The first habitat was predominantly found at depths greater than 40 m where divers have a very limited duration of safe dive times. Accordingly, very little scientific work has been undertaken at these depths. This habitat mainly consisted of encrusting coralline algae that formed leaf like plates and occupied the majority of the reef. As such this habitat has been name "encrusting corallines" and was recorded at a number of sites from around the two main islands.

A second habitat, equivalent to the urchin barrens habitat described in Shears *et al.* (2004) was also observed. Called "Centro barrens", this habitat consisted of moderate densities of the Australian sea urchin, *Centrostephenus rodgersii.* The Centro barrens habitat was found deeper (~20–25 m) than the previously described urchin barrens habitat (~4–10 m), which is formed by the New Zealand sea urchin *Evechinus chloroticus* (Choat & Schiel, 1982; Schiel, 1984; Shears, 2007).

This current survey has shed light on the ranges and breadth of subtidal habitats over a number of spatial scales (metres to kilometres) and at depths where few scientific divers are able to access. Accurate mapping of deep subtidal habitats will allow the identification of benthic communities that are vulnerable to damage, and allow management practices to be put in place to protect them.

6. Human use

6.1 Biosecurity

The Poor Knights Islands Marine Reserve is a high value area of national significance and the unique marine assemblages present in the reserve need to be protected from modification by invasive organisms. Vessel movement in the vicinity of the Poor Knights Islands is the most likely method for the introduction of invasive organisms to the islands via hull fouling, ballast water, and sea chests (water-intake recesses in hull). International and local shipping traffic to and from the port of Whangarei pass near the Poor Knights Islands and may discharge ballast water containing the larvae or spores of invasive species in the vicinity of the islands (Dodgshun *et al.*, 2007), which are then distributed at a local scale by water currents. Pleasure crafts visiting the Poor Knights Islands are also a significant biosecurity risk as many of these vessels remain inactive for long periods of time in sheltered marinas where invasive organisms are prevalent.

Biosecurity New Zealand has identified a number of non-indigenous marine organisms present in the country that have the potential to cause major changes to native species assemblages or cause large economic losses to our aquaculture and marine industries. These unwanted organisms include the Asian kelp, *Undaria pinnatifida*, the ascidians, *Styela clava, Didemnum vexillum, Ciona intestinalis*, and *Eudistoma elongatum*, and the Mediterranean fan worm, *Sabella spallanzanii* (Biosecurity New Zealand, 2008). Of the six invasive marine organisms listed above, the clubbed tunicate, *Styela clava*, has been recorded nearest to the Poor Knights Islands. This solitary ascidian has already been detected from the nearby Tutukaka Marina, Marsden Cove Marina (Whangarei), Hauraki Gulf, Waitemata Harbour, and Lyttelton Harbour (Biosecurity New Zealand, 2008). *Styela clava* can reach densities of 50–100 individuals/m^2 on natural substrates (Lutzen, 1999) and has the potential to cause significant environmental and economic impact through high-density fouling.

To date, the only likely invasive species recorded at the Poor Knights Islands is the parchment tubeworm, *Chaetopterus* sp., though it is not certain whether this worm is endemic to New Zealand or has been introduced from overseas (Tricklebank *et al.*, 2001). The earliest records of *Chaetopterus* sp. in New Zealand date back to circa 1966, but abundances around the country remained low until the mid 1990's when northern populations increased dramatically, particularly around the Hauraki Gulf region (Acosta, 2001). Taxonomic descriptions of the 'Hauraki' *Chaetopterus* sp. show that the species is new to science (Tricklebank *et al.*, 2001) and different from a second New Zealand species found around the Marlborough Sounds (G. Read, NIWA, pers. comm.). The 'Hauraki' *Chaetopterus* sp. was first discovered at the Poor Knights Islands in 1999 and underwent a major population explosion in the following years. Benthic surveys conducted at the Poor Knights Islands in 2001 recorded *Chaetopterus* sp. densities of up to ~20,000 individuals/m^2 on coarse soft sediments at Maroro Bay, Skull Bay, and Shag Bay at depths down to 69 m. The polychaete was also found on rocky reefs at much lower densities (Brook *et al.*, 2001). However, abundance of *Chaetopterus* sp. at the Poor Knights Islands drastically decreased in the years following Brook *et al's* study, and dense mats of the tubeworm at the Poor Knights Islands were no longer present by ~2003–2004 (F. Brooks, pers. comm.). The ecological impact of *Chaetopterus* sp. on the benthic community at the Poor Knights Islands is unknown.