Background

Shallow reef habitat covers extensive areas along the Victorian coast and is dominated by seaweeds, mobile invertebrates and fishes. To effectively manage and conserve these important and biologically rich habitats, the Victorian Government established a long-term Subtidal Reef Monitoring Program (SRMP) on reefs located throughout Victoria.

The subtidal reef at Jawbone Marine Sanctuary (MS) is in shallow water (<4 m) and consists of large basalt boulders and bedrock sloping steeply to sand at the toe of the reef.

Surveys at this location began in 2003 with the sixth survey of the sanctuary completed in April 2013.

Aims

The subtidal reef monitoring program provides a general description of the biological communities and species populations at each monitoring site and any changes over time. The program is designed to identify any:

- unusual biological phenomena;
- important community shifts;
- strong temporal trends;
- presence of introduced species; and
- any other important management information.

Figure 1. Sessile invertebrates and brown algae *Dictyota dichotoma* on boulder reef
Results

The seaweed assemblages at Jawbone Marine Sanctuary were largely depauperate of larger algal patches such as the common kelp *Ecklonia radiata*.

The alga cover was generally a mixture of crustose coralline algae, filamentous brown algae, small thallose browns such as *Dictyota dichotoma* and the green *Caulerpa* and *Codium* species.

The invertebrate community consisted largely of the sea urchin *Heliocidaris erythrogramma* with a few species of sea star in lower abundance.

The southern hulafish, *Trachinops caudimaculatus* was the most abundant fish inside the sanctuary. The zebra fish *Girella zebra* was sporadically present in relatively high abundance and to a lesser extent the dusky morwong *Dactylophora nigricans*. Only small numbers of the little weed whiting *Neodax balteatus* were observed.

Trends and community shifts

The community structure at Jawbone MS has been generally variable over time with trends observed in some invertebrate abundance.

- Seaweed community structure and species abundances were generally variable over time.
- There was a very large increase in *Heliocidaris erythrogramma* inside the sanctuary in 2009, persisting to 2013.
- The sea star *Meridiastra calcar* declined and virtually disappeared from the sanctuary during 2003 to 2005.
- Low numbers of fish species and abundances were generally observed in the sanctuary, with occasional influxes of non-resident species to cause high variability over the monitoring period.

Implications

The following management implications were observed at Jawbone MS over the monitoring period:

- The introduced species of Japanese kelp *Undaria pinnatifida*, Mediterranean fanworm *Sabella spallanzanii* and northern Pacific seastar *Asterias amurensis* were present in the sanctuary;
- The northern Pacific seastar has not been recorded at either site since 2005 however it was visible on sand flats off the transects in 2011 and 2013;
- The observed increases in sea urchins may be reflective of a greater availability of food provided by *U. pinnatifida*;
- The abundance and size of black-lipped abalone *Haliotis rubra* remained similar inside and outside the sanctuary and there was no evidence of changed fishing pressures.

Figure 2. Juvenile Japanese kelp *Undaria pinnatifida*.

Figure 3. The sea urchin *Heliocidaris erythrogramma* was observed in large abundance in Jawbone MS and at the reference site.