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6 October 2021

Westernport and Peninsula Protection Council and Save Westernport Inc.

Western Port Marine Pest Survey

This letter report describes the results of marine pest inspections at Yaringa Boat Harbour and Stony Point Jetty in September 2021.

1. Introduction

Western Port is largely free of the high priority marine pests of concern in Victoria. Incursions of introduced marine species into Western Port were described by Cohen et al (2000) who identified four exotic species (the ascidians *Ascidiella aspersa*, *Ciona intestinalis* and *Styela plicata* and the green algae *Ulva lactuca*) in Western Port. These new records increased the total number of exotic species recorded in the bay to 14 as previous surveys had identified 10 exotic species: the fanworm *Sabella spallanzanii*, the green crab *Carcinus maenus*, the bivalves *Corbula gibba*, *Crassostrea gigas*, *Musculista senhousia* and *Theora lubrica*, the algae *Codium fragile tomentosoides*, the ascidian *S. clava* and the bryozoans *Bugula neritina* and *Watersipora subtorquata*. The Cohen et al. (2000) survey confirmed the presence of *S. spallanzanii*, *C. maenus*, *C. gigas* and *S. clava* in Westernport. *Carcinus maenus* was reported to be widely distributed in the bay, but the remaining 13 exotic species appear to have a limited distribution.

A single occurrence of the Japanese kelp *Undaria pinnatifida* in Western Port is known from near Flinders Pier. The plants were removed and there were no further findings in subsequent monitoring of the site. Such intervention of localised, minor incursions has also proven to be successful in eradicating Northern Pacific seastar *Asterias amurensis* outbreaks in the Gippsland region.

Marine pest surveys in other parts of Victoria have shown that exotic species are often associated with recreational marinas or shipping facilities, often being restricted to these locations and not spreading to the wider environment. However, natural or anthropogenic perturbations and increased activities that promote translocation could cause the release of exotic species out of these enclosed areas and into the wider environment.

Increased shipping activity and recreational boating in Western Port has the potential to increase the risk of marine pest introductions. Therefore, surveillance and monitoring should increase commensurate with the increasing risk. The Westernport and Peninsula Protection Council

commissioned this study to complete marine pest inspections at sites that are not monitored in other programs such as those in progress by Department of Jobs, Precincts and Regions.

2. Methods

The inspection sites were located in Western Port, within the Ramsar Management Area but outside Marine Sanctuaries (Figure 1).

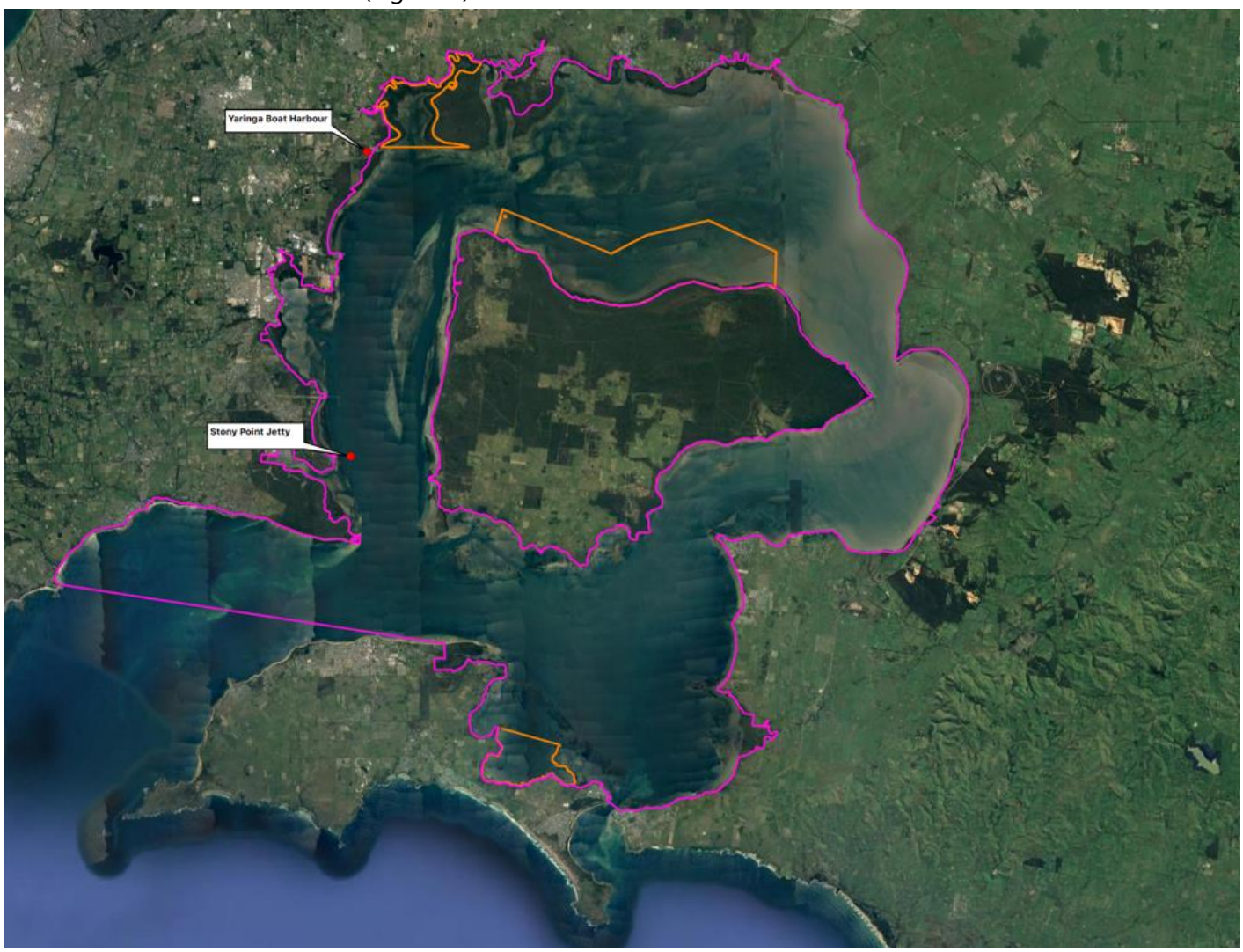


Figure 1. Location of Yaringa Boat Harbour and Stony Point Jetty in Western Port. Pink area denotes the Ramsar Management Area. Orange area denotes Marine Sanctuaries.

Visual inspections were completed by SCUBA diving. The primary scientist with taxonomic knowledge of marine invertebrates undertook visual inspections and underwater still photography. The second diver collected video footage. All available habitats were inspected and included floating pontoons, pylons (wooden and concrete), hulls of moored vessels, ropes, tyres and seafloor

substrates. Macrobenthic species were visually identified in the field and photographed. Video footage covered representative habitat surfaces encountered. After field inspection, still and video imagery was reviewed to check in-field identifications and further screen for marine pests.

2.1 Yaringa Boat Harbour

Yaringa Boat Harbour is a privately managed facility in the northwest of the bay. Divers accessed the water via the floating pontoons, inspecting representative surfaces and substrates on the north and south jetties (Figure 2) at inshore, midpoint and offshore locations. At each location, divers entered the berthing pens and followed the floating structures to inspect the berths in that area, crossing the channel from north to south, and repeating the process on the south side. The inspections targeted all surfaces and substrates, including the hulls of recreational and commercial vessels, particularly those that appeared to have been in-situ for some time. Above water visual inspections of floating pontoons and the boat ramp were also made.

Floating pontoons were composed of plastic-coated foam. Hulls were fibreglass, aluminium or steel. Pylons were wooden and the boat ramp was concrete. The seafloor throughout the harbour was fine mud. Underwater visibility was approximately 0.7 m on the day of the survey (20 September 2021).

Figure 2. Location of inspection sites at Yaringa Boat Harbour.

2.1 Stony Point Jetty

At Stony Point Jetty, divers accessed the water from a vessel, inspecting representative surfaces and substrates along the axes of the main jetty, terminal jetty and finger jetty (Figure 3) at inshore,

midpoint and offshore locations. The inspections targeted the upper, mid and lower sections of pylons and seafloor substrates. Pylons were composed of wood and concrete and were characterised by dense sessile invertebrate growth, with the exception of some concrete pylons on the main jetty axis that had recently been scraped clean. Steel structures were observed on the seafloor. Bare substrates consisted of sands, gravels and shell hash. *Zostera nigricaulis* and *Caulerpa cactoides* beds were observed proximal to jetty structures. Throughout the harbour was fine mud. Underwater visibility was approximately 1.5 m on the day of the survey (21 September 2021).

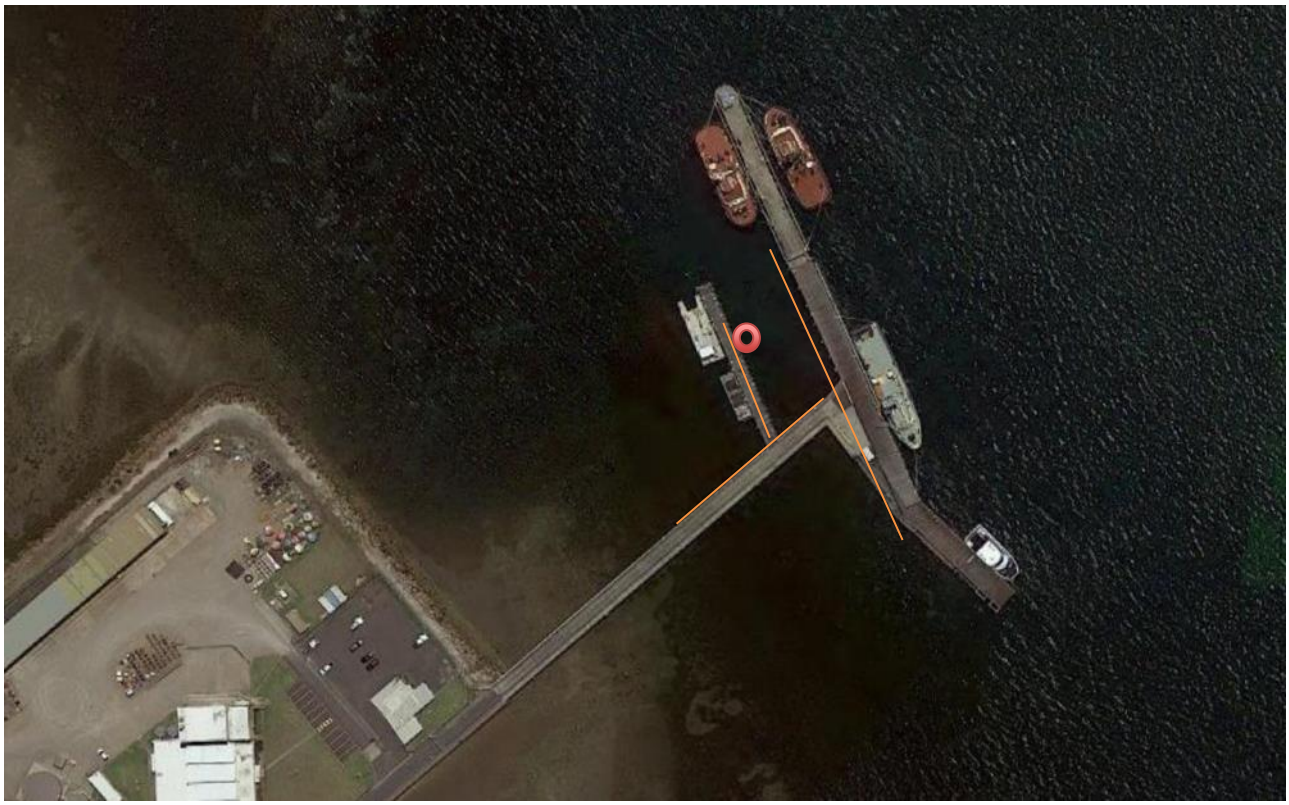


Figure 3. Location of inspection sites at Stony Point Jetty.

3. Results

3.1 Yaringa Boat Harbour

Table 1 lists the introduced marine species detected at Yaringa Boat Harbour.

Table 1. Introduced marine species recorded at Yaringa Boat Harbour.

Common name	Species name
Pleated sea squirt	*Styela plicata*
Colonial ascidian	*Botryllus schlosseri*

Ascidian	*Ciona intestinalis*
Sea lettuce	*Ulva* cf. *lactuca**

Footnote: * Identification based on morphological characteristics only. Identification is considered provisional and would require genetics to confidently differentiate from native species. Following a precautionary approach and identification of this species in previous marine pest studies, and the fact that it is in very high abundance at the site, the identification of *U.* cf. *lactuca* is made.

(a) *Ulva lactuca* and *Styela plicata* on floating pontoon, *S. plicata* circled at right

(b) *Botryllus schlosseri* among biological matrix

(c) *Ciona intestinalis* among biological matrix

Figure 4. Introduced marine species identified at Yaringa Boat Harbour.

Ulva (sea lettuce) was observed in high abundance attached to floating pontoons. High abundance may indicate high nutrient loads entering the water way. While the sea lettuce is not noxious, it can become invested with epiphytes and sediment, die off and cause clogging of water ways and cause poor visual amenity.

(a) Burrow mounds and organic matter on seafloor

(b) Mud oyster (*Ostrea angasi*) at base of pylon

(c) Wooden pylon

(d) Rope and tyre

(e) Biological matrix typifying growth on the underside of floating pontoons (left) and the hulls of older vessels (right)

Figure 5. Substrate and biological features at Yaringa Boat Harbour.

3.1 Stony Point Jetty

Table 2 lists the introduced marine species detected at Stony Point Jetty.

Table2. Introduced marine species recorded at Stony Point.

Common name	Species name
Pacific oyster	*Crassostrea gigas*

The observations of *C. gigas* at Stony Pt were interesting in that the species was observed primary attached to concrete pylons that had recently been scraped clean as part of the jetty maintenance. Other pylons had not been cleaned and were characterised by the expected high diversity of encrusting and cushion fauna. This may indicate that newly cleaned surfaces provide preferential colonisation habitat for *C. gigas*, while surfaces colonised with abundant invertebrate growth may not allow colonisation of the species.

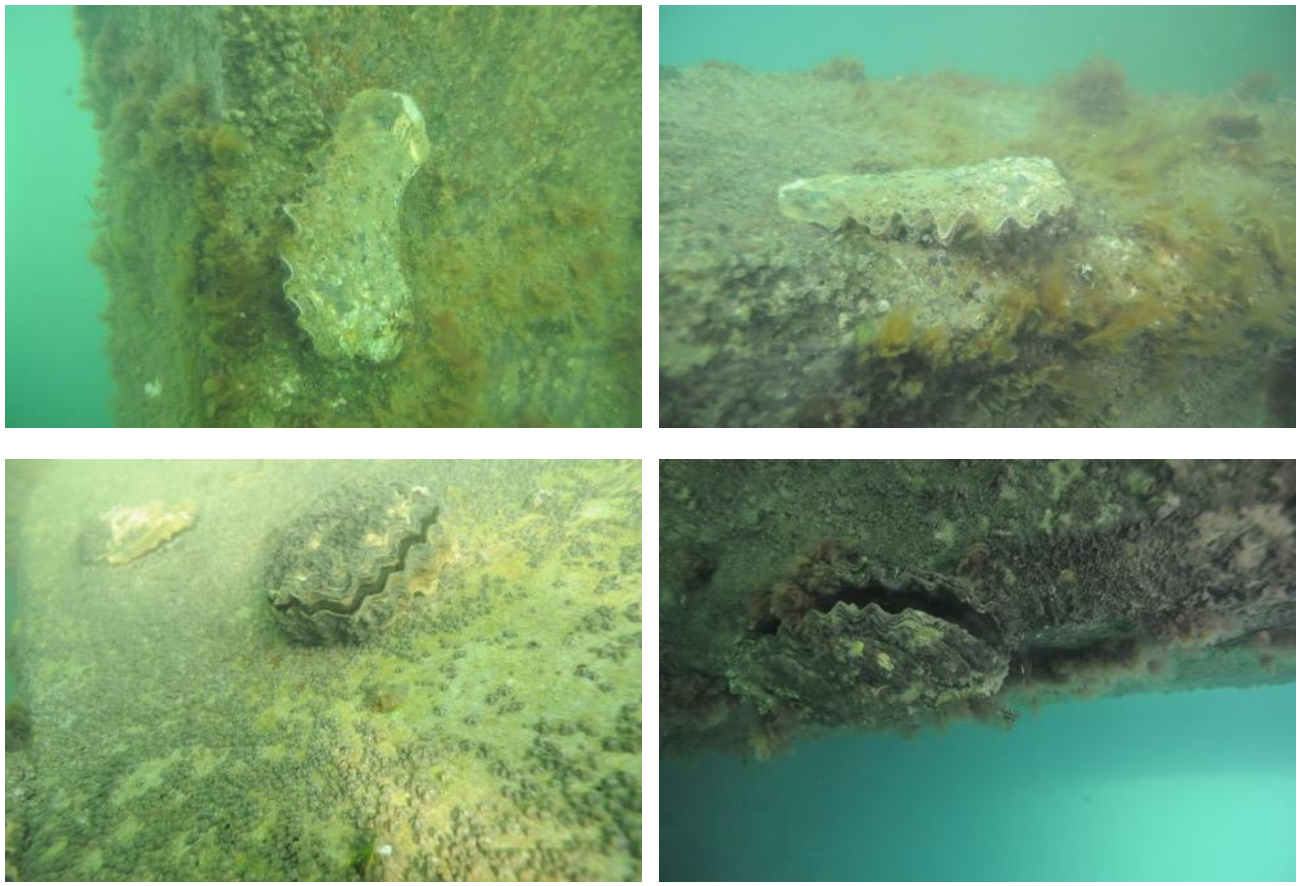


Figure 6. Pacific oyster on recently cleaned concrete pylons.

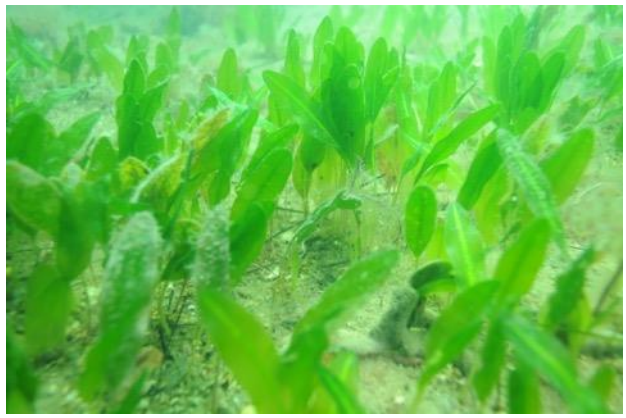
(a) Shell hash and gravel bed (including lamp shells)

(b) *Zostera nigricaulis* bed

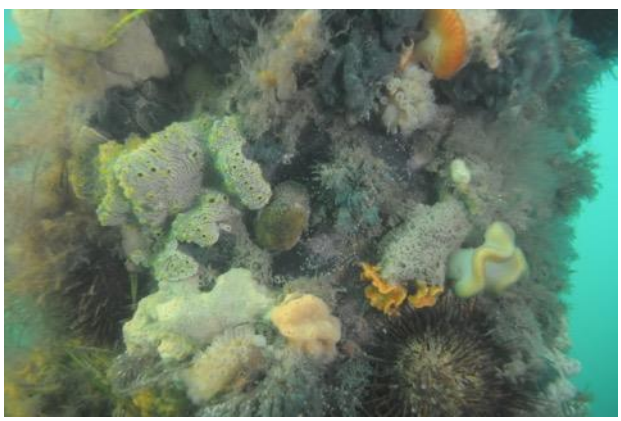
(c) *Caulerpa longifolia* attached to pylon

(d) *Caulerpa cactoides* bed

(e) *Caulerpa trifaria* clump attached to pylon



(f) *Halophila australis* bed



(g) Abundant encrusting and cushion fauna attached to pylons

Figure 7. Substrate and biological features at Stony Point Jetty.

4. Conclusions and Recommendations

The observations made in this study are consistent with Cohen et al.'s (2000) assessment of introduced marine species known from the bay. The higher priority Victorian marine pests were not observed, namely *Undaria pinnatifida*, *Asterias amurensis*, *Caulerpa taxifolia*, *Sabella spellanzanii*, *Musculista senhousia* and *Codium fragile* ssp*. fragile*. The European green crab *Carcinus maenas* was reported to be relatively widespread by Cohen et al. (2000) but was not observed in the present study, which may be related to the absence of suitable habitat or the cryptic nature of the species.

The observations made of Pacific oyster at Stony Point Jetty support the notion that there is potential for invasive species to preferentially colonise disturbed habitats. This, in conjunction with proposed increases in commercial shipping activity and planned increases in recreational boating activity, highlights the need for surveillance and monitoring to be increased accordingly. Cumulative natural stressors such as sediment stress, physical damage and climate change, in combination with human activities has the potential to reduce the resilience of native biotopes and promote the spread of marine pests out of isolated harbours with impacts to unique Western Port biotopes.

The neighbouring Port Phillip Bay presents a model for the impact that marine pests can have on marine condition and the difficulties of reducing spread. Multiple lines of defence are required to mitigate the risk. Ballast water management and monitoring, settlement plate studies, education program and in-field inspections at potential incursion locations and around sentinel sites and high value/critical biotopes should form part of a coordinated approach to protecting Western Port from marine pests.

Areas of commercial activity should be monitored in addition of recreational areas and sites in the southern sectors of the bay should be monitored as potential stepping-stones into the bay. Rocky subtidal reefs, intertidal rock habitat, intertidal sediment beds, seagrass beds, *Caulerpa* beds, sublittoral sediment beds, and bryozoan reefs are some of the key habitats that should be included in future monitoring in addition to the man-made structures of commercial harbours and jetties. Trapping for *C. maenas* is recommended to supplement visual surveys to account for the cryptic nature of the species.