658	-38.405871	144.215659	-38.406144	10.5	07-Jun-04
PA_T3_31	T3_31	144.215708	-38.405071	144.215714	-38.405317	9.5	07-Jun-04

PA_T3_32	T3_32	144.215592	-38.403637	144.215590	-38.403773	5.5	07-Jun-04
PA_T3_33	T3_33	144.215758	-38.402321	144.215781	-38.402381	2.5	07-Jun-04
PA_T4_34	T4_34	144.221908	-38.417254	144.221909	-38.417258	15.0	08-Jun-04
PA_T4_35	T4_35	144.221858	-38.415521	144.221872	-38.415815	11.5	08-Jun-04
PA_T4_36	T4_36	144.221842	-38.413137	144.221841	-38.413337	8.0	08-Jun-04
PA_T4_37	T4_37	144.221692	-38.410521	144.221708	-38.410847	13.0	08-Jun-04
PA_T4_38	T4_38	144.221775	-38.410037	144.221715	-38.410352	12.5	08-Jun-04
PA_T4_39	T4_39	144.221808	-38.408637	144.221802	-38.408975	13.5	08-Jun-04
PA_T4_40	T4_40	144.221442	-38.407287	144.221544	-38.407645	14.5	08-Jun-04
PA_T4_41a	T4_41a	144.222175	-38.405087	144.222103	-38.405306	9.0	08-Jun-04
PA_T4_41b	T4_41b	144.222025	-38.404804	144.222138	-38.405010	9.0	08-Jun-04
PA_T4_42	T4_42	144.222042	-38.403737	144.222042	-38.403926	7.5	08-Jun-04
PA_T4_43	T4_43	144.221925	-38.402337	144.221927	-38.402428	3.5	08-Jun-04
PA_T5_44	T5_44	144.227275	-38.400187	144.227270	-38.400140	2.0	08-Jun-04
PA_T5_45	T5_45	144.227125	-38.401504	144.227167	-38.401345	6.5	08-Jun-04
PA_T5_46	T5_46	144.227225	-38.402287	144.227230	-38.402076	8.0	08-Jun-04
PA_T5_47	T5_47	144.227242	-38.403104	144.227303	-38.402862	10.0	08-Jun-04
PA_T5_48	T5_48	144.227242	-38.403404	144.227245	-38.403194	12.5	08-Jun-04
PA_T5_49	T5_49	144.227225	-38.404621	144.227258	-38.404356	11.5	08-Jun-04
PA_T5_50	T5_50	144.227192	-38.407221	144.227057	-38.406901	13.0	08-Jun-04
PA_T5_51	T5_51	144.227175	-38.409987	144.227176	-38.409778	8.0	08-Jun-04
PA_T5_52	T5_52	144.227108	-38.410854	144.227166	-38.410661	7.5	08-Jun-04
PA_T5_53	T5_53	144.227408	-38.413637	144.227258	-38.413330	13.0	08-Jun-04
PA_T6_54	T6_54	144.234892	-38.411671	144.234789	-38.411949	11.5	08-Jun-04
PA_T6_55	T6_55	144.234775	-38.409004	144.234859	-38.409194	8.0	08-Jun-04
PA_T6_56	T6_56	144.234758	-38.406071	144.234851	-38.406419	14.0	08-Jun-04
PA_T6_57	T6_57	144.234925	-38.401854	144.234931	-38.402222	14.0	08-Jun-04
PA_T6_58	T6_58	144.234792	-38.400787	144.234588	-38.400998	10.5	08-Jun-04
PA_T6_59	T6_59	144.234808	-38.400454	144.234898	-38.400663	9.0	08-Jun-04
PA_T6_60	T6_60	144.237092	-38.398437	144.236987	-38.398432	3.5	08-Jun-04
PA_T6_61	T6_61	144.238842	-38.398154	144.238749	-38.398150	3.0	08-Jun-04
PA_T7_62	T7_62	144.249825	-38.397270	144.249762	-38.397274	2.5	08-Jun-04
PA_T7_63	T7_63	144.250075	-38.397303	144.250013	-38.397306	1.5	08-Jun-04
PA_T7_64	T7_64	144.251125	-38.397286	144.251090	-38.397287	1.0	08-Jun-04

PA_T7_65	T7_65	144.251792	-38.397586	144.251744	-38.397545	2.5	08-Jun-04
PA_T7_66	T7_66	144.252308	-38.398070	144.252231	-38.397989	4.0	08-Jun-04
PA_T7_67	T7_67	144.254575	-38.399020	144.254304	-38.398876	10.0	08-Jun-04
PA_T7_68	T7_68	144.255725	-38.399220	144.255336	-38.399152	12.5	08-Jun-04
PA_T8_69	T8_69	144.257192	-38.398953	144.257193	-38.399376	16.5	08-Jun-04
PA_T8_70	T8_70	144.256508	-38.397286	144.256506	-38.397558	10.5	08-Jun-04
PA_T8_71a	T8_71a	144.254558	-38.396053	144.254637	-38.396135	4.5	08-Jun-04
PA_T8_71b	T8_71b	144.254408	-38.396003	144.254525	-38.396061	4.5	08-Jun-04
PA_T8_72	T8_72	144.254658	-38.395420	144.254615	-38.395504	3.5	08-Jun-04
PA_T8_73	T8_73	144.254592	-38.395170	144.254590	-38.395242	3.0	08-Jun-04
PA_T8_74	T8_74	144.254942	-38.394786	144.254846	-38.394852	4.0	08-Jun-04
PA_T8_75	T8_75	144.255258	-38.394453	144.255145	-38.394508	4.0	08-Jun-04
PA_T8_76	T8_76	144.255308	-38.393836	144.255445	-38.393839	4.0	08-Jun-04
PA_T8_77a	T8_77a	144.255492	-38.392786	144.255496	-38.392786	1.0	08-Jun-04
PA_T8_77b	T8_77b	144.255275	-38.392753	144.255280	-38.392754	1.0	08-Jun-04
PA_T8_78	T8_78	144.255208	-38.392070	144.255167	-38.392111	2.0	08-Jun-04
PA_T8_79	T8_79	144.256858	-38.391986	144.256706	-38.391985	5.0	08-Jun-04
PA_T8_80	T8_80	144.259075	-38.392320	144.258801	-38.392278	8.5	08-Jun-04
PA_T9_81	T9_81	144.260224	-38.390470	144.260100	-38.390632	7.0	08-Jun-04
PA_T9_82	T9_82	144.260774	-38.389986	144.260557	-38.390030	7.0	08-Jun-04
PA_T9_83	T9_83	144.260407	-38.389403	144.260409	-38.389405	5.5	08-Jun-04
PA_T9_84	T9_84	144.260574	-38.388986	144.260364	-38.389089	7.5	08-Jun-04
PA_T10_85	T10_85	144.258707	-38.382853	144.258686	-38.382904	2.0	08-Jun-04
PA_T10_86	T10_86	144.262841	-38.381403	144.262794	-38.381415	1.6	08-Jun-04
PA_T11_87	T11_87	144.266191	-38.382086	144.266125	-38.382024	2.5	08-Jun-04
PA_T11_88	T11_88	144.266557	-38.382836	144.266585	-38.382864	2.0	08-Jun-04
PA_T11_89	T11_89	144.266407	-38.383770	144.266359	-38.383715	3.5	08-Jun-04
PA_T11_90	T11_90	144.266824	-38.384770	144.266828	-38.384636	5.5	08-Jun-04
PA_T11_91a	T11_91a	144.267341	-38.386203	144.267453	-38.385957	10.0	08-Jun-04
PA_T11_91b	T11_91b	144.267391	-38.386503	144.267386	-38.386225	11.0	08-Jun-04
PA_T11_92	T11_92	144.267757	-38.387170	144.267613	-38.386897	11.5	08-Jun-04
PA_T12_93	T12_93	144.271857	-38.375986	144.271825	-38.375940	2.0	08-Jun-04
PA_T12_94	T12_94	144.272357	-38.376820	144.272300	-38.376699	5.0	08-Jun-04
PA_T12_95	T12_95	144.273407	-38.378153	144.273338	-38.378012	5.5	08-Jun-04

PA_T12_96	T12_96	144.274774	-38.380353	144.274644	-38.380114	10.0	08-Jun-04
PA_T12_97	T12_97	144.275891	-38.382320	144.275498	-38.382053	15.5	08-Jun-04
PA_T13_98	T13_98	144.253792	-38.391336	144.253788	-38.391340	0.0	01-Nov-04
PA_T13_99	T13_99	144.253992	-38.390620	144.253987	-38.390624	0.0	01-Nov-04
PA_T15_104	T15_104	144.283006	-38.371370	144.282939	-38.371333	2.6	01-Nov-04
PA_T13_100	T13_100	144.254358	-38.388753	144.254352	-38.388831	3.2	01-Nov-04
PA_T14_101a	T14_101a	144.278291	-38.374153	144.278187	-38.374151	3.3	01-Nov-04
PA_T14_101b	T14_101b	144.278457	-38.374270	144.278391	-38.374201	3.3	01-Nov-04
PA_T14_102	T14_102	144.279124	-38.374636	144.279029	-38.374585	3.5	01-Nov-04
PA_T14_103	T14_103	144.279541	-38.374736	144.279437	-38.374685	3.9	01-Nov-04
PA_T15_105	T15_105	144.283306	-38.371786	144.283258	-38.371683	4.3	01-Nov-04
PA_T15_106	T15_106	144.283273	-38.372986	144.283272	-38.372836	5.8	01-Nov-04
PA_T15_107	T15_107	144.283273	-38.374136	144.283232	-38.373899	9.3	01-Nov-04
PA_T15_108	T15_108	144.283241	-38.374836	144.283242	-38.374566	10.7	01-Nov-04

Table 12 Point Danger MS video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
PD_T1_1	T1_1	144.328100	-38.340750	144.329418	-38.339254	0.0	09-Jul-04
PD_T1_2	T1_2	144.328250	-38.341350	144.329568	-38.339852	0.0	09-Jul-04
PD_T1_3a	T1_3a	144.328450	-38.341750	144.329770	-38.340253	0.0	09-Jul-04
PD_T1_3b	T1_3b	144.328467	-38.341833	144.329790	-38.340334	0.0	09-Jul-04
PD_T1_4a	T1_4a	144.328500	-38.341883	144.329823	-38.340389	0.0	09-Jul-04
PD_T1_4b	T1_4b	144.328617	-38.342017	144.329944	-38.340518	0.0	09-Jul-04
PD_T1_5a	T1_5a	144.328750	-38.342100	144.330078	-38.340602	0.0	09-Jul-04
PD_T1_5b	T1_5b	144.328900	-38.342067	144.330228	-38.340570	0.0	09-Jul-04
PD_T1_6a	T1_6a	144.329733	-38.342317	144.331054	-38.340823	0.0	09-Jul-04
PD_T1_6b	T1_6b	144.329983	-38.342267	144.331307	-38.340765	0.0	09-Jul-04
PD_T1_7	T1_7	144.330867	-38.343133	144.332147	-38.341586	2.3	09-Jul-04
PD_T1_8	T1_8	144.330383	-38.342467	144.331733	-38.341000	1.5	09-Jul-04
PD_T1_9	T1_9	144.330183	-38.341717	144.331530	-38.340320	4.1	09-Jul-04
PD_T1_10	T1_10	144.330217	-38.341167	144.331527	-38.339761	3.8	09-Jul-04
PD_T2_11	T2_11	144.328200	-38.341750	144.329519	-38.340256	0.0	09-Jul-04
PD_T2_12	T2_12	144.328283	-38.341983	144.329602	-38.340483	0.0	09-Jul-04
PD_T2_13	T2_13	144.328700	-38.342633	144.330024	-38.341133	0.0	09-Jul-04
PD_T2_14a	T2_14a	144.329017	-38.343133	144.330337	-38.341635	0.0	09-Jul-04
PD_T2_14b	T2_14b	144.329050	-38.343283	144.330377	-38.341789	0.0	09-Jul-04
PD_T2_15	T2_15	144.329217	-38.343933	144.330505	-38.342378	2.5	09-Jul-04
PD_T2_16a	T2_16a	144.329233	-38.344350	144.330672	-38.342796	4.2	09-Jul-04
PD_T2_16b	T2_16b	144.329133	-38.344367	144.330578	-38.342857	3.7	09-Jul-04
PD_T2_17a	T2_17a	144.328800	-38.344367	144.330199	-38.342903	2.6	09-Jul-04
PD_T2_17b	T2_17b	144.328617	-38.344300	144.330019	-38.342835	2.9	09-Jul-04
PD_T2_18	T2_18	144.328233	-38.343900	144.329552	-38.342464	2.5	09-Jul-04
PD_T2_19	T2_19	144.328467	-38.343567	144.329840	-38.342084	1.7	09-Jul-04
PD_T2_20	T2_20	144.327933	-38.343550	144.329315	-38.342054	2.0	09-Jul-04
PD_T2_21	T2_21	144.327550	-38.343433	144.328941	-38.341955	2.2	09-Jul-04
PD_T2_22	T2_22	144.327433	-38.343333	144.328807	-38.341862	1.9	09-Jul-04
PD_T2_23a	T2_23a	144.327350	-38.343267	144.328719	-38.341788	1.5	09-Jul-04
PD_T2_23b	T2_23b	144.327000	-38.343200	144.328356	-38.341707	1.2	09-Jul-04
PD_T2_24	T2_24	144.326483	-38.343017	144.327836	-38.341533	1.1	09-Jul-04

PD_T2_25	T2_25	144.325833	-38.342717	144.327183	-38.341248	1.3	09-Jul-04
PD_T2_26	T2_26	144.325733	-38.342650	144.327071	-38.341173	1.0	09-Jul-04
PD_T2_27	T2_27	144.325567	-38.342617	144.326890	-38.341115	0.0	09-Jul-04
PD_T3_28a	T3_28a	144.328967	-38.341583	144.330291	-38.340085	0.0	09-Jul-04
PD_T3_28b	T3_28b	144.329283	-38.341667	144.330541	-38.340144	2.2	09-Jul-04
PD_T3_29a	T3_29a	144.329783	-38.341967	144.331080	-38.340409	2.6	09-Jul-04
PD_T3_29b	T3_29b	144.329967	-38.342083	144.331212	-38.340547	2.6	09-Jul-04
PD_T3_30a	T3_30a	144.329983	-38.342100	144.331247	-38.340548	2.8	09-Jul-04
PD_T3_30b	T3_30b	144.330167	-38.342200	144.331448	-38.340679	1.7	09-Jul-04
PD_T3_31	T3_31	144.330617	-38.342350	144.331866	-38.340823	2.7	09-Jul-04
PD_T3_32	T3_32	144.331417	-38.342567	144.332648	-38.341021	3.4	09-Jul-04
PD_T3_33	T3_33	144.332133	-38.342333	144.333227	-38.340836	7.0	09-Jul-04
PD_T4_34	T4_34	144.327733	-38.343933	144.328980	-38.342469	2.8	01-Nov-04
PD_T4_35a	T4_35a	144.328667	-38.343833	144.329911	-38.342337	2.5	01-Nov-04
PD_T4_35b	T4_35b	144.328850	-38.343767	144.330119	-38.342297	2.0	01-Nov-04
PD_T4_36	T4_36	144.330433	-38.343767	144.331653	-38.342269	3.2	01-Nov-04
PD_T4_37	T4_37	144.331300	-38.343783	144.332464	-38.342287	4.9	01-Nov-04
PD_T4_38	T4_38	144.332383	-38.343750	144.333551	-38.342294	5.0	01-Nov-04
PD_T5_39	T5_39	144.331717	-38.342700	144.333038	-38.341300	4.0	01-Nov-04
PD_T5_40	T5_40	144.331850	-38.342033	144.333174	-38.340709	6.8	01-Nov-04
PD_T5_41	T5_41	144.331983	-38.341150	144.333275	-38.339828	7.1	01-Nov-04
PD_T6_42	T6_42	144.331033	-38.340750	144.332507	-38.339252	4.5	01-Nov-04
PD_T6_43	T6_43	144.330083	-38.340683	144.331514	-38.339184	3.4	01-Nov-04
PD_T6_44	T6_44	144.329417	-38.340567	144.330774	-38.339104	1.9	01-Nov-04
PD_T6_45	T6_45	144.328617	-38.340550	144.329940	-38.339049	0.0	01-Nov-04

Table 13 Barwon Bluff MS video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
BB_T1_1	T1_1	144.505136	-38.287651	144.505103	-38.287586	2.7	09-Jul-04
BB_T1_2	T1_2	144.505219	-38.288301	144.505286	-38.288230	3.6	09-Jul-04
BB_T1_3a	T1_3a	144.504802	-38.289401	144.504804	-38.289283	4.6	09-Jul-04
BB_T1_3b	T1_3b	144.504802	-38.289601	144.504773	-38.289543	2.3	09-Jul-04
BB_T1_4	T1_4	144.504652	-38.290301	144.504647	-38.290199	4.0	09-Jul-04
BB_T2_5	T2_5	144.503486	-38.290884	144.503539	-38.290833	2.7	09-Jul-04
BB_T2_6a	T2_6a	144.503186	-38.291284	144.503240	-38.291223	2.9	09-Jul-04
BB_T2_6b	T2_6b	144.503102	-38.291468	144.503142	-38.291428	2.1	09-Jul-04
BB_T2_7a	T2_7a	144.503102	-38.291951	144.503104	-38.291869	3.1	09-Jul-04
BB_T2_7b	T2_7b	144.503102	-38.292068	144.503101	-38.291959	4.2	09-Jul-04
BB_T3_8	T3_8	144.502452	-38.290968	144.502496	-38.290928	2.2	09-Jul-04
BB_T3_9	T3_9	144.502319	-38.291418	144.502320	-38.291374	1.8	09-Jul-04
BB_T3_10	T3_10	144.502402	-38.291801	144.502399	-38.291764	1.4	09-Jul-04
BB_T3_11	T3_11	144.502119	-38.292184	144.502125	-38.292082	4.1	09-Jul-04
BB_T3_12	T3_12	144.502152	-38.292418	144.502093	-38.292352	3.2	09-Jul-04
BB_T3_13	T3_13	144.502286	-38.292668	144.502290	-38.292581	3.5	09-Jul-04
BB_T4_14	T4_14	144.501152	-38.292301	144.501157	-38.292305	0.0	09-Jul-04
BB_T4_15	T4_15	144.500652	-38.292984	144.500702	-38.292890	4.0	09-Jul-04
BB_T4_16	T4_16	144.500386	-38.293334	144.500472	-38.293254	4.2	09-Jul-04
BB_T4_17	T4_17	144.499952	-38.293951	144.500065	-38.293804	6.6	09-Jul-04
BB_T5_18	T5_18	144.500269	-38.292018	144.500266	-38.291952	2.7	09-Jul-04
BB_T5_19	T5_19	144.500069	-38.292201	144.500110	-38.292165	1.8	09-Jul-04
BB_T5_20	T5_20	144.499936	-38.292368	144.499933	-38.292315	2.0	09-Jul-04
BB_T5_21	T5_21	144.499736	-38.292584	144.499777	-38.292537	2.2	09-Jul-04
BB_T5_22	T5_22	144.499186	-38.293218	144.499265	-38.293129	4.1	09-Jul-04
BB_T6_23	T6_23	144.499052	-38.292401	144.499050	-38.292404	0.0	09-Jul-04
BB_T6_24	T6_24	144.498886	-38.292601	144.498930	-38.292555	2.4	09-Jul-04
BB_T6_25	T6_25	144.498736	-38.292851	144.498774	-38.292777	3.3	09-Jul-04

Table 14 Port Phillip Heads MNP - Point Lonsdale video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
PL_T1_1	T1_1	144.605200	-38.290433	144.605201	-38.290431	0.0	24-May-04
PL_T1_2	T1_2	144.604950	-38.290450	144.604949	-38.290453	0.0	24-May-04
PL_T1_3	T1_3	144.605034	-38.291067	144.605031	-38.291067	0.0	24-May-04
PL_T1_4	T1_4	144.605234	-38.291533	144.605214	-38.291431	4.0	24-May-04
PL_T1_5	T1_5	144.605184	-38.292167	144.605239	-38.292053	4.7	24-May-04
PL_T1_6	T1_6	144.605567	-38.293017	144.605601	-38.292863	6.0	24-May-04
PL_T1_7	T1_7	144.605567	-38.293433	144.605566	-38.293223	8.2	24-May-04
PL_T1_8	T1_8	144.605300	-38.294067	144.605304	-38.293911	6.2	24-May-04
PL_T2_9	T2_9	144.607284	-38.291400	144.607284	-38.291401	0.0	24-May-04
PL_T2_10	T2_10	144.607434	-38.292017	144.607435	-38.292017	0.0	24-May-04
PL_T2_11a	T2_11a	144.607500	-38.292367	144.607504	-38.292370	0.0	24-May-04
PL_T2_11b	T2_11b	144.607500	-38.292583	144.607497	-38.292586	0.0	24-May-04
PL_T2_12	T2_12	144.607367	-38.293283	144.607371	-38.293286	0.0	24-May-04
PL_T2_13	T2_13	144.607617	-38.294533	144.607613	-38.294273	10.1	24-May-04
PL_T2_14	T2_14	144.607350	-38.294817	144.607520	-38.294650	8.5	24-May-04
PL_T3_15	T3_15	144.609467	-38.291733	144.609402	-38.291670	3.0	24-May-04
PL_T3_16	T3_16	144.609284	-38.292083	144.609288	-38.292001	3.2	24-May-04
PL_T3_17	T3_17	144.609284	-38.292400	144.609300	-38.292326	2.8	24-May-04
PL_T3_18	T3_18	144.608950	-38.293200	144.609012	-38.293086	4.9	24-May-04
PL_T3_19	T3_19	144.608950	-38.293500	144.608947	-38.293337	6.3	24-May-04
PL_T3_20	T3_20	144.609000	-38.293917	144.609004	-38.293689	8.9	24-May-04
PL_T3_21	T3_21	144.609050	-38.294167	144.608973	-38.293923	9.9	24-May-04
PL_T3_22	T3_22	144.609400	-38.294950	144.609232	-38.294757	9.2	24-May-04
PL_T3_23	T3_23	144.609334	-38.295133	144.609409	-38.294923	8.5	24-May-04
PL_T3_24	T3_24	144.609050	-38.295517	144.609145	-38.295323	8.3	24-May-04
PL_T4_25	T4_25	144.608700	-38.293783	144.608512	-38.293688	6.8	23-Jun-04
PL_T4_26	T4_26	144.609800	-38.294717	144.609800	-38.294516	8.0	23-Jun-04
PL_T4_27	T4_27	144.610034	-38.295217	144.609932	-38.295015	8.4	23-Jun-04
PL_T4_28	T4_28	144.610800	-38.295883	144.610641	-38.295723	8.0	23-Jun-04
PL_T4_29	T4_29	144.611117	-38.296433	144.611034	-38.296281	6.6	23-Jun-04
PL_T5_30	T5_30	144.612284	-38.294300	144.612463	-38.294192	7.0	23-Jun-04
PL_T5_31	T5_31	144.612150	-38.294767	144.612154	-38.294546	8.8	23-Jun-04

PL_T5_32	T5_32	144.612250	-38.295650	144.612195	-38.295403	10.0	23-Jun-04
PL_T5_33	T5_33	144.612384	-38.296033	144.612283	-38.295837	8.4	23-Jun-04
PL_T5_34	T5_34	144.612700	-38.296583	144.612594	-38.296475	5.2	23-Jun-04
PL_T5_35	T5_35	144.612834	-38.296867	144.612713	-38.296693	7.6	23-Jun-04
PL_T5_36	T5_36	144.612950	-38.297117	144.612921	-38.296959	6.3	23-Jun-04
PL_T6_37	T6_37	144.614800	-38.296550	144.614847	-38.296466	3.7	09-Jul-04
PL_T6_38	T6_38	144.614700	-38.296717	144.614761	-38.296645	3.4	09-Jul-04
PL_T6_39	T6_39	144.614534	-38.297167	144.614565	-38.297028	5.6	09-Jul-04
PL_T6_40	T6_40	144.614134	-38.297833	144.614191	-38.297642	7.6	09-Jul-04
PL_T9_41a	T9_41a	144.617784	-38.297067	144.617919	-38.296925	7.0	09-Jul-04
PL_T9_41b	T9_41b	144.617584	-38.297367	144.617740	-38.297156	9.7	09-Jul-04
PL_T9_42	T9_42	144.617250	-38.298017	144.617340	-38.297851	7.2	09-Jul-04
PL_T9_43	T9_43	144.617150	-38.298817	144.617154	-38.298622	7.7	09-Jul-04
PL_T7_44	T7_44	144.615550	-38.291867	144.615546	-38.291867	0.0	11-May-04
PL_T7_45	T7_45	144.615850	-38.291783	144.615789	-38.291791	2.0	11-May-04
PL_T7_46	T7_46	144.616550	-38.291917	144.616483	-38.291895	2.1	11-May-04
PL_T7_47	T7_47	144.617500	-38.292100	144.617425	-38.292104	2.2	11-May-04
PL_T7_48	T7_48	144.617984	-38.292067	144.617883	-38.292068	3.2	11-May-04
PL_T7_49	T7_49	144.620134	-38.292000	144.619978	-38.292002	4.7	11-May-04
PL_T7_50	T7_50	144.620767	-38.292117	144.620582	-38.292060	6.0	11-May-04
PL_T7_51	T7_51	144.621667	-38.292183	144.621492	-38.292186	5.3	11-May-04
PL_T7_52	T7_52	144.622550	-38.292333	144.622357	-38.292330	6.1	11-May-04
PL_T7_53	T7_53	144.623767	-38.292417	144.623510	-38.292380	8.1	11-May-04
PL_T7_54	T7_54	144.625517	-38.292600	144.625222	-38.292451	10.7	11-May-04
PL_T7B_55	T7B_55	144.627117	-38.292933	144.627528	-38.292930	12.6	11-May-04
PL_T8_56	T8_56	144.619250	-38.294733	144.619102	-38.294661	5.4	11-May-04
PL_T8_57	T8_57	144.619734	-38.294917	144.619507	-38.294849	7.5	11-May-04
PL_T8_58	T8_58	144.620234	-38.295083	144.620017	-38.294986	7.7	11-May-04
PL_T8_59	T8_59	144.620600	-38.295233	144.620375	-38.295236	6.8	11-May-04
PL_T8_60	T8_60	144.620734	-38.295183	144.620627	-38.295223	3.7	11-May-04
PL_T8_61	T8_61	144.623150	-38.294883	144.622834	-38.294880	9.8	11-May-04
PL_T8_62	T8_62	144.624017	-38.294933	144.623644	-38.294933	11.5	11-May-04
PL_T8_63	T8_63	144.624900	-38.294667	144.624449	-38.294787	14.9	11-May-04

Table 15 ort Phillip Heads MNP - Point Nepean video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
PN_T1_1	T1_1	144.681933	-38.305083	144.681929	-38.305084	8.4	07-May-04
PN_T2_2	T2_2	144.678133	-38.303983	144.678134	-38.303982	4.7	07-May-04
PN_T3_3	T3_3	144.674799	-38.304133	144.674798	-38.304222	3.5	10-May-04
PN_T4_4	T4_4	144.669634	-38.306817	144.669685	-38.306769	2.5	10-May-04
PN_T4_5	T4_5	144.669484	-38.305150	144.669483	-38.305234	3.2	10-May-04
PN_T5_6	T5_6	144.666384	-38.307350	144.666385	-38.307353	0.0	10-May-04
PN_T5_7	T5_7	144.666317	-38.306000	144.666276	-38.306089	3.6	10-May-04
PN_T6_8	T6_8	144.664584	-38.305733	144.664581	-38.305821	3.6	10-May-04
PN_T7_9	T7_9	144.662267	-38.306100	144.662318	-38.306127	2.0	10-May-04
PN_T7_10	T7_10	144.662334	-38.305417	144.662339	-38.305497	3.1	10-May-04
PN_T7_11	T7_11	144.662417	-38.305117	144.662360	-38.305200	3.6	10-May-04
PN_T8_12	T8_12	144.660434	-38.305833	144.660382	-38.305881	2.4	07-May-04
PN_T8_13	T8_13	144.660584	-38.305567	144.660562	-38.305632	2.7	07-May-04
PN_T8_14	T8_14	144.660900	-38.305033	144.660865	-38.305107	3.2	07-May-04
PN_T9_15	T9_15	144.658884	-38.305483	144.658886	-38.305482	0.0	07-May-04
PN_T9_16	T9_16	144.659134	-38.304217	144.659094	-38.304333	4.7	07-May-04
PN_T9_17	T9_17	144.659250	-38.303583	144.659253	-38.303660	3.0	07-May-04
PN_T11_18	T11_18	144.656134	-38.303667	144.656139	-38.303787	4.8	07-May-04
PN_T10_19	T10_19	144.657967	-38.304433	144.657969	-38.304490	2.3	07-May-04
PN_T10_20	T10_20	144.657900	-38.303900	144.657904	-38.304012	4.5	07-May-04
PN_T11_21	T11_21	144.656167	-38.303333	144.656161	-38.303445	4.5	07-May-04
PN_T11_22	T11_22	144.656200	-38.302333	144.656203	-38.302509	6.9	07-May-04
PN_T12_23	T12_23	144.655284	-38.304550	144.655301	-38.304590	1.5	10-May-04
PN_T12_24	T12_24	144.655067	-38.302317	144.654971	-38.302403	4.5	10-May-04
PN_T13_25	T13_25	144.653484	-38.301100	144.653470	-38.301084	2.8	24-May-04
PN_T13_26	T13_26	144.653284	-38.299783	144.653312	-38.299946	6.6	24-May-04
PN_T13_27	T13_27	144.653450	-38.299700	144.653190	-38.299826	9.5	24-May-04
PN_T16_28	T16_28	144.647050	-38.302233	144.647052	-38.302235	0.0	24-May-04
PN_T16_29	T16_29	144.646100	-38.302550	144.646253	-38.302553	4.6	24-May-04
PN_T16_30	T16_30	144.640950	-38.304100	144.641376	-38.304140	13.1	24-May-04
PN_T17_31	T17_31	144.648817	-38.302817	144.648817	-38.302820	0.0	24-May-04
PN_T17_32	T17_32	144.647734	-38.302967	144.647841	-38.302963	3.2	24-May-04

PN_T17_33	T17_33	144.645084	-38.304150	144.645381	-38.304049	10.0	24-May-04
PN_T18_34	T18_34	144.646750	-38.305883	144.647060	-38.305885	9.5	24-May-04
PN_T19_35	T19_35	144.653850	-38.306317	144.653814	-38.306363	2.2	24-May-04
PN_T19_36	T19_36	144.653884	-38.306250	144.653863	-38.306273	1.0	24-May-04
PN_T19_37	T19_37	144.652584	-38.306467	144.652703	-38.306421	4.2	24-May-04
PN_T19_38	T19_38	144.648784	-38.307950	144.649145	-38.307882	11.5	24-May-04
PN_T20_39	T20_39	144.655017	-38.307700	144.655065	-38.307667	2.0	24-May-04
PN_T20_40	T20_40	144.652000	-38.308900	144.652227	-38.308782	8.4	24-May-04
PN_T21_41	T21_41	144.658534	-38.309800	144.658580	-38.309639	6.4	24-May-04
PN_T21_42	T21_42	144.657467	-38.310300	144.657659	-38.310206	6.9	24-May-04
PN_T21_43	T21_43	144.656600	-38.310883	144.656782	-38.310792	6.7	24-May-04
PN_T21_44	T21_44	144.655350	-38.311467	144.655619	-38.311391	8.9	24-May-04
PN_T22_45	T22_45	144.662134	-38.312833	144.662186	-38.312756	3.3	24-May-04
PN_T4_46	T4_46	144.669350	-38.304367	144.669405	-38.304457	3.9	10-May-04
PN_T5_47	T5_47	144.666367	-38.305233	144.666335	-38.305333	4.1	10-May-04
PN_T6_48	T6_48	144.664684	-38.305217	144.664689	-38.305309	3.8	10-May-04
PN_T7_49	T7_49	144.662684	-38.302717	144.662618	-38.302844	5.5	10-May-04
PN_T8_50	T8_50	144.661050	-38.304067	144.661054	-38.304210	5.6	07-May-04
PN_T9_51	T9_51	144.658967	-38.304967	144.658932	-38.305095	5.0	07-May-04
PN_T11_52	T11_52	144.656217	-38.302817	144.656211	-38.302950	5.3	07-May-04
PN_T17_53	T17_53	144.648267	-38.302783	144.648270	-38.302782	0.0	24-May-04
PN_T18_54	T18_54	144.649667	-38.304500	144.649748	-38.304452	3.2	24-May-04
PN_T18_55	T18_55	144.649117	-38.304917	144.649210	-38.304829	4.4	24-May-04
PN_T19_56	T19_56	144.651817	-38.306817	144.651937	-38.306776	4.2	24-May-04
PN_T20_57	T20_57	144.654000	-38.308083	144.654148	-38.308081	4.6	24-May-04
PN_T22_58	T22_58	144.660000	-38.314550	144.660201	-38.314357	9.8	24-May-04

Table 16 Mushroom Reef MS video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
MM_T1_1	T1_1	145.013197	-38.482714	145.013198	-38.482655	2.2	21-Sep-04
MM_T1_2	T1_2	145.013381	-38.482414	145.013353	-38.482441	1.4	21-Sep-04
MM_T1_3	T1_3	145.013697	-38.482947	145.013696	-38.482907	1.6	21-Sep-04
MM_T1_4	T1_4	145.013681	-38.483314	145.013686	-38.483267	2.0	21-Sep-04
MM_T1_5	T1_5	145.013581	-38.484014	145.013609	-38.483969	2.0	21-Sep-04
MM_T1_6	T1_6	145.014864	-38.485130	145.014815	-38.485133	1.5	21-Sep-04
MM_T1_7	T1_7	145.015631	-38.485097	145.015561	-38.485119	2.4	21-Sep-04
MM_T1_8	T1_8	145.016147	-38.484964	145.016149	-38.484985	0.8	21-Sep-04
MM_T1_9	T1_9	145.015731	-38.484880	145.015819	-38.484898	2.8	21-Sep-04
MM_T1_10	T1_10	145.014597	-38.484880	145.014650	-38.484905	2.1	21-Sep-04
MM_T1_11	T1_11	145.013597	-38.484930	145.013663	-38.484934	2.2	21-Sep-04
MM_T1_12	T1_12	145.013264	-38.485047	145.013306	-38.484982	3.0	21-Sep-04
MM_T1_13	T1_13	145.013481	-38.487630	145.013384	-38.487569	3.7	21-Sep-04
MM_T1_14	T1_14	145.013847	-38.487814	145.013666	-38.487727	6.5	21-Sep-04
MM_T1_15	T1_15	145.014514	-38.487997	145.014381	-38.488001	4.1	21-Sep-04
MM_T1_16	T1_16	145.015797	-38.487780	145.015763	-38.487781	1.1	21-Sep-04
MM_T2_17	T2_17	145.017397	-38.487580	145.017362	-38.487565	1.4	21-Sep-04
MM_T2_18	T2_18	145.018064	-38.487780	145.018033	-38.487783	1.1	21-Sep-04
MM_T2_19	T2_19	145.019547	-38.487980	145.019392	-38.487959	4.8	21-Sep-04
MM_T2_20	T2_20	145.020147	-38.487097	145.020160	-38.487152	2.3	21-Sep-04
MM_T2_21	T2_21	145.019581	-38.486114	145.019601	-38.486197	3.2	21-Sep-04
MM_T2_22	T2_22	145.019447	-38.485814	145.019461	-38.485861	1.9	21-Sep-04
MM_T2_23	T2_23	145.020097	-38.488947	145.020078	-38.488872	2.9	21-Sep-04
MM_T2_24	T2_24	145.020047	-38.489530	145.020062	-38.489449	3.2	21-Sep-04
MM_T2_25	T2_25	145.017881	-38.491097	145.017790	-38.491212	5.2	21-Sep-04
MM_T2_26	T2_26	145.017281	-38.491864	145.017284	-38.491681	7.1	21-Sep-04
MM_T2_27	T2_27	145.015897	-38.492230	145.016051	-38.492336	6.4	21-Sep-04
MM_T2_28	T2_28	145.015397	-38.491897	145.015398	-38.491902	0.0	21-Sep-04
MM_T2_29	T2_29	145.013431	-38.490497	145.013470	-38.490715	8.6	21-Sep-04
MM_T2_30	T2_30	145.013597	-38.488530	145.013446	-38.488643	6.5	21-Sep-04

Table 17 Corner Inlet MNP video site locations (coordinates in GDA94). Note that the towed video frame was not used in Corner Inlet so there are no corrected coordinates for the layback.

Full site ID	Park Location	Boat Longitude	Boat Latitude	Depth (m)	DATE_
CI_1	Corner Inlet - North	146.421682	-38.809835	2.7	29-Jul-04
CI_2	Corner Inlet - North	146.417332	-38.810852	2.0	29-Jul-04
CI_3	Corner Inlet - North	146.397649	-38.806519	2.0	29-Jul-04
CI_4	Corner Inlet - North	146.404116	-38.803203	2.0	29-Jul-04
CI_5	Corner Inlet - North	146.401066	-38.799869	1.7	29-Jul-04
CI_6	Corner Inlet - North	146.412299	-38.797685	1.9	29-Jul-04
CI_7	Corner Inlet - North	146.417299	-38.795535	2.0	29-Jul-04
CI_8	Corner Inlet - North	146.407399	-38.793818	1.7	29-Jul-04
CI_9	Corner Inlet - North	146.388949	-38.798336	1.6	29-Jul-04
CI_10	Corner Inlet - North	146.389066	-38.802486	1.2	29-Jul-04
CI_11	Corner Inlet - North	146.380649	-38.804503	1.1	29-Jul-04
CI_12	Corner Inlet - North	146.377066	-38.801636	1.7	29-Jul-04
CI_13	Corner Inlet - North	146.364649	-38.803202	1.9	29-Jul-04
CI_14	Corner Inlet - North	146.372149	-38.804486	1.7	29-Jul-04
CI_15	Corner Inlet - North	146.382949	-38.800403	1.7	29-Jul-04
CI_16	Corner Inlet - North	146.385899	-38.803269	1.3	29-Jul-04
CI_17	Corner Inlet - North	146.388466	-38.804286	1.4	29-Jul-04
CI_18	Corner Inlet - North	146.392716	-38.805853	1.8	29-Jul-04
CI_19	Corner Inlet - North	146.398099	-38.795186	1.5	29-Jul-04
CI_20	Corner Inlet - North	146.412482	-38.799952	1.9	29-Jul-04
CI_21	Corner Inlet - North	146.408732	-38.804785	2.8	29-Jul-04
CI_22	Corner Inlet - South	146.373517	-38.846802	1.7	29-Jul-04
CI_23	Corner Inlet - South	146.370801	-38.848618	1.5	29-Jul-04
CI_24	Corner Inlet - South	146.372218	-38.853486	0.5	29-Jul-04
CI_25	Corner Inlet - South	146.375918	-38.853936	1.0	29-Jul-04
CI_26	Corner Inlet - South	146.379433	-38.854869	0.9	29-Jul-04
CI_27	Corner Inlet - South	146.379367	-38.854569	1.1	29-Jul-04
CI_28	Corner Inlet - South	146.378600	-38.853053	1.2	29-Jul-04
CI_29	Corner Inlet - South	146.378250	-38.848718	0.9	29-Jul-04
CI_30	Corner Inlet - South	146.377767	-38.850285	1.2	29-Jul-04
CI_31	Corner Inlet - North	146.425766	-38.801268	1.5	29-Jul-04
CI_32	Corner Inlet - North	146.433999	-38.794868	1.7	29-Jul-04

CI_33	Corner Inlet - North	146.421499	-38.789085	1.0	29-Jul-04
CI_34a	Corner Inlet - North	146.437066	-38.787552	2.0	29-Jul-04
CI_34b	Corner Inlet - North	146.437216	-38.787468	1.2	29-Jul-04
CI_35	Corner Inlet - South	146.389883	-38.842119	0.0	30-Jul-04
CI_36	Corner Inlet - South	146.390367	-38.843736	0.0	30-Jul-04
CI_37	Corner Inlet - South	146.391000	-38.847503	0.0	30-Jul-04
CI_38	Corner Inlet - South	146.393083	-38.847269	6.3	30-Jul-04
CI_39	Corner Inlet - South	146.397332	-38.844419	8.0	30-Jul-04
CI_40	Corner Inlet - South	146.404266	-38.846986	0.6	30-Jul-04
CI_41	Corner Inlet - South	146.406782	-38.849403	0.0	30-Jul-04
CI_42	Corner Inlet - South	146.412181	-38.848219	0.7	30-Jul-04
CI_43	Corner Inlet - South	146.416548	-38.846303	0.8	30-Jul-04
CI_44	Corner Inlet - South	146.417648	-38.844236	0.8	30-Jul-04
CI_45	Corner Inlet - South	146.416865	-38.842569	1.1	30-Jul-04
CI_46	Corner Inlet - South	146.413165	-38.842686	1.6	30-Jul-04
CI_47	Corner Inlet - South	146.403149	-38.843469	0.8	30-Jul-04
CI_48	Corner Inlet - South	146.396167	-38.843419	0.8	30-Jul-04
CI_49	Corner Inlet - South	146.382300	-38.846369	0.9	30-Jul-04
CI_50	Corner Inlet - South	146.385750	-38.855486	0.0	30-Jul-04
CI_51	Corner Inlet - South	146.378001	-38.859486	0.1	30-Jul-04
CI_52	Corner Inlet - South	146.372134	-38.858419	0.9	30-Jul-04
CI_53	Corner Inlet - South	146.377883	-38.843453	0.1	30-Jul-04
CI_54a	Corner Inlet - North	146.422949	-38.790668	1.7	30-Jul-04
CI_54b	Corner Inlet - North	146.423216	-38.790602	5.1	30-Jul-04
CI_54c	Corner Inlet - North	146.423916	-38.790302	12.8	30-Jul-04
CI_54d	Corner Inlet - North	146.424716	-38.790552	10.5	30-Jul-04
CI_54e	Corner Inlet - North	146.434466	-38.795802	1.8	30-Jul-04

Table18. Point Hicks MNP video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
PH_T1_1	T1_1	149.281628	-37.798337	149.281599	-37.798283	2.1	02-Apr-05
PH_T1_2	T1_2	149.282028	-37.800187	149.282028	-37.800050	5.5	02-Apr-05
PH_T1_3	T1_3	149.281428	-37.804187	149.281521	-37.803863	13.1	02-Apr-05
PH_T2_4	T2_4	149.280378	-37.798354	149.280329	-37.798353	1.4	02-Apr-05
PH_T2_5	T2_5	149.281345	-37.798587	149.281265	-37.798506	3.9	02-Apr-05
PH_T2_6	T2_6	149.281995	-37.799004	149.281925	-37.798935	3.3	02-Apr-05
PH_T3_7	T3_7	149.279045	-37.799037	149.279100	-37.799025	1.7	02-Apr-05
PH_T4_8	T4_8	149.278112	-37.800571	149.278146	-37.800495	3.1	02-Apr-05
PH_T4_9	T4_9	149.278628	-37.800904	149.278443	-37.800904	5.6	02-Apr-05
PH_T4_10	T4_10	149.280262	-37.801321	149.280054	-37.801233	7.5	02-Apr-05
PH_T5_11	T5_11	149.277762	-37.802337	149.277631	-37.802208	6.6	02-Apr-05
PH_T5_12	T5_12	149.278512	-37.802604	149.278265	-37.802520	8.4	02-Apr-05
PH_T5_13	T5_13	149.279962	-37.803271	149.279637	-37.803178	10.8	02-Apr-05
PH_T6_14	T6_14	149.276928	-37.803721	149.277052	-37.803688	4.2	02-Apr-05
PH_T6_15	T6_15	149.277262	-37.803954	149.277071	-37.803958	6.1	02-Apr-05
PH_T6_16	T6_16	149.278262	-37.805237	149.278056	-37.804966	12.5	02-Apr-05
PH_T6_17	T6_17	149.278945	-37.805654	149.278549	-37.805461	14.5	02-Apr-05
PH_T7_18	T7_18	149.274845	-37.803371	149.274848	-37.803298	2.9	02-Apr-05
PH_T7_19	T7_19	149.275028	-37.805321	149.275026	-37.805025	11.6	02-Apr-05
PH_T7_20	T7_20	149.275478	-37.806504	149.275250	-37.806048	19.3	02-Apr-05
PH_T7_21	T7_21	149.275262	-37.806887	149.275429	-37.806324	22.6	02-Apr-05
PH_T8_22	T8_22	149.273662	-37.802954	149.273665	-37.802870	3.4	02-Apr-05
PH_T8_23	T8_23	149.272962	-37.804137	149.272965	-37.804136	0.0	02-Apr-05
PH_T8_24	T8_24	149.272795	-37.805104	149.272694	-37.804899	8.6	02-Apr-05
PH_T8_25	T8_25	149.272378	-37.806071	149.272774	-37.805681	19.6	02-Apr-05
PH_T9_26	T9_26	149.270328	-37.802654	149.270331	-37.802655	0.0	02-Apr-05
PH_T9_27	T9_27	149.268178	-37.802754	149.268491	-37.802655	10.4	02-Apr-05
PH_T10_28	T10_28	149.269112	-37.800754	149.269050	-37.800878	5.2	02-Apr-05
PH_T10_29	T10_29	149.269645	-37.800171	149.269595	-37.800146	1.8	02-Apr-05
PH_T10_30	T10_30	149.268578	-37.800754	149.268728	-37.800758	4.8	02-Apr-05
PH_T10_31	T10_31	149.267328	-37.801471	149.267565	-37.801357	8.6	02-Apr-05
PH_T11_32	T11_32	149.266595	-37.800071	149.266672	-37.799995	3.9	02-Apr-05

PH_T11_33	T11_33	149.265312	-37.800621	149.265655	-37.800537	11.2	02-Apr-05
PH_T11_34	T11_34	149.263778	-37.801287	149.264349	-37.801283	17.9	02-Apr-05
PH_T12_35	T12_35	149.265095	-37.798837	149.265272	-37.798797	5.6	02-Apr-05
PH_T12_36	T12_36	149.264328	-37.799071	149.264326	-37.799067	0.0	02-Apr-05
PH_T12_37	T12_37	149.262528	-37.799621	149.263021	-37.799462	16.5	02-Apr-05
PH_T13_38	T13_38	149.265178	-37.797637	149.265180	-37.797636	0.0	02-Apr-05
PH_T13_39	T13_39	149.263612	-37.797304	149.263909	-37.797300	9.1	02-Apr-05
PH_T14_40	T14_40	149.265828	-37.796371	149.265938	-37.796423	4.0	02-Apr-05
PH_T14_41	T14_41	149.265145	-37.796071	149.265419	-37.796162	9.1	02-Apr-05
PH_T15_42	T15_42	149.266945	-37.791987	149.266941	-37.792078	3.5	02-Apr-05
PH_T15_43	T15_43	149.266778	-37.791687	149.266804	-37.791684	0.9	02-Apr-05
PH_T15_44	T15_44	149.261678	-37.793171	149.261906	-37.793058	8.5	02-Apr-05
PH_T16_45	T16_45	149.256078	-37.789971	149.255846	-37.790200	11.5	02-Apr-05
PH_T16_46	T16_46	149.258512	-37.786254	149.258486	-37.786284	1.5	02-Apr-05
PH_T17_47	T17_47	149.249078	-37.782221	149.249130	-37.782191	2.1	02-Apr-05
PH_T17_48	T17_48	149.245712	-37.786371	149.245875	-37.786056	13.4	02-Apr-05
PH_T18_49	T18_49	149.234562	-37.785837	149.234251	-37.786142	15.4	02-Apr-05
PH_T18_50	T18_50	149.235612	-37.780137	149.235671	-37.780141	2.0	02-Apr-05
PH_T19_51	T19_51	149.223529	-37.778904	149.223575	-37.778856	2.4	02-Apr-05
PH_T19_52	T19_52	149.223479	-37.783687	149.223483	-37.783345	13.4	02-Apr-05

Table19. Cape Howe MNP video site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Boat Longitude	Boat Latitude	Video Longitude	Video Latitude	Depth (m)	Date
CH_T1_1	T1_1	149.976677	149.976677	149.976552	-37.506694	4.3	7-Jun-05
CH_T1_2	T1_2	149.977927	149.977927	149.977632	-37.507397	10.8	7-Jun-05
CH_T1_3	T1_3	149.978860	149.978860	149.978491	-37.507970	13.6	7-Jun-05
CH_T2_4	T2_4	149.974994	149.974994	149.974891	-37.507322	3.2	7-Jun-05
CH_T2_5	T2_5	149.975644	149.975644	149.975512	-37.507567	4.8	7-Jun-05
CH_T2_6	T2_6	149.977410	149.977410	149.977016	-37.508692	14.8	7-Jun-05
CH_T2_7	T2_7	149.977760	149.977760	149.977435	-37.508988	16.2	7-Jun-05
CH_T3_8	T3_8	149.973644	149.973644	149.973730	-37.508270	2.9	7-Jun-05
CH_T3_9	T3_9	149.974660	149.974660	149.974443	-37.508847	7.9	7-Jun-05
CH_T3_10	T3_10	149.975927	149.975927	149.975637	-37.509853	14.7	7-Jun-05
CH_T3_11	T3_11	149.976594	149.976594	149.976236	-37.510415	18.5	7-Jun-05
CH_T4_12	T4_12	149.972410	149.972410	149.972374	-37.509142	1.7	7-Jun-05
CH_T4_13	T4_13	149.973010	149.973010	149.972875	-37.509526	5.0	7-Jun-05
CH_T4_14	T4_14	149.973894	149.973894	149.973683	-37.509938	10.4	7-Jun-05
CH_T4_15	T4_15	149.974144	149.974144	149.973907	-37.510158	12.0	7-Jun-05
CH_T4_16	T4_16	149.975227	149.975227	149.974777	-37.511001	16.5	7-Jun-05
CH_T4_17	T4_17	149.975610	149.975610	149.975252	-37.511268	17.9	7-Jun-05
CH_T5_18	T5_18	149.970895	149.970895	149.970851	-37.509811	2.3	7-Jun-05
CH_T5_19	T5_19	149.971578	149.971578	149.971423	-37.510265	5.8	7-Jun-05
CH_T5_20	T5_20	149.972410	149.972410	149.972192	-37.510832	8.1	7-Jun-05
CH_T5_21	T5_21	149.972910	149.972910	149.972596	-37.511047	11.7	7-Jun-05
CH_T5_22	T5_22	149.973877	149.973877	149.973455	-37.511890	15.6	7-Jun-05
CH_T6_23	T6_23	149.969578	149.969578	149.969497	-37.510755	2.6	7-Jun-05
CH_T6_24	T6_24	149.969928	149.969928	149.969815	-37.510783	4.1	7-Jun-05
CH_T6_25	T6_25	149.971295	149.971295	149.971070	-37.512212	11.4	7-Jun-05
CH_T6_26	T6_26	149.972845	149.972845	149.972527	-37.513283	16.2	7-Jun-05
CH_T7_27	T7_27	149.968095	149.968095	149.968033	-37.511783	2.3	7-Jun-05
CH_T7_28	T7_28	149.971745	149.971745	149.971421	-37.514491	16.0	7-Jun-05
CH_T8_29	T8_29	149.966561	149.966561	149.966436	-37.512580	4.6	7-Jun-05
CH_T8_30	T8_30	149.970561	149.970561	149.970282	-37.515439	14.8	7-Jun-05
CH_T9_31	T9_31	149.965595	149.965595	149.965474	-37.514272	4.2	7-Jun-05
CH_T9_32	T9_32	149.970461	149.970461	149.969982	-37.517582	17.7	7-Jun-05

CH_T10_33	T10_33	149.945262	149.945262	149.945171	-37.521213	3.3	7-Jun-05
CH_T10_34	T10_34	149.950562	149.950562	149.950048	-37.525552	17.3	7-Jun-05
CH_T11_35	T11_35	149.933612	149.933612	149.933499	-37.525306	3.9	7-Jun-05
CH_T11_36	T11_36	149.937662	149.937662	149.937490	-37.528135	15.2	7-Jun-05
CH_T12_37	T12_37	149.923346	149.923346	149.923269	-37.529894	4.0	7-Jun-05
CH_T12_38	T12_38	149.927129	149.927129	149.926847	-37.532572	14.4	7-Jun-05
CH_T13_39	T13_39	149.915697	149.915697	149.915548	-37.536438	5.3	7-Jun-05
CH_T13_40	T13_40	149.920313	149.920313	149.919989	-37.539482	15.8	7-Jun-05

2 Appendix 2

2.1 VIDEO SITE HABITAT CLASSIFICATION

The following tables present habitat classifications for the video survey sites. Depth values correspond to values recorded by the vessel sounder at each site. Where the vessel was in depths <1 m or where interference due to the pitch and roll of the vessel prevented the sounder measuring the depth, a value of 0 was recorded.

Table 20. Discovery Bay MNP video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	2.4	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T1_2	9.2	Rock-Reef/Sediment	Low profile reef	Patchy	Boulders	Bare	
T1_3a	6.2	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T1_3b	7.2	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T1_4	12.2	Sediment	Unvegetated sediment				
T2_5	12.9	Sediment	Unvegetated sediment				
T2_6	9.4	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Phyllospora
T2_7	2.7	Rock-Reef/Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora/Durvillaea
T2_8	3.7	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Phyllospora with Macrocystis
T3_9	3.5	Rock/Reef	Low profile reef	Continuous	Boulders	Bare	
T3_10	4.8	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Durvillaea
T3_11	8.2	Sediment	Unvegetated sediment				
T3_12	8.6	Rock-Reef/Sediment	Low profile reef	Patchy	Broken	Macroalgae	Durvillaea
T3_13	12.8	Sediment	Unvegetated sediment				
T4_14	12.4	Sediment	Unvegetated sediment				
T4_15	9.4	Sediment	Unvegetated sediment				
T4_16	6.2	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T4_17	4.0	Rock/Reef	High profile reef	Continuous	Boulders	Bare	
T5_18	3.3	Sediment	Unvegetated sediment				
T5_19	3.6	Rock-Reef/Sediment	High profile reef	Patchy	Broken	Bare	
T5_20	4.0	Rock-Reef/Sediment	High profile reef	Patchy	Broken	Bare	
T5_21	9.4	Sediment	Unvegetated sediment				
T6_22	12.5	Sediment	Unvegetated sediment				
T7_23	7.1	Sediment	Unvegetated sediment				
T7_24	2.5	Sediment	Unvegetated sediment				
T8_25	3.4	Sediment	Unvegetated sediment				
T8_26	9.5	Sediment	Unvegetated sediment				
T9_27	3.3	Rock-Reef/Sediment	Low profile reef	Patchy	Broken	Bare	
T9_28	4.2	Rock-Reef/Sediment	High profile reef	Patchy	Broken	Bare	
T9_29	6.1	Sediment	Unvegetated sediment				
T10_30	4.6	Sediment	Unvegetated sediment				
T10_31	8.9	Sediment	Unvegetated sediment				
T11_32	2.4	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Durvillaea
T11_33	4.4	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Phyllospora
T11_34	9.5	Rock-Reef/Sediment	Low profile reef	Patchy	Broken	Macroalgae	Mixed algae
T12_35	4.3	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T12_36	10.6	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Phyllospora
T12_37	11.6	Sediment	Unvegetated sediment				
T13_38	4.4	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T13_39	6.3	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T14_40	13.9	Sediment	Unvegetated sediment				
T14_41	11.8	Sediment	Unvegetated sediment				
T15_42	6.1	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Phyllospora
T15_43	7.3	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T15_44	10.1	Rock-Reef/Sediment	High profile reef	Patchy	Broken	Macroalgae	Durvillaea

Table 20. Continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
					Seaward edge of Durvillaea.
					Large numbers of purple wrasse (*Notolabrus fucicola*) visible.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Small patch of reef only surrounded by bare sediment.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Large numbers of purple wrasse (*Notolabrus fucicola*) visible.
					Large numbers of purple wrasse (*Notolabrus fucicola*) visible.
Ripples	Sand	Bare			
Flat	Sand	Bare			
Flat	Sand	Bare			
					Large numbers of purple wrasse (*Notolabrus fucicola*) visible.

Table21. Marengo Reefs MS video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	2.8	Sediment	Unvegetated sediment				
T1_2a	0.0	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Phyllospora
T1_2b	0.0	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T1_3a	0.0	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T1_3b	4.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T1_4	0.0	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Phyllospora
T1_5	0.0	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T1_6	5.1	Sediment	Unvegetated sediment				
T1_7a	4.4	Sediment	Unvegetated sediment				
T1_7b	2.4	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T2_8	9.6	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Mixed brown algae
T2_9	6.5	Sediment	Unvegetated sediment				
T2_10	3.7	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora
T2_11	6.0	Sediment	Unvegetated sediment				
T2_12a	2.5	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Phyllospora
T2_12b	0.0	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T2_13	0.0	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T2_14	5.6	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora with Durvillaea
T3_15	2.2	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T3_16	8.6	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T4_17a	1.6	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T4_17b	1.9	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T4_18	3.6	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T5_19	3.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T5_20	3.7	Sediment	Unvegetated sediment				
T5_21	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T5_22	1.3	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Durvillaea
T5_23	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora

Table 21 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					The reef is very low profile and covered by sand.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Australian Fur Seals observed.
					School of Australian Salmon observed.
Ripples	Sand	Bare			

Table 22. Eagle Rock MS video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	1.8	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T1_2	2.7	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Mixed brown algae
T1_3	3.3	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Phyllospora
T1_4	6.6	Sediment	Unvegetated sediment				
T1_5	7.9	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora
T2_6	1.6	Rock/Reef -Sediment	High profile reef	Patchy	Boulders	Macroalgae	Durvillaea/Mixed brown algae
T2_7	2.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae with Phyllospora
T2_8	4.3	Sediment	Unvegetated sediment				
T2_9	3.6	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T2_10	5.9	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T3_11	1.9	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Durvillaea
T3_12	3.0	Sediment	Unvegetated sediment				
T3_13	3.8	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora/Mixed brown algae
T3_14	5.7	Sediment	Unvegetated sediment				
T3_15	5.7	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T3_16	7.4	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora
T4_17	1.8	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Durvillaea
T4_18	0.0	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora
T4_19	3.9	Sediment	Unvegetated sediment				
T4_20	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T4_21	7.8	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T5_22	2.0	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Durvillaea
T5_23	2.9	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Durvillaea/Mixed brown algae
T5_24	4.8	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T5_25	5.5	Sediment	Unvegetated sediment				
T5_26	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T6_27	1.6	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Durvillaea
T6_28	3.7	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Durvillaea
T6_29	3.9	Sediment	Unvegetated sediment				
T6_30	5.1	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora
T6_31	6.2	Sediment	Unvegetated sediment				
T6_32	7.1	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T7_33	2.4	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Mixed brown algae
T7_34	3.0	Sediment	Unvegetated sediment				
T7_35	5.8	Sediment	Unvegetated sediment				
T8_36	1.4	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora
T8_37	3.2	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Durvillaea/Mixed brown algae
T9_38a	1.7	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora/Durvillaea
T9_38b	1.6	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T9_39	3.9	Sediment	Unvegetated sediment				
T9_40	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T9_41	5.0	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora
T9_42	5.8	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora

Table 22 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
	Sand	Bare			Small sand patch surrounded by reef.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			

Table 23. Point Addis MNP video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	1.5	Sediment	Unvegetated sediment				
T1_2	5.0	Rock/Reef -Sediment	Low profile reef	Patchy	Ripple sand veneer	Bare	
T1_3	6.5	Rock/Reef -Sediment	Low profile reef	Patchy	Ripple sand veneer	Bare	
T1_4	8.5	Rock/Reef -Sediment	Low profile reef	Patchy	Ripple sand veneer	Bare	
T1_5	7.5	Rock/Reef -Sediment	Low profile reef	Patchy	Boulders	Macroalgae	Mixed brown algae
T1_6a	9.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Mixed algae
T1_6b	9.0	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed brown algae
T1_7	10.0	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed brown algae
T1_8	10.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Mixed algae with Ecklonia
T1_9	11.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T1_10	10.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T1_11	11.5	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T2_12	2.5	Sediment	Unvegetated sediment				
T2_13	6.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Mixed red algae
T2_14	10.5	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed algae
T2_15	10.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Mixed algae with Ecklonia
T2_16	11.0	Sediment	Unvegetated sediment				
T2_17	11.5	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Seagrass/Macroalgae	Amphibolis/mixed algae
T2_18	10.5	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Seagrass/Macroalgae	Amphibolis
T2_19	9.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Mixed algae with Ecklonia
T2_20	10.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia
T2_21	1.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Hormosira
T2_22	9.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T2_23	15.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T3_24	13.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T3_25	10.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Mixed algae with Ecklonia
T3_26	6.5	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T3_27	12.0	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed algae
T3_28	10.5	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T3_29	12.0	Sediment	Unvegetated sediment				
T3_30	10.5	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T3_31	9.5	Rock/Reef -Sediment	High profile reef	Patchy	Boulders	Bare	
T3_32	5.5	Rock/Reef -Sediment	Low profile reef	Patchy	Ripple sand veneer	Bare	
T3_33	2.5	Sediment	Unvegetated sediment				
T4_34	15.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T4_35	11.5	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T4_36	8.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T4_37	13.0	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed brown algae
T4_38	12.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Mixed algae with Ecklonia
T4_39	13.5	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed brown algae
T4_40	14.5	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed brown algae
T4_41a	9.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Mixed algae with Ecklonia
T4_41b	9.0	Sediment	Unvegetated sediment				
T4_42	7.5	Sediment	Vegetated sediment				
T4_43	3.5	Rock/Reef -Sediment	Low profile reef	Patchy	Ripple sand veneer	Bare	
T5_44	2.0	Sediment	Unvegetated sediment				
T5_45	6.5	Rock/Reef -Sediment	Low profile reef	Patchy	Ripple sand veneer	Bare	
T5_46	8.0	Sediment	Vegetated sediment				
T5_47	10.0	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed brown algae
T5_48	12.5	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Mixed brown algae
T5_49	11.5	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed algae
T5_50	13.0	Rock/Reef -Sediment	Low profile reef	Continuous	Rubble	Macroalgae	Mixed brown algae
T5_51	8.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Mixed brown algae with Ecklonia
T5_52	7.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia/mixed algae
T5_53	13.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T6_54	11.5	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T6_55	8.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T6_56	14.0	Rock/Reef -Sediment	Low profile reef	Continuous	Rubble	Macroalgae	Mixed brown algae
T6_57	14.0	Rock/Reef -Sediment	Low profile reef	Continuous	Rubble	Macroalgae	Mixed brown algae
T6_58	10.5	Rock/Reef -Sediment	Low profile reef	Continuous	Rubble	Macroalgae	Mixed brown algae
T6_59	9.0	Sediment	Unvegetated sediment				
T6_60	3.5	Sediment	Unvegetated sediment				
T6_61	3.0	Rock/Reef -Sediment	High profile reef	Patchy	Boulders	Macroalgae	Mixed algae
T7_62	2.5	Rock/Reef -Sediment	High profile reef	Patchy	Boulders	Macroalgae	Mixed algae
T7_63	1.5	Sediment	Unvegetated sediment				
T7_64	1.0	Rock/Reef	High profile reef	Continuous	Boulders	Macroalgae	Durvillaea/Mixed algae
T7_65	2.5	Sediment	Unvegetated sediment				
T7_66	4.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Mixed algae
T7_67	10.0	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed algae
T7_68	12.5	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Ecklonia/mixed brown algae

Table 23 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
Ripples	Sand	Bare			
					Unusual reef type with overlying sand ripples.
					Unusual reef type with overlying sand ripples.
					Unusual reef type with overlying sand ripples.
					Bare sand present in between the reef.
Ripples	Sand	Bare			
					These are isolated pinnacles.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Site is surrounded by bare sand. Some sparse mixed algae on patches of reef.
					Unusual reef type with overlying sand ripples.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Seagrass	Sparse patchy	Zostera sp.	Very sparse and patchy Zostera sp.
					Unusual reef type with overlying sand ripples.
Ripples	Sand	Bare			
					Small patch of unusual reef type with overlying sand ripples.
Ripples	Sand	Seagrass	Sparse patchy	Zostera sp.	Very sparse and patchy Zostera sp.
					School of Shortfin Pike (*Sphyraena novaehollandiae*) visible.
Ripples	Sand	Bare			
Ripples	Sand	Bare			Very sparse low profile boulders present.
Ripples	Sand	Bare			
Ripples	Sand	Bare			

Table 23. (Continued)

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T8_69	16.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed algae
T8_70	10.5	Sediment	Unvegetated sediment				
T8_71a	4.5	Sediment	Unvegetated sediment				
T8_71b	4.5	Rock/Reef	High profile reef	Continuous	Boulders	Macroalgae	Mixed brown algae
T8_72	3.5	Sediment	Unvegetated sediment				
T8_73	3.0	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T8_74	4.0	Sediment	Unvegetated sediment				
T8_75	4.0	Sediment	Vegetated sediment				
T8_76	4.0	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T8_77a	1.0	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T8_77b	1.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Durvillaea
T8_78	2.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed algae
T8_79	5.0	Sediment	Unvegetated sediment				
T8_80	8.5	Sediment	Unvegetated sediment				
T9_81	7.0	Sediment	Unvegetated sediment				
T9_82	7.0	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T9_83	5.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T9_84	7.5	Sediment	Unvegetated sediment				
T10_85	2.0	Sediment	Unvegetated sediment				
T10_86	1.6	Sediment	Unvegetated sediment				
T11_87	2.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T11_88	2.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Macrocystis
T11_89	3.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora with Durvillaea
T11_90	5.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T11_91a	10.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae with Ecklonia
T11_91b	11.0	Sediment	Unvegetated sediment				
T11_92	11.5	Sediment	Unvegetated sediment				
T12_93	2.0	Sediment	Unvegetated sediment				
T12_94	5.0	Sediment	Unvegetated sediment				
T12_95	5.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora with mixed brown algae
T12_96	10.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora with mixed brown algae
T12_97	15.5	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Macroalgae	Mixed algae
T13_98	0.0	Rock/Reef -Sediment	Low profile reef	Patchy	Boulders	Macroalgae	Mixed algae
T13_99	0.0	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Seagrass/Macroalgae	Amphibolis/mixed algae
T15_104	2.6	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed algae
T13_100	3.2	Sediment	Unvegetated sediment				
T14_101a	3.3	Sediment	Unvegetated sediment				
T14_101b	3.3	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Mixed brown algae with Durvillaea
T14_102	3.5	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Mixed brown algae
T14_103	3.9	Sediment	Vegetated sediment				
T15_105	4.3	Rock/Reef -Sediment	Low profile reef	Continuous	Rubble	Seagrass/Macroalgae	Amphibolis/mixed algae
T15_106	5.8	Rock/Reef -Sediment	Low profile reef	Continuous	Rubble	Seagrass/Macroalgae	Amphibolis/mixed algae
T15_107	9.3	Rock/Reef -Sediment	Low profile reef	Continuous	Rubble	Seagrass/Macroalgae	Amphibolis/mixed algae
T15_108	10.7	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Mixed algae

Table 23 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
					Sponges and Ascidians visible.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Amphibolis growing directly on top of high profile reef.
Ripples	Sand	Bare			
		Seagrass	Dense	Amphibolis	
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			Drift algae present.
Ripples	Sand	Bare			Drift algae present.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			A lot of drift material present along this transect particularly close to the reef at the beginning.
Ripples	Sand	Bare			
					Isolated patches of Amphibolis present
	Sand	Seagrass	Dense	Amphibolis	

Table 24. Point Danger MS video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	0.0	Sediment	Unvegetated sediment				
T1_2	0.0	Sediment	Unvegetated sediment				
T1_3a	0.0	Sediment	Unvegetated sediment				
T1_3b	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed algae
T1_4a	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed algae
T1_4b	0.0	Rock/Reef -Sediment	Low profile reef	Continuous	Cobble	Bare	
T1_5a	0.0	Rock/Reef -Sediment	Low profile reef	Continuous	Cobble	Bare	
T1_5b	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed algae
T1_6a	0.0	Rock/Reef -Sediment	Low profile reef	Continuous	Cobble	Macroalgae	Mixed algae with Hormosira
T1_6b	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed algae with Hormosira
T1_7	2.3	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Mixed brown algae
T1_8	1.5	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Mixed brown algae
T1_9	4.1	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T1_10	3.8	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T2_11	0.0	Rock/Reef -Sediment	Low profile reef	Continuous	Cobble	Bare	
T2_12	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Seagrass/Macroalgae	Amphibolis with mixed algae
T2_13	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Hormosira
T2_14a	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T2_14b	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T2_15	2.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T2_16a	4.2	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T2_16b	3.7	Rock/Reef	Low profile reef	Continuous	Solid	Seagrass/Macroalgae	Amphibolis/mixed algae
T2_17a	2.6	Rock/Reef	Low profile reef	Continuous	Solid	Seagrass/Macroalgae	Amphibolis/mixed algae
T2_17b	2.9	Sediment	Unvegetated sediment				
T2_18	2.5	Sediment	Unvegetated sediment				
T2_19	1.7	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T2_20	2.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T2_21	2.2	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T2_22	1.9	Sediment	Unvegetated sediment				
T2_23a	1.5	Sediment	Unvegetated sediment				
T2_23b	1.2	Rock/Reef -Sediment	Low profile reef	Continuous	Cobble	Macroalgae	Mixed brown algae/Hormosira
T2_24	1.1	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T2_25	1.3	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae/Hormosira
T2_26	1.0	Sediment	Unvegetated sediment				
T2_27	0.0	Rock/Reef	Low profile reef	Continuous	Boulders	Macroalgae	Mixed brown algae/Hormosira
T3_28a	0.0	Sediment	Unvegetated sediment				
T3_28b	2.2	Sediment	Vegetated sediment				
T3_29a	2.6	Sediment	Vegetated sediment				
T3_29b	2.6	Sediment	Vegetated sediment				
T3_30a	2.8	Sediment	Vegetated sediment				
T3_30b	1.7	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T3_31	2.7	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T3_32	3.4	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T3_33	7.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T4_34	2.8	Sediment	Unvegetated sediment				
T4_35a	2.5	Sediment	Unvegetated sediment				
T4_35b	2.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T4_36	3.2	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T4_37	4.9	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T4_38	5.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T5_39	4.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T5_40	6.8	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T5_41	7.1	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T6_42	4.5	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T6_43	3.4	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T6_44	1.9	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T6_45	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae/Hormosira

Table 24 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Only very sparse algae on cobble.
					Only very sparse algae on cobble.
					Only very sparse algae on cobble.
					Extensive sediment over the reef.
					Extensive sediment over the reef.
					Extensive sediment over the reef.
					Extensive sediment over the reef.
Ripples	Sand	Bare			
Ripples	Sand	Bare			Small dense patch of Amphibolis surrounded by bare sediment.
					Extensive sediment over the reef.
					Extensive sediment over the reef.
Ripples	Sand	Bare			
Ripples	Sand	Bare			A band of Amphibolis/mixed brown algae lies in the transition from this site to T2_23b.
					A band of Amphibolis/mixed brown algae lies in the transition from this site to T2_23a.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
	Sand	Seagrass	Dense	Amphibolis	
		Seagrass	Dense	Amphibolis	Areas of bare sand between these 2 points.
		Seagrass	Dense	Amphibolis	
		Seagrass	Dense	Amphibolis	
Ripples	Sand	Bare			
Ripples	Sand	Bare			

Table 25. Barwon Bluff MS video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	2.7	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Mixed algae
T1_2	3.6	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora with mixed brown algae
T1_3a	4.6	Sediment	Unvegetated sediment				
T1_3b	2.3	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T1_4	4.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T2_5	2.7	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T2_6a	2.9	Sediment	Unvegetated sediment				
T2_6b	2.1	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T2_7a	3.1	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae with Phyllospora
T2_7b	4.2	Sediment	Unvegetated sediment				
T3_8	2.2	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora with mixed brown algae
T3_9	1.8	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T3_10	1.4	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora with Macrocystis
T3_11	4.1	Sediment	Unvegetated sediment				
T3_12	3.2	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora with Durvillaea
T3_13	3.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora with mixed brown algae
T4_14	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T4_15	4.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Durvillaea
T4_16	4.2	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T4_17	6.6	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia
T5_18	2.7	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Phyllospora/Durvillaea
T5_19	1.8	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea with Phyllospora
T5_20	2.0	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Macrocystis
T5_21	2.2	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T5_22	4.1	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T6_23	0.0	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Durvillaea
T6_24	2.4	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Phyllospora
T6_25	3.3	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora

Table 25 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
					School of Australian salmon present. Video blurred by freshwater from Barwon River.
Ripples	Sand	Bare			School of Silver trevally present feeding on sand.
Flat	Sand	Bare			Small patch of sand only surrounded by reef.
Flat	Sand	Bare			Small patch of sand only surrounded by reef.
Ripples	Sand	Bare			

Table 26. Port Phillip Heads MNP – Point Lonsdale video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T1_2	0.0	Sediment	Unvegetated sediment				
T1_3	0.0	Sediment	Unvegetated sediment				
T1_4	4.0	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Bare	
T1_5	4.7	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Mixed algae
T1_6	6.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T1_7	8.2	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora
T1_8	6.2	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Seagrass/Macroalgae	Amphibolis/mixed algae
T2_9	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Hormosira
T2_10	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Hormosira
T2_11a	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Durvillaea
T2_11b	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed algae
T2_12	0.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed algae with Ecklonia
T2_13	10.1	Sediment	Unvegetated sediment				
T2_14	8.5	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T3_15	3.0	Sediment	Unvegetated sediment				
T3_16	3.2	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Durvillaea
T3_17	2.8	Sediment	Unvegetated sediment				
T3_18	4.9	Rock/Reef	Low profile reef	Continuous	Solid	Seagrass/Macroalgae	Amphibolis/mixed algae
T3_19	6.3	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Bare	
T3_20	8.9	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora/Ecklonia
T3_21	9.9	Rock/Reef -Sediment	Low profile reef	Patchy	Cobble	Bare	
T3_22	9.2	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora/Ecklonia
T3_23	8.5	Sediment	Unvegetated sediment				
T3_24	8.3	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Mixed brown algae
T4_25	6.8	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora/Ecklonia
T4_26	8.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora/Ecklonia
T4_27	8.4	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Mixed algae
T4_28	8.0	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora with Ecklonia
T4_29	6.6	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora/Ecklonia
T5_30	7.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora/Ecklonia
T5_31	8.8	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora/Ecklonia
T5_32	10.0	Sediment	Unvegetated sediment				
T5_33	8.4	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Mixed algae
T5_34	5.2	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora with Ecklonia
T5_35	7.6	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Mixed algae
T5_36	6.3	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora with Ecklonia
T6_37	3.7	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora with Ecklonia
T6_38	3.4	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T6_39	5.6	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T6_40	7.6	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Phyllospora
T9_41a	7.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Ecklonia
T9_41b	9.7	Rock/Reef	Low profile reef	Continuous	Solid	Bare	
T9_42	7.2	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Ecklonia
T9_43	7.7	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia
T7_44	0.0	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T7_45	2.0	Sediment	Unvegetated sediment				
T7_46	2.1	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T7_47	2.2	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T7_48	3.2	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Seagrass/Macroalgae	Amphibolis with mixed algae
T7_49	4.7	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Mixed algae with Amphibolis
T7_50	6.0	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Mixed algae with Amphibolis
T7_51	5.3	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Phyllospora
T7_52	6.1	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora/Ecklonia
T7_53	8.1	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Ecklonia
T7_54	10.7	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia
T7B_55	12.6	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia
T8_56	5.4	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Mixed brown algae/Macrocystis
T8_57	7.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia
T8_58	7.7	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Ecklonia
T8_59	6.8	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Ecklonia
T8_60	3.7	Rock/Reef -Sediment	High profile reef	Patchy	Solid	Macroalgae	Macrocystis
T8_61	9.8	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Ecklonia
T8_62	11.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia
T8_63	14.9	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia

Table 26 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
					Difficult to identify biota from video.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					This point represents the drop off from intertidal reef to the subtidal reef.
					Brown and green algae visible. High percentage of sand over the reef.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Generally less Ecklonia present.
Ripples	Sand	Bare			
					Generally a lot more sand over the reef here, giving a more patchy appearance.
					Can only just see the HP reef in the video as unable to get any closer to it.
					There is far less algal cover here than Transects 1-6.
					There are patches of HP reef amongst the generally LP reef here
Flat	Sand	Bare			Appear to be burrow holes in the sand.
					This sites is the seaward limit of Amphibolis on Transect 7.
					Australian fur seal observed.
					Australian fur seal observed.

Table 27. Port Phillip Heads MNP – Point Nepean video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	8.4	Sediment	Unvegetated sediment				
T2_2	4.7	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Seagrass	Amphibolis
T3_3	3.5	Sediment	Unvegetated sediment				
T4_4	2.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T4_5	3.2	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T5_6	0.0	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis with mixed algae
T5_7	3.6	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis with mixed algae
T6_8	3.6	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis with mixed algae
T7_9	2.0	Sediment	Vegetated sediment				
T7_10	3.1	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora/Ecklonia
T7_11	3.6	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis with mixed algae
T8_12	2.4	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Seagrass	Amphibolis
T8_13	2.7	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Ecklonia/mixed brown algae
T8_14	3.2	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis with mixed algae
T9_15	0.0	Sediment	Vegetated sediment				
T9_16	4.7	Rock/Reef -Sediment	High profile reef	Patchy	Solid	Macroalgae	Phyllospora/Ecklonia
T9_17	3.0	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Seagrass	Amphibolis
T11_18	4.8	Sediment	Unvegetated sediment				
T10_19	2.3	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Mixed brown algae
T10_20	4.5	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora/Ecklonia
T11_21	4.5	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Phyllospora/Ecklonia
T11_22	6.9	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Phyllospora with Amphibolis
T12_23	1.5	Sediment	Vegetated sediment				
T12_24	4.5	Rock/Reef -Sediment	Low profile reef	Patchy	Rubble	Seagrass/Macroalgae	Amphibolis with mixed algae
T13_25	2.8	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass	Amphibolis
T13_26	6.6	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Mixed green algae
T13_27	9.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia/Macrocystis
T16_28	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Macrocystis
T16_29	4.6	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Cystophora spp.
T16_30	13.1	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Ecklonia
T17_31	0.0	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Durvillaea
T17_32	3.2	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Mixed brown algae
T17_33	10.0	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora with Ecklonia
T18_34	9.5	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora with Ecklonia
T19_35	2.2	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Macrocystis
T19_36	1.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Hormosira/Macrocystis
T19_37	4.2	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Durvillaea
T19_38	11.5	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora with Ecklonia
T20_39	2.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Durvillaea/Turf algae
T20_40	8.4	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora with Ecklonia
T21_41	6.4	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Turf algae
T21_42	6.9	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Turf algae
T21_43	6.7	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Bare	
T21_44	8.9	Sediment	Unvegetated sediment				
T22_45	3.3	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Turf algae
T4_46	3.9	Sediment	Unvegetated sediment				
T5_47	4.1	Sediment	Unvegetated sediment				
T6_48	3.8	Sediment	Unvegetated sediment				
T7_49	5.5	Sediment	Unvegetated sediment				
T8_50	5.6	Sediment	Unvegetated sediment				
T9_51	5.0	Sediment	Unvegetated sediment				
T11_52	5.3	Sediment	Unvegetated sediment				
T17_53	0.0	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Turf algae
T18_54	3.2	Sediment	Unvegetated sediment				
T18_55	4.4	Sediment	Unvegetated sediment				
T19_56	4.2	Sediment	Unvegetated sediment				
T20_57	4.6	Sediment	Unvegetated sediment				
T22_58	3.8	Sediment	Unvegetated sediment				

Table 27 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
Ripples	Sand	Bare			
Ripples	Sand	Bare			
	Sand	Seagrass	Dense	Amphibolis	
	Sand	Seagrass	Dense	Amphibolis	
Ripples	Sand	Bare			Drift algae present.
					These are only very small patches of reef.
	Sand	Seagrass	Dense	Amphibolis	
					Transition from Hormosira on rock platform to Macrocystis in subtidal in front of rock platform.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand				Drift algae present.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			

Table28. Mushroom Reefs MS video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	2.2	Rock/Reef -Sediment	Low profile reef	Patchy	Cobble/Rubble	Macroalgae	Mixed algae
T1_2	1.4	Rock/Reef -Sediment	Low profile reef	Continuous	Cobble/Rubble	Seagrass	Amphibolis
T1_3	1.6	Rock/Reef	Low profile reef	Continuous	Solid	Seagrass/Macroalgae	Amphibolis/mixed algae
T1_4	2.0	Rock/Reef -Sediment	Low profile reef	Patchy	Cobble/Rubble	Bare	
T1_5	2.0	Rock/Reef -Sediment	Low profile reef	Continuous	Cobble/Rubble	Seagrass	Amphibolis
T1_6	1.5	Sediment	Vegetated sediment				
T1_7	2.4	Sediment	Vegetated sediment				
T1_8	0.8	Sediment	Vegetated sediment				
T1_9	2.8	Sediment	Vegetated sediment				
T1_10	2.1	Sediment	Unvegetated sediment				
T1_11	2.2	Rock/Reef -Sediment	Low profile reef	Patchy	Cobble/Rubble	Seagrass	Amphibolis
T1_12	3.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae
T1_13	3.7	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Mixed brown algae with Phyllospora
T1_14	6.5	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Phyllospora
T1_15	4.1	Sediment	Unvegetated sediment				
T1_16	1.1	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Seagrass/Macroalgae	Amphibolis/mixed algae
T2_17	1.4	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Mixed algae
T2_18	1.1	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Cystophora spp.
T2_19	4.8	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Phyllospora
T2_20	2.3	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Mixed algae
T2_21	3.2	Sediment	Unv egetated sediment				
T2_22	1.9	Rock/Reef	Low profile reef	Continuous	Solid	Seagrass/Macroalgae	Amphibolis/mixed algae
T2_23	2.9	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Cystophora spp.
T2_24	3.2	Rock/Reef	High profile reef	Continuous	Broken	Bare	
T2_25	5.2	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Ecklonia
T2_26	7.1	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Ecklonia
T2_27	6.4	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Ecklonia
T2_28	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Ecklonia
T2_29	8.6	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Ecklonia
T2_30	6.5	Sediment	Unvegetated sediment				

Table 28 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
	Sand	Seagrass	Dense	Amphibolis	
Flat	Sand	Seagrass	Medium	Zostera sp.	
	Sand	Seagrass	Dense	Amphibolis	
	Sand	Seagrass	Medium	Zostera sp.	
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Mixture of broken low profile reef, dominated by mixed brown algae, and rubble dominated by Amphibolis.
					Patches of cobble amongst the low profile reef.
					Patches of cobble amongst the low profile reef.
Ripples	Sand/Gravel	Bare			Coarse dark sand.
					Some very sparse Macrocystis also observed.
					Some very sparse Macrocystis also observed.
Flat	Sand/Gravel	Bare			Coarse dark sand. Drift algae present.

Table29. Corner Inlet MNP video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
CI_1	2.7	Sediment	Vegetated sediment				
CI_2	2.0	Sediment	Unvegetated sediment				
CI_3	2.0	Sediment	Vegetated sediment				
CI_4	2.0	Sediment	Vegetated sediment				
CI_5	1.7	Sediment	Vegetated sediment				
CI_6	1.9	Sediment	Vegetated sediment				
CI_7	2.0	Sediment	Vegetated sediment				
CI_8	1.7	Sediment	Vegetated sediment				
CI_9	1.6	Sediment	Vegetated sediment				
CI_10	1.2	Sediment	Vegetated sediment				
CI_11	1.1	Sediment	Vegetated sediment				
CI_12	1.7	Sediment	Vegetated sediment				
CI_13	1.9	Sediment	Vegetated sediment				
CI_14	1.7	Sediment	Vegetated sediment				
CI_15	1.7	Sediment	Vegetated sediment				
CI_16	1.3	Sediment	Vegetated sediment				
CI_17	1.4	Sediment	Vegetated sediment				
CI_18	1.8	Sediment	Vegetated sediment				
CI_19	1.5	Sediment	Vegetated sediment				
CI_20	1.9	Sediment	Vegetated sediment				
CI_21	2.8	Sediment	Vegetated sediment				
CI_22	1.7	Sediment	Vegetated sediment				
CI_23	1.5	Sediment	Vegetated sediment				
CI_24	0.5	Sediment	Vegetated sediment				
CI_25	1.0	Sediment	Vegetated sediment				
CI_26	0.9	Sediment	Vegetated sediment				
CI_27	1.1	Sediment	Vegetated sediment				
CI_28	1.2	Sediment	Unvegetated sediment				
CI_29	0.9	Sediment	Unvegetated sediment				
CI_30	1.2	Sediment	Vegetated sediment				
CI_31	1.5	Sediment	Vegetated sediment				
CI_32	1.7	Sediment	Vegetated sediment				
CI_33	1.0	Sediment	Unvegetated sediment				
CI_34a	2.0	Sediment	Vegetated sediment				
CI_34b	1.2	Sediment	Unvegetated sediment				
CI_35	0.0	Sediment	Vegetated sediment				
CI_36	0.0	Sediment	Vegetated sediment				
CI_37	0.0	Sediment	Vegetated sediment				
CI_38	6.3	Sediment	Vegetated sediment				
CI_39	8.0	Sediment	Vegetated sediment				
CI_40	0.6	Sediment	Vegetated sediment				
CI_41	0.0	Sediment	Vegetated sediment				
CI_42	0.7	Sediment	Vegetated sediment				
CI_43	0.8	Sediment	Vegetated sediment				
CI_44	0.8	Sediment	Vegetated sediment				
CI_45	1.1	Sediment	Vegetated sediment				
CI_46	1.6	Sediment	Vegetated sediment				
CI_47	0.8	Sediment	Vegetated sediment				
CI_48	0.8	Sediment	Vegetated sediment				
CI_49	0.9	Sediment	Vegetated sediment				
CI_50	0.0	Sediment	Vegetated sediment				
CI_51	0.1	Sediment	Vegetated sediment				
CI_52	0.9	Sediment	Unvegetated sediment				
CI_53	0.1	Sediment	Vegetated sediment				
CI_54a	1.7	Sediment	Unvegetated sediment				
CI_54b	5.1	Sediment	Vegetated sediment				
CI_54c	12.8	Sediment	Vegetated sediment				

Table 29 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
	Sand	Seagrass/Macroalgae	Dense	Posidonia/mixed algae	High percentage of undefined macroalgae amongst the seagrass. Siltation/epiphytes on Posidonia leaves.
Ripples	Sand	Bare			
Flat	Sand	Seagrass/Macroalgae	Medium	Posidonia/mixed algae	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Sparse	Halophila/Zostera sp.	Posidonia leaf litter/detritus present.
Flat	Sand	Seagrass	Dense	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Medium	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Medium	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Medium	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Dense	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Medium	Zostera sp.	Heavy siltation/algae over leaves and Posidonia leaf litter/detritus present.
Flat	Sand	Seagrass	Medium	Zostera sp.	
Flat	Sand	Seagrass	Dense	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Medium	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Medium	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Medium	Posidonia	Siltation/epiphy tes on Posidonia leaves.
Flat	Sand	Seagrass	Sparse Patchy	Zostera sp.	Heavy siltation over leaves.
	Sand	Seagrass/Macroalgae	Dense	Zostera sp./mixed algae	High percentage of undefined macroalgae amongst the seagrass.
Flat	Sand	Seagrass	Medium	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Medium	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Seagrass	Medium	Posidonia	Siltation/epiphytes on Posidonia leaves.
Flat	Sand	Macroalgae	Sparse Patchy	Mixed algae	
Flat	Sand	Seagrass	Sparse	Halophila	
Ripples	Sand	Macroalgae	Sparse	Mixed algae	
Flat	Sand	Seagrass	Medium Patchy	Zostera sp.	Leaf length approximately 5 cm.
	Sand	Seagrass	Dense	Zostera sp.	Leaf length approximately 20 cm.
	Sand	Seagrass	Dense	Zostera sp.	Leaf length approximately 30 cm.
Flat	Sand	Seagrass	Sparse	Posidonia	This Posidonia is adjacent to the dense Zostera sp at site CI_26.
Ripples	Sand	Bare			
Ripples	Sand	Bare			High number of burrow holes visible.
Flat	Sand	Seagrass	Sparse Patchy	Posidonia	High number of burrow holes visible.
	Sand	Seagrass/Macroalgae	Dense	Posidonia/mixed algae	High percentage of undefined macroalgae amongst the seagrass. Siltation/epiphytes on Posidonia leaves.
	Sand	Seagrass/Macroalgae	Dense	Posidonia/mixed algae	High percentage of undefined macroalgae amongst the seagrass. Siltation/epiphytes on Posidonia leaves.
Ripples	Sand	Bare			High number of burrow holes visible.
	Sand	Seagrass/Macroalgae	Dense	Posidonia/mixed algae	High percentage of undefined macroalgae amongst the seagrass. Siltation/epiphytes on Posidonia leaves.
Ripples	Sand	Bare			High number of burrow holes visible.
Flat	Sand	Seagrass	Medium	Zostera sp.	Leaf length approximately 5 cm.
	Sand	Seagrass	Dense	Zostera sp.	Leaf length approximately 20 cm.
Flat	Sand	Seagrass	Medium	Zostera sp.	Leaf length approximately 5-10 cm.
Flat	Sand	Seagrass	Medium	Zostera sp.	Leaf length approximately 5-10 cm.
Flat	Sand	Seagrass	Sparse Patchy	Zostera sp.	Very sparse here, is almost bare but there is seagrass present. Leaf length approximately 5 cm.
Flat	Sand	Seagrass	Medium	Zostera sp.	Leaf length approximately 5-10 cm.
Flat	Sand	Seagrass	Sparse Patchy	Zostera sp.	Very sparse here, is almost bare but there is seagrass present. Leaf length approximately 5 cm.
Ripples	Sand	Seagrass	Sparse Patchy	Zostera sp.	Very sparse here, is almost bare but there is seagrass present. Leaf length approximately 5 cm.
Ripples	Sand	Seagrass	Sparse Patchy	Zostera sp.	Very sparse here, is almost bare but there is seagrass present. Leaf length approximately 5 cm.
Ripples	Sand	Seagrass	Sparse Patchy	Zostera sp.	Very sparse here, is almost bare but there is seagrass present. Leaf length approximately 5 cm.
	Sand	Seagrass	Dense	Zostera sp.	Leaf length approximately 20 cm.
	Sand	Seagrass	Dense	Zostera sp.	Leaf length approximately 20 cm. Heavy epiphytic algal or sediment cover on leaves.
Flat	Sand	Seagrass	Sparse Patchy	Zostera sp.	Leaf length approximately 5 cm.
Flat	Sand	Seagrass	Medium Patchy	Zostera sp.	Sparse seagrass surrounding the medium patches. Leaf length approximately 5 cm.
Flat	Sand	Seagrass	Medium Patchy	Zostera sp.	Sparse seagrass surrounding the medium patches. Leaf length approximately 10 cm.
Flat	Sand	Seagrass	Medium Patchy	Zostera sp.	Sparse seagrass surrounding the medium patches. Leaf length approximately 5 cm.
Flat	Sand	Seagrass	Sparse Patchy	Zostera sp.	Leaf length approximately 5 cm.
Flat	Sand	Bare			High number of burrow holes visible.
	Sand	Seagrass	Medium Patchy	Zostera sp.	Sparse seagrass surrounding the medium patches. Leaf length approximately 5 cm.
Ripples	Sand	Bare			
Ripples	Sand	Seagrass	Medium	Posidonia	Possibly a large percentage of Posidonia leaf detritus here.
Ripples	Sand	Seagrass	Sparse	Zostera sp.	Very sparse here, is almost bare but there is seagrass present.

Table 29. (Continued)

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
CI_54d	10.5	Sediment	Unvegetated sediment				
CI_54e	1.8	Sediment	Unvegetated sediment				

Table 29 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
Ripples	Sand	Bare			
Ripples	Sand	Bare			

Table 30. Point Hicks MNP video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	2.1	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora with Durvillaea
T1_2	5.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora
T1_3	13.1	Sediment	Unvegetated sediment				
T2_4	1.4	Sediment	Unvegetated sediment				
T2_5	3.9	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Bare	
T2_6	3.3	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Mixed algae
T3_7	1.7	Sediment	Unvegetated sediment				
T4_8	3.1	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T4_9	5.6	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora with Durvillaea
T4_10	7.5	Sediment	Unvegetated sediment				
T5_11	6.6	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora with Ecklonia
T5_12	8.4	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora with Ecklonia
T5_13	10.8	Sediment	Unvegetated sediment				
T6_14	4.2	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora with Durvillaea
T6_15	6.1	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora with Ecklonia
T6_16	12.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora/Ecklonia
T6_17	14.5	Sediment	Unvegetated sediment				
T7_18	2.9	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T7_19	11.6	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia with Phyllospora
T7_20	19.3	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia
T7_21	22.6	Sediment	Unvegetated sediment				
T8_22	3.4	Rock/Reef -Sediment	Low profile reef	Patchy	Boulders	Bare	
T8_23	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T8_24	8.6	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Ecklonia
T8_25	19.6	Rock/Reef	High profile reef	Continuous	Broken	Sessile invertebrates	Sponges/Ascidians
T9_26	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T9_27	10.4	Sediment	Unvegetated sediment				
T10_28	5.2	Rock/Reef	High profile reef	Continuous	Broken	Bare	
T10_29	1.8	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T10_30	4.8	Sediment	Unvegetated sediment				
T10_31	8.6	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora/Ecklonia
T11_32	3.9	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T11_33	11.2	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora with Ecklonia
T11_34	17.9	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Ecklonia
T12_35	5.6	Sediment	Unvegetated sediment				
T12_36	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora with Ecklonia
T12_37	16.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Ecklonia
T13_38	0.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T13_39	9.1	Sediment	Unvegetated sediment				
T14_40	4.0	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora with Ecklonia
T14_41	9.1	Rock/Reef -Sediment	Low profile reef	Patchy	Boulders	Bare	
T15_42	3.5	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Bare	
T15_43	0.9	Rock/Reef -Sediment	Low profile reef	Patchy	Broken	Macroalgae	Mixed algae
T15_44	8.5	Sediment	Unvegetated sediment				
T16_45	11.5	Sediment	Unvegetated sediment				
T16_46	1.5	Sediment	Unvegetated sediment				
T17_47	2.1	Sediment	Unvegetated sediment				
T17_48	13.4	Sediment	Unvegetated sediment				
T18_49	15.4	Sediment	Unvegetated sediment				
T18_50	2.0	Sediment	Unvegetated sediment				
T19_51	2.4	Sediment	Unvegetated sediment				
T19_52	13.4	Sediment	Unvegetated sediment				

Table 30 contnued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			Drift algae observed.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Banded morwong (*Cheilodactylus spactabilis*); Blue morwong (*Nemadactylus douglasii*) and Old wife (*Enoplosus armatus*) observed .
Ripples	Sand	Bare			
					Banded morwong (*Cheilodactylus spactabilis*) observed.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Port Jackson shark (*Heterodontus portusjacksoni)* observed.
Ripples	Sand	Bare			
Ripples	Sand	Bare			Small shark observed appears to be a Swell shark (*Cephaloscyllium laticeps*).
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			

Table 31. Cape Howe MNP video site habitat classification.

id	Boat depth	Substratum type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
T1_1	4.3	Rock/Reef	High profile reef	Continuous	Solid	Macroalgae	Phyllospora
T1_2	10.8	Rock/Reef	Low profile reef	Continuous	Boulders	Bare	Urchin barren
T1_3	13.6	Rock/Reef	Low profile reef	Continuous	Broken	Macroalgae	Phyllospora
T2_4	3.2	Sediment	Unvegetated sediment				
T2_5	4.8	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora
T2_6	14.8	Rock/Reef	High profile reef	Continuous	Broken	Bare	Urchin barren
T2_7	16.2	Rock/Reef	High profile reef	Continuous	Broken	Bare	Urchin barren
T3_8	2.9	Rock/Reef -Sediment	Low profile reef	Patchy	Solid	Macroalgae	Durvillaea
T3_9	7.9	Sediment	Unvegetated sediment				
T3_10	14.7	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T3_11	18.5	Sediment	Unvegetated sediment				
T4_12	1.7	Rock/Reef -Sediment	High profile reef	Patchy	Broken	Macroalgae	Phyllospora/Durvillaea
T4_13	5.0	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T4_14	10.4	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T4_15	12.0	Sediment	Unvegetated sediment				
T4_16	16.5	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T4_17	17.9	Sediment	Unvegetated sediment				
T5_18	2.3	Rock/Reef	High profile reef	Continuous	Broken	Macroalgae	Phyllospora/Durvillaea
T5_19	5.8	Sediment	Unvegetated sediment				
T5_20	8.1	Rock/Reef	Low profile reef	Continuous	Solid	Macroalgae	Phyllospora
T5_21	11.7	Sediment	Unvegetated sediment				
T5_22	15.6	Sediment	Unvegetated sediment				
T6_23	2.6	Rock/Reef -Sediment	High profile reef	Patchy	Solid	Macroalgae	Phyllospora/Durvillaea
T6_24	4.1	Sediment	Unvegetated sediment				
T6_25	11.4	Sediment	Unvegetated sediment				
T6_26	16.2	Sediment	Unvegetated sediment				
T7_27	2.3	Sediment	Unvegetated sediment				
T7_28	16.0	Sediment	Unvegetated sediment				
T8_29	4.6	Sediment	Unvegetated sediment				
T8_30	14.8	Sediment	Unvegetated sediment				
T9_31	4.2	Sediment	Unvegetated sediment				
T9_32	17.7	Sediment	Unvegetated sediment				
T10_33	3.3	Sediment	Unvegetated sediment				
T10_34	17.3	Sediment	Unvegetated sediment				
T11_35	3.9	Sediment	Unvegetated sediment				
T11_36	15.2	Sediment	Unvegetated sediment				
T12_37	4.0	Sediment	Unvegetated sediment				
T12_38	14.4	Sediment	Unvegetated sediment				
T13_39	5.3	Sediment	Unvegetated sediment				
T13_40	15.8	Sediment	Unvegetated sediment				

Table 31 continued

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
					Sea urchins visible.
Ripples	Sand	Bare			
					Sea urchins visible.
					Sea urchins visible. Small shark observed appears to be a Swell shark (*Cephaloscyllium laticeps*).
					High number of ascidians visible under Durvillaea.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					Port Jackson shark (*Heterodontus portusjacksoni*) observed.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					High number of ascidians visible under algae.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
					High number of ascidians visible under algae.
Ripples	Sand	Bare			
Ripples	Sand	Bare			Drift algae present.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			Drift algae present.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			Drift algae present.
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			
Ripples	Sand	Bare			

3 Appendix 3

3.1 INTERTIDAL SURVEY SITE LOCATIONS

The following tables present the locations of intertidal survey sites.

Table 32. Eagle Rock MS intertidal site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Latitude	Longitude	Date
ER_IT_01	IT_01	-38.469404	144.102012	14-Mar-04
ER_IT_02	IT_02	-38.469255	144.102545	14-Mar-04
ER_IT_03	IT_03	-38.469396	144.102574	14-Mar-04
ER_IT_04	IT_04	-38.469203	144.103117	14-Mar-04
ER_IT_05	IT_05	-38.469081	144.103571	14-Mar-04
ER_IT_06	IT_06	-38.469247	144.104327	14-Mar-04
ER_IT_07	IT_07	-38.469486	144.104763	14-Mar-04
ER_IT_08	IT_08	-38.468938	144.105248	14-Mar-04
ER_IT_09	IT_09	-38.468638	144.105460	14-Mar-04
ER_IT_10	IT_10	-38.468300	144.105941	14-Mar-04
ER_IT_11	IT_11	-38.468107	144.106952	14-Mar-04
ER_IT_12	IT_12	-38.467547	144.107329	14-Mar-04
ER_IT_13	IT_13	-38.467330	144.107236	14-Mar-04
ER_IT_14	IT_14	-38.467015	144.107467	14-Mar-04
ER_IT_15	IT_15	-38.467976	144.107080	14-Mar-04
ER_IT_16	IT_16	-38.468192	144.106376	14-Mar-04
ER_IT_17	IT_17	-38.468123	144.105725	14-Mar-04
ER_IT_18	IT_18	-38.469020	144.103301	14-Mar-04
ER_IT_19	IT_19	-38.468850	144.102468	14-Mar-04

Table 33. Point Addis MNP intertidal site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Latitude	Longitude	Date
PA_IT_01	IT_01	-38.390783	144.252283	14-May-05
PA_IT_02	IT_02	-38.390983	144.253133	14-May-05
PA_IT_03	IT_03	-38.392033	144.254333	14-May-05
PA_IT_04	IT_04	-38.393300	144.254050	14-May-05
PA_IT_05	IT_05	-38.393717	144.253283	14-May-05
PA_IT_06	IT_06	-38.373700	144.276083	14-May-05
PA_IT_07	IT_07	-38.372800	144.279967	14-May-05
PA_IT_08	IT_08	-38.371633	144.281383	14-May-05
PA_IT_09	IT_09	-38.371600	144.280733	14-May-05

Table 34. Point Danger MS intertidal site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Latitude	Longitude	Date
PD_IT_01	IT_01	-38.341084	144.327171	14-Feb-04
PD_IT_02	IT_02	-38.340783	144.328614	14-Feb-04
PD_IT_03	IT_03	-38.340311	144.328523	14-Feb-04
PD_IT_04	IT_04	-38.339554	144.328946	14-Feb-04
PD_IT_05	IT_05	-38.340276	144.329490	14-Feb-04
PD_IT_06	IT_06	-38.340744	144.330789	14-Feb-04
PD_IT_07	IT_07	-38.341481	144.331187	14-Feb-04
PD_IT_08	IT_08	-38.341628	144.330974	14-Feb-04
PD_IT_09	IT_09	-38.341773	144.329674	14-Feb-04
PD_IT_10	IT_10	-38.341682	144.329086	14-Feb-04
PD_IT_11	IT_11	-38.341322	144.329125	14-Feb-04
PD_IT_12	IT_12	-38.341348	144.328564	14-Feb-04
PD_IT_13	IT_13	-38.341378	144.327201	14-Feb-04
PD_IT_14	IT_14	-38.341575	144.328196	14-Feb-04
PD_IT_15	IT_15	-38.340992	144.328573	14-Feb-04
PD_IT_16	IT_16	-38.340649	144.329285	14-Feb-04
PD_IT_17	IT_17	-38.340901	144.329369	14-Feb-04
PD_IT_18	IT_18	-38.341262	144.329569	14-Feb-04
PD_IT_19	IT_19	-38.341176	144.330372	14-Feb-04
PD_IT_20	IT_20	-38.341189	144.331073	14-Feb-04
PD_IT_21	IT_21	-38.340673	144.330074	14-Feb-04
PD_IT_22	IT_22	-38.339665	144.328274	14-Feb-04
PD_IT_23	IT_23	-38.340096	144.327812	14-Feb-04
PD_IT_24	IT_24	-38.340365	144.327647	14-Feb-04
PD_IT_25	IT_25	-38.340347	144.327344	14-Feb-04
PD_IT_26	IT_26	-38.340499	144.326937	14-Feb-04
PD_IT_27	IT_27	-38.340666	144.327272	14-Feb-04
PD_IT_28	IT_28	-38.340742	144.327514	14-Feb-04
PD_IT_29	IT_29	-38.341082	144.328028	14-Feb-04
PD_IT_30	IT_30	-38.340961	144.327714	14-Feb-04

Table 35. Barwon Bluff MS intertidal site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Latitude	Longitude	Date
BB_IT_01	IT_01	-38.289023	144.501000	26-Jan-04
BB_IT_02	IT_02	-38.289707	144.501648	26-Jan-04
BB_IT_03	IT_03	-38.289972	144.502494	26-Jan-04
BB_IT_04	IT_04	-38.289675	144.502752	26-Jan-04
BB_IT_05	IT_05	-38.290346	144.501315	26-Jan-04
BB_IT_06	IT_06	-38.291069	144.500366	26-Jan-04
BB_IT_07	IT_07	-38.291452	144.499334	26-Jan-04
BB_IT_08	IT_08	-38.290385	144.497181	26-Jan-04
BB_IT_09	IT_09	-38.290476	144.497927	26-Jan-04
BB_IT_10	IT_10	-38.290753	144.498118	26-Jan-04
BB_IT_11	IT_11	-38.290577	144.500634	26-Jan-04
BB_IT_12	IT_12	-38.289293	144.501731	20-Feb-04
BB_IT_13	IT_13	-38.289358	144.502033	20-Feb-04
BB_IT_14	IT_14	-38.290004	144.502272	20-Feb-04
BB_IT_15	IT_15	-38.291164	144.499514	20-Feb-04
BB_IT_16	IT_16	-38.290664	144.498655	20-Feb-04
BB_IT_17	IT_17	-38.290276	144.497142	20-Feb-04

Table 36. Port Phillip Heads MNP – Point Lonsdale intertidal site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Latitude	Longitude	Date
PL_IT_01	IT_01	-38.290618	144.606311	6-Feb-04
PL_IT_02	IT_02	-38.290527	144.605788	6-Feb-04
PL_IT_03	IT_03	-38.291334	144.606610	6-Feb-04
PL_IT_04	IT_04	-38.291277	144.606924	6-Feb-04
PL_IT_05	IT_05	-38.291743	144.607253	6-Feb-04
PL_IT_06	IT_06	-38.292020	144.607394	6-Feb-04
PL_IT_07	IT_07	-38.291234	144.607429	6-Feb-04
PL_IT_08	IT_08	-38.291404	144.610344	6-Feb-04
PL_IT_09	IT_09	-38.291971	144.610902	6-Feb-04
PL_IT_10	IT_10	-38.293036	144.616288	6-Feb-04
PL_IT_11	IT_11	-38.292774	144.615264	6-Feb-04
PL_IT_12	IT_12	-38.293103	144.614089	6-Feb-04
PL_IT_13	IT_13	-38.292660	144.612915	6-Feb-04
PL_IT_14	IT_14	-38.292060	144.613105	6-Feb-04
PL_IT_15	IT_15	-38.291868	144.612038	6-Feb-04

Table 37. Port Phillip Heads MNP – Point Nepean intertidal site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Latitude	Longitude	Date
PN_IT_01	IT_01	-38.301383	144.653067	5-Apr-05
PN_IT_02	IT_02	-38.301700	144.651817	5-Apr-05
PN_IT_03	IT_03	-38.301917	144.650883	5-Apr-05
PN_IT_04	IT_04	-38.301833	144.649900	5-Apr-05
PN_IT_05	IT_05	-38.302533	144.649767	5-Apr-05
PN_IT_06	IT_06	-38.301517	144.648550	5-Apr-05
PN_IT_07	IT_07	-38.301900	144.648417	5-Apr-05
PN_IT_08	IT_08	-38.303133	144.650533	5-Apr-05
PN_IT_09	IT_09	-38.304483	144.651717	5-Apr-05
PN_IT_10	IT_10	-38.304550	144.653017	5-Apr-05
PN_IT_11	IT_11	-38.305233	144.653967	5-Apr-05
PN_IT_12	IT_12	-38.305883	144.655033	5-Apr-05

Table 38. Mushroom Reef MS intertidal site locations (coordinates in GDA94).

Full Site ID	Abbreviated ID	Latitude	Longitude	Date
MM_IT_01	IT_01	-38.484194	145.017696	31-Jan-04
MM_IT_02	IT_02	-38.484323	145.017277	31-Jan-04
MM_IT_03	IT_03	-38.485177	145.017401	31-Jan-04
MM_IT_04	IT_04	-38.485245	145.017323	31-Jan-04
MM_IT_05	IT_05	-38.485785	145.017766	31-Jan-04
MM_IT_06	IT_06	-38.485765	145.018817	31-Jan-04
MM_IT_07	IT_07	-38.486431	145.019243	31-Jan-04
MM_IT_08	IT_08	-38.486654	145.018323	31-Jan-04
MM_IT_09	IT_09	-38.486386	145.016749	31-Jan-04
MM_IT_10	IT_10	-38.486131	145.016488	31-Jan-04
MM_IT_11	IT_11	-38.485821	145.016289	31-Jan-04
MM_IT_12	IT_12	-38.486158	145.014474	31-Jan-04
MM_IT_13	IT_13	-38.485583	145.015382	31-Jan-04
MM_IT_14	IT_14	-38.485868	145.015879	6-Mar-04
MM_IT_15	IT_15	-38.486341	145.015830	6-Mar-04
MM_IT_16	IT_16	-38.486168	145.015046	6-Mar-04
MM_IT_17	IT_17	-38.485584	145.014535	6-Mar-04
MM_IT_18	IT_18	-38.485294	145.016492	6-Mar-04
MM_IT_19	IT_19	-38.485719	145.016585	6-Mar-04
MM_IT_20	IT_20	-38.485987	145.017617	6-Mar-04
MM_IT_21	IT_21	-38.483225	145.015814	6-Mar-04
MM_IT_22	IT_22	-38.483827	145.016389	6-Mar-04
MM_IT_23	IT_23	-38.483868	145.015681	6-Mar-04
MM_IT_24	IT_24	-38.483675	145.015493	6-Mar-04
MM_IT_25	IT_25	-38.482944	145.014429	6-Mar-04
MM_IT_26	IT_26	-38.482810	145.016074	6-Mar-04
MM_IT_27	IT_27	-38.482974	145.015126	6-Mar-04
MM_IT_28	IT_28	-38.483312	145.015480	6-Mar-04
MM_IT_29	IT_29	-38.483479	145.015904	6-Mar-04
MM_IT_30	IT_30	-38.481744	145.013933	6-Mar-04
MM_IT_31	IT_31	-38.481577	145.014200	6-Mar-04
MM_IT_32	IT_32	-38.481381	145.014868	6-Mar-04
MM_IT_33	IT_33	-38.481611	145.014976	6-Mar-04

4 Appendix 4

4.1 INTERTIDAL SITE HABITAT CLASSIFICATION

The following tables present habitat classifications for the intertidal survey sites.

Table 39. Eagle Rock MS intertidal site classification.

ID	Substratum type	Substratum Category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
IT_01	Rock/Reef	High profile platform	Continuous	Broken	Macroalgae	Hormosira/Mixed brown algae
IT_02	Rock/Reef	High profile platform	Continuous	Broken	Macroalgae	Hormosira
IT_03	Rock/Reef	High profile platform	Continuous	Broken	Macroalgae	Hormosira/Mixed brown algae
IT_04	Rock/Reef	High profile platform	Continuous	Broken/Boulders	Macroalgae	Hormosira/Mixed brown algae
IT_05	Rock/Reef	High profile platform	Continuous	Broken/Boulders	Bare	
IT_06	Rock/Reef	High profile platform	Continuous	Broken	Bare	
IT_07	Rock/Reef	High profile platform	Continuous	Solid	Bare	Mixed brown algae/Hormosira
IT_08	Rock/Reef	High profile platform	Continuous	Boulders	Bare	
IT_09	Rock/Reef	High profile platform	Continuous	Boulders	Bare	
IT_10	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_11	Rock/Reef	Low profile platform	Continuous	Boulders	Bare	
IT_12	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_13	Sediment	Sand flat				
IT_14	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_15	Rock/Reef – Sediment	High profile platform	Patchy	Boulders	Bare	
IT_16	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_17	Rock/Reef	High profile platform	Continuous	Solid	Bare	
IT_18	Rock/Reef	High profile platform	Continuous	Boulders/Cobble	Bare	
IT_19	Sediment	Sand beach				

Table 40. Point Addis MNP intertidal site classification.

ID	Substratum Type	Substratum Category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
IT_01	Rock/Reef	Low profile platform	Continuous	Boulders/Cobble	Bare	
IT_02	Sediment	Sand flat				
IT_03	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_04	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_05	Sediment	Sand beach				
IT_06	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Mixed red algae
IT_07	Rock/Reef	Low profile platform	Continuous	Solid	Hormosira	
IT_08	Rock/Reef	Low profile platform	Continuous	Solid	Hormosira	
IT_09	Sediment	Sand beach				

Table 39 (continued).

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
					Dense Hormosira extends back to shoreline. Mixed brown algae in rock pools, Durvillaea on seaward edge of platform.
					Mixed brown/red algae and Caulerpa in rock pools.
					Mixed brown/red algae and Caulerpa in rock pools. Durvillaea on seaward edge of rock platform.
					Less Hormosira/brown algae at this site than sites 1-3 and mainly in rock pools.
					Mostly bare with some Hormosira and brown algae in rock pools.
					Mostly bare with some Hormosira and brown algae in rock pools. Durvillaea/Phyllospora on seaward edge of platform.
					Site is located on flat area on top of high profile platform.
					Some Hormosira in gaps between boulders.
					Some Hormosira in gaps between boulders and scattered on boulders.
					Some Hormosira in gaps between boulders. Brown algae and Durvillaea at seaward edge of platform.
					Rock stacks sit between this site and the cliff. Seaward edge of platform is high profile with dense Hormosira and brown algae.
Flat	Sand	Bare			
					Dense carpet of Hormosira.
					Scattered brown algae.
					The front and left side (looking seaward) of this site are bounded by boulders.
					This outcrop of bare reef is surrounded by sand.
					Scattered Hormosira.
Flat	Sand	Bare			

Table 40 (continued).

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
					Small area of boulder/cobble surrounded by sand flat.
Flat	Sand	Bare			
					Scattered boulder/cobble over low profile platform.
					Amphibolis in small rockpools and Durvillaea on seaward edge of platform.
Flat	Sand	Bare			Rocky protrusions amongst sand beach.
					Some turfing algae at site.
					Dense carpet of Hormosira.
Flat	Sand	Bare			Strip of sand between base of cliff and back of rock platform.

Table 41. Point Danger MS intertidal site classification.

ID	Substratum Type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
IT_01	Sediment	Sand flat				
IT_02	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_03	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Mixed brown algae
IT_04	Sediment	Sand flat				
IT_05	Rock/Reef	Low profile platform	Continuous	Cobble	Bare	
IT_06	Rock/Reef	Low profile platform	Continuous	Cobble	Macroalgae	Mixed brown algae/Ulva
IT_07	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Hormosira/Mixed brown algae
IT_08	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Mixed brown algae
IT_09	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Mixed brown algae
IT_10	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Mixed brown algae
IT_11	Rock/Reef	Low profile platform	Continuous	Solid	Seagrass	Amphibolis
IT_12	Sediment	Vegetated sediment				
IT_13	Sediment	Sand flat				
IT_14	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Hormosira
IT_15	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_16	Sediment	Sand flat				
IT_17	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Mixed brown algae/Hormosira
IT_18	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_19	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Hormosira/Mixed brown algae
IT_20	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Hormosira/brown algae/Ulva
IT_21	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Hormosira
IT_22	Rock/Reef – Sediment	Low profile platform	Patchy	Broken	Macroalgae	Hormosira
IT_23	Sediment	Sand beach				
IT_24	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_25	Rock/Reef – Sediment	Low profile platform	Patchy	Solid	Bare	
IT_26	Rock/Reef	Low profile platform	Continuous	Broken	Bare	
IT_27	Rock/Reef – Sediment	Low profile platform	Patchy	Solid	Macroalgae	Ulva
IT_28	Sediment	Sand flat				
IT_29	Rock/Reef	Low profile platform	Continuous	Broken	Macroalgae	Hormosira
IT_30	Rock/Reef – Sediment	Low profile platform	Patchy	Solid	Macroalgae	Hormosira

Table 42. Barwon Bluff MS intertidal site classification.

ID	Substratum Type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
IT_01	Sediment	Sand flat				
IT_02	Sediment	Sand beach				
IT_03	Rock/Reef	High profile platform	Continuous	Broken	Bare	
IT_04	Rock/Reef	Low profile platform	Continuous	Boulders	Macroalgae	Hormosira
IT_05	Rock/Reef	High profile platform	Continuous	Broken	Bare	
IT_06	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_07	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_08	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_09	Rock/Reef – Sediment	Low profile platform	Patchy	Solid	Bare	
IT_10	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_11	Sediment	Sand flat				
IT_12	Rock/Reef	High profile platform	Continuous	Boulders	Bare	
IT_13	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_14	Rock/Reef	High profile platform	Continuous	Broken/Boulders	Bare	
IT_15	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_16	Rock/Reef	Low profile platform	Continuous	Gutters	Bare	
IT_17	Rock/Reef	Low profile platform	Continuous	Gutters	Bare	

Table 41 (continued).

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
Flat	Sand	Bare			
					Sand veneer and cobbles scattered over platform.
					Shallow rock pool (10-20 cm). Sand veneer over rock.
Flat	Sand	Bare			
					Scattered Hormosira.
					Some larger boulder sized rocks amongst cobble. Adjacent shallow subtidal has Amphibolis beds.
					Seaward edge of platform.
					This site has more sand amongst platform than adjacent areas.
					Edge of platform. Adjacent rockpool has sand seabed with brown algae merging into Amphibolis.
					Edge of platform to rockpool with sand seabed.
Flat	Sand	Seagrass	Dense	Amphibolis	Edge of platform to rockpool with sand seabed.
Flat	Sand	Bare			Sand surrounded by patches of rock platform with dense Hormosira. Amphibolis/brown algae at seaward edge.
					Site is at edge of brown algae with Ulva dominated to seaward of this point and Hormosira dominated to landward.
					Sand veneer scattered over platform.
Flat	Sand	Bare			
					Sand veneer over platform.
					Sand veneer over platform.
					Site is at edge of band of bare cobble. Amphibolis in adjacent subtidal area.
					Sand patches and cobble amongst platform.
Flat	Sand	Bare			Bare rock patches amongst the sand and between this site and cliff at backshore.
					Dense small black mussels.
					Cobbles spread amongst platform.
					Sparse Hormosira and small black mussels on rocks.
Flat	Sand	Bare			
					Cobbles spread over platform. Brown algae in shallow rock pools. Hormosira only on platform to the east.
					Extensive sand veneer over platform.

Table 42 (continued).

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
Flat	Sand	Bare			
Flat	Sand	Bare			Sand beach.
					Rock pools have Hormosira and brown algae. Black basalt.
					Durvillaea is visible on seaward edge of platform. Black basalt.
					Rock type here is beige sandstone versus black basalt to east. Rockpools on platform feature brown algae and Amphibolis.
					Green turf algae amongst Hormosira. Sandstone platform. Durvillaea visible on seaward edge of platform.
					Sandstone.
					Sandstone.
					Sandstone. Edge of dense Hormosira on platform to bare platform.
Flat	Sand	Bare			Bare sand separating sandstone and basalt.
					Black basalt.
					Flat platform with dense Hormosira surrounded by basalt boulder field.
					Black basalt. Hormosira in cracks between boulders and brown algae in rock pools.
					Sandstone with dimpled texture. Large rockpools nearby have brown algae and Amphibolis.
					Sandstone.
					Sandstone.

Table 43. Port Phillip Heads MNP - Point Lonsdale intertidal site classification.

ID	Substratum Type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
IT_01	Rock/Reef – Sediment	Low profile platform	Patchy	Solid	Macroalgae	Hormosira
IT_02	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_03	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Ulva
IT_04	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_05	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_06	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_07	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_08	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_09	Rock/Reef	Low profile platform	Continuous	Gutters	Macroalgae	Hormosira
IT_10	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_11	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_12	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_13	Rock/Reef	Low profile platform	Continuous	Gutters	Macroalgae	Hormosira
IT_14	Rock/Reef – Sediment	High profile platform	Patchy	Solid	Bare	
IT_15	Sediment	Sand flat				

Table 44. Port Phillip Heads MNP - Point Nepean intertidal site classification.

ID	Substratum Type	Substratum category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
IT_01	Rock	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_02	Sediment	Sand beach				
IT_03	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_04	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_05	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_06	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_07	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_08	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_09	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_10	Sediment	Sand beach				
IT_11	Sediment	Sand beach				
IT_12	Sediment	Sand beach				

Table 43 (continued).

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
					Bands of sand between large patches of rock platform.
					Scattered sand across platform and brown algae in shallow rock pools. Band of Durvillaea on seaward edge of platform.
					Site dominated by Ulva with very little Hormosira. Surrounding areas dominated by Hormosira.
					Site is located at edge of deep rockpool with dense bed of Amphibolis.
					Very little Hormosira at this site and scattered beds of black lichen/turfing algae.
					Large rockpools around this site feature Amphibolis and brown algae. Seaward edge of platform is bordered by Durvillaea.
					Patch of platform surrounded by sand.
					Band of Durvillaea on seaward edge of platform adjacent this site.
					Dense carpet of Hormosira covers all platform from this site back to the Lighthouse.
					Reef at edge of platform is guttered and gutters/rockpools have Amphibolis and brown algae.
					Scattered rock protrusions up to about 1-1.5 m surrounded by sand overlying platform.
Flat	Sand	Bare			

Table 44 (continued).

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
Flat	Sand	Bare			
					Rock bridge between 2 rock pools. Rock pools have Amphibolis and mixed brown algae.
					Brown algae in adjacent rock pool.
					Landward side of rock pile with navigation tower (approx 8 m from tower base).
					Durvillaea on seaward edge of platform. Rockpools have Caulerpa; Phyllospora and brown algae.
					Site located adjacent rock pool.
					Seaward side of rock pile. Photo 28 taken from about 50 m to west.
Flat	Sand	Bare			Edge of sand beach in cove and rock platform. Gap in rock platform extends out to deeper water.
Flat	Sand	Bare			Eastern end of sand beach in cove.
Flat	Sand	Bare			Eastern end of rock wall. Sand beach in front of seawall and backing low profile rock platform with Hormosira.

Table 45. Mushroom Reef MS intertidal site classification.

ID	Substratum Type	Substratum Category	Structure - Rock	Texture - Rock	Biota type - Rock	Dominant canopy biota - Rock
IT_01	Rock/Reef	Low profile platform	Continuous	Cobble	Bare	
IT_02	Rock/Reef	Low profile platform	Continuous	Cobble	Bare	
IT_03	Rock/Reef	Low profile platform	Continuous	Cobble	Bare	
IT_04	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_05	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_06	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_07	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_08	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_09	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_10	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_11	Rock/Reef	Low profile platform	Continuous	Cobble	Bare	
IT_12	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_13	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_14	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_15	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_16	Rock/Reef	Low profile platf orm	Continuous	Solid	Macroalgae	Hormosira
IT_17	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_18	Rock/Reef	Low profile platform	Continuous	Cobble	Bare	
IT_19	Rock/Reef	Low profile platform	Continuous	Cobble	Bare	
IT_20	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_21	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_22	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_23	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_24	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_25	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_26	Rock/Reef	Low profile platform	Continuous	Cobble	Bare	
IT_27	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_28	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_29	Rock/Reef	Low profile platform	Continuous	Solid	Bare	
IT_30	Rock/Reef	Low profile platform	Continuous	Solid	Macroalgae	Hormosira
IT_31	Rock/Reef	High profile platform	Continuous	Broken	Bare	
IT_32	Rock/Reef	High profile platform	Continuous	Broken	Bare	
IT_33	Rock/Reef	Low profile platform	Continuous	Broken	Bare	

Table 45 (continued).

Structure - Sediment	Texture - Sediment	Biota type - Sediment	Biota density - Sediment	Dominant biota - Sediment	Comments
					Higher proportion of pebble/gravel amongst cobble than adjacent platform.
					Edge of transition from cobble to low profile rock platform.
					Start of low profile rock platform.
					Shallow rock pools surround site with *Hormosira* and coralline algae. Black lichen in places on rock platform.
					Mixed brown algae in rock pools and adjacent subtidal areas.
					Adjacent platform edge dominated by *Durvillaea.*
					Amphibolis with brown algae and coralline algae in adjacent rockpools.
					Hormosira dominates surrounding platform.
					Edge of transition from bare rock platform and cobble.
					Turf algae amongst Hormosira.
					Edge of transition to cobble.
					Edge of transition to cobble.
					Some beds of small mussels scattered around platform.
					Hormosira has been burnt brown by sun. Shallow rockpools have white coralline algae.
					Site represents a band of dense Hormosira between water edge and internal bare platform.
					Some larger boulders amongst the cobble.
					Edge of transition to bare rock platform.
					White coralline algae in shallow rock pools and scattered Hormosira.
					Area of higher profile platform (0.5-1 m) outcropping from surrounding flat platform.
					Area of higher profile platform (0.5-1 m) outcropping from surrounding flat platform.
					Edge of higher profile (0.5-1 m) and flat profile platform.
					Area of higher profile platform (0.5-1 m) outcropping from surrounding flat platform.
					Edge of flat and higher profile (0.5-1) platform. White coralline algae in shallow rockpools and scattered Hormosira.
					Edge of flat profile and higher profile (0.5-1 m) platform. White coralline algae in shallow rockpools.
					Edge of flat profile and higher profile (0.5-1 m) platform.
					Amphibolis and brown algae in adjacent rockpools.
					Turf algae and green algae in rock pools.