

Seagrass and macroalgae snapshot 2020-21

Princess Royal Harbour

The condition and area of seagrass and macroalgae is being monitored in a number of South West and Great Southern estuaries by the Department of Water and Environmental Regulation, including Princess Royal Harbour. This report describes the distribution of seagrass and macroalgae in Princess Royal Harbour in January 2021.

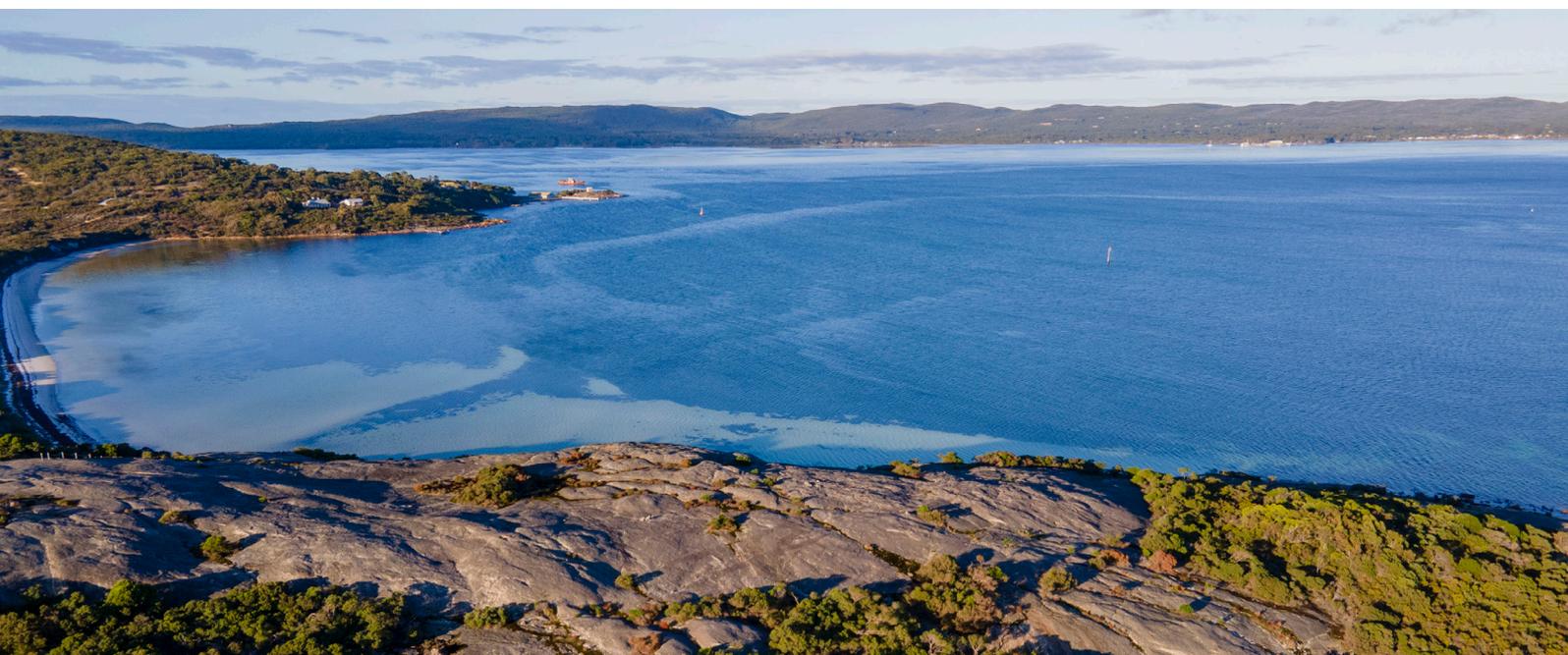
Understanding seagrass condition and macroalgae presence helps to guide how we manage our estuaries

Seagrasses are flowering plants with leaves, roots and rhizomes. They require good water and sediment quality to thrive and are a valuable indicator of estuary health. Seagrass meadows provide food and habitat for animals, and produce oxygen, making them an important part of the estuary ecosystem.

Macroalgae are aquatic plants that can be free-floating, attached to solid surfaces or can grow from sediments. Though macroalgae are an important part of the food chain, an over-abundance can indicate an imbalance in the ecosystem, usually caused by excess nutrients. Some species of macroalgae can respond rapidly to increased nutrients, resulting in prolific growth which can smother seagrass, clog waterways and accumulate along the shoreline.

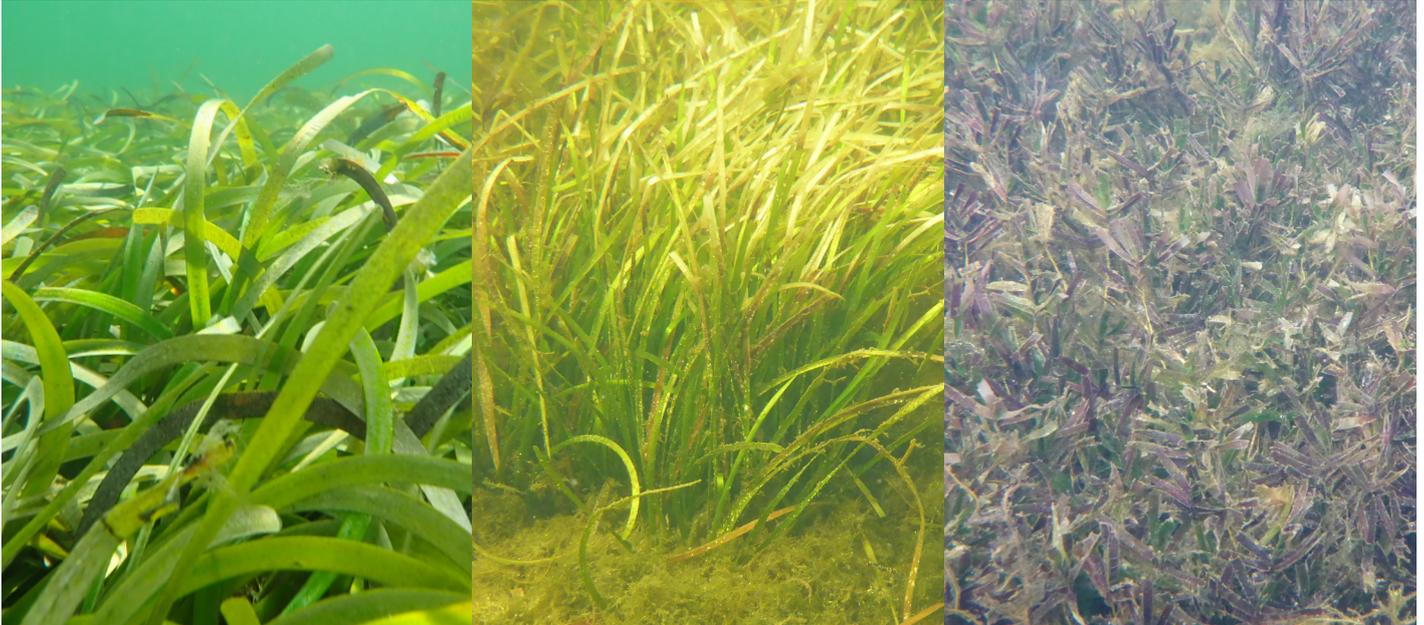
Princess Royal Harbour

Princess Royal Harbour is a marine embayment located near Albany in the Great Southern region of Western Australia. The harbour is connected to the Southern Ocean via a dredged entrance channel. While the harbour has no natural river inflow, it receives freshwater from rainfall, stormwater and runoff via a series of drains from urban, agricultural and industrial land use (including from the Port of Albany). Water quality deteriorated in the mid-1970s and 1980s largely due to nutrient enrichment from industrial and agricultural runoff. Increased nutrients resulted in the proliferation of nuisance macroalgae which smothered seagrass meadows, causing widespread declines. Other signs of poor health included the closure of fishing in the western end of the harbour (from 1984 to 1992) due to the detection of toxic mercury and lead contamination. Within the last three decades, reductions in nutrient input from domestic and industrial sources have improved the condition of the harbour.



Seagrass snapshot

There are three dominant seagrass species in Princess Royal Harbour. *Posidonia australis* is the most common and is widely distributed across the harbour. *Posidonia sinuosa* is often found in mixed meadows with *Posidonia australis*. *Amphibolis spp*¹ is distributed along the western bank and in Shoal Bay. These three seagrasses are large, fairly slow-growing, and have limited ability to recover from disturbance compared to the smaller colonising species that are common in other estuaries. *Posidonia coriacea*, *Halophila ovalis* and *Ruppia megacarpa* are also present in the estuary in a few isolated areas.



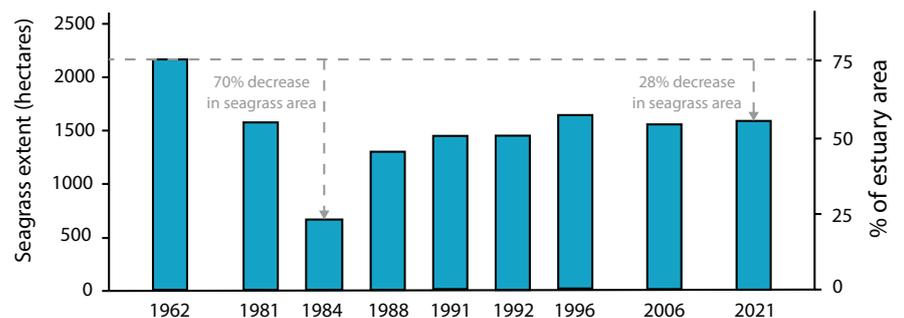
Posidonia australis

Posidonia sinuosa

Amphibolis

Seagrass over time

- In 1962, seagrass was distributed across 2,176 hectares
- Almost 70 per cent of seagrass area was lost by 1984 due to excess nutrients promoting an overabundance of macroalgae that smothered the seagrass
- By 2006, the extent of seagrass had increased to span across 1,529 hectares
- Seagrass density appears to be slowly increasing — attributed to improved management of nutrient input



The Department of Water and Environmental Regulation monitored the extent and distribution of seagrass in January 2021. Seagrass area (extent) was similar in 2021 to that recorded in 2006.



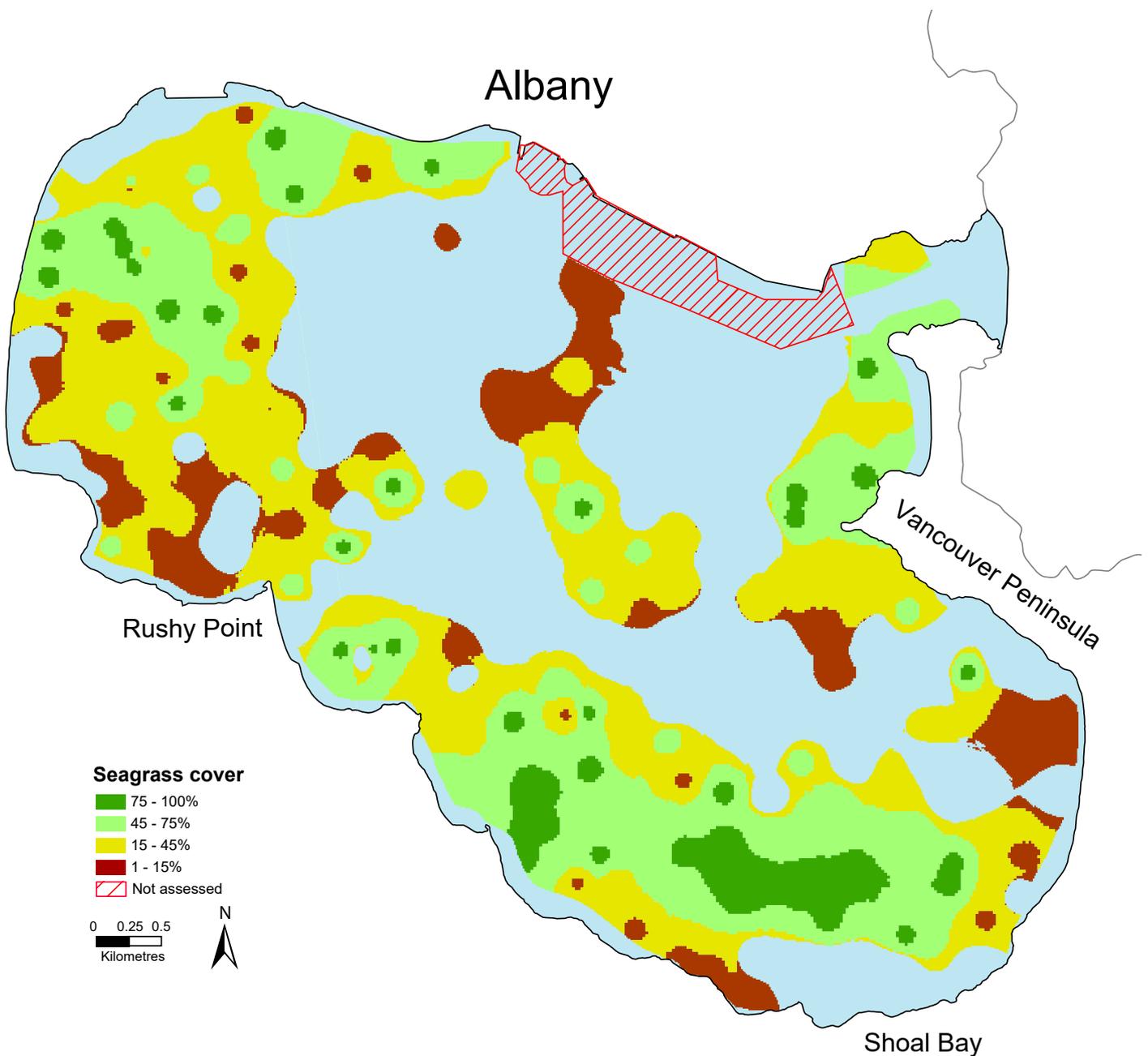
¹ Likely to be *Amphibolis griffithii* based on historical reports

Seagrass distribution in January 2021

Seagrass was estimated to cover 1,559 hectares in January 2021, which is about 55 per cent of the estuary area. Seagrass cover was medium across the whole estuary, with the highest density meadows observed along the edges of the estuary, particularly in Shoal Bay. Seagrass is found in shallow areas of the estuary, with over 60 per cent growing in water less than two metres deep.

Posidonia australis was the dominant seagrass species, followed by *Posidonia sinuosa*. Both species were observed across the whole estuary, except in the deeper central basin. *Amphibolis* maintains its distribution in the western area and in Shoal Bay, while *Posidonia coriacea* was only observed a few times near Vancouver Peninsula. *Halophila ovalis* was also found in the deeper central basin, the western part of the harbour and at the harbour mouth. *Ruppia megacarpa* was typically seen in the shallow western basin. In 2021, seagrass canopy height for *Posidonia* and *Amphibolis* averaged 40 cm but was up to a metre in some places.

The department also observed the abundance of small organisms growing on the seagrass leaves (epiphytes), which can reduce light availability and impact seagrass growth. The epiphyte cover was medium on average across the estuary.



Macroalgae snapshot

Macroalgae species are divided into green, red and brown types. Within Princess Royal Harbour, the green macroalgae *Cladophora prolifera* has been the most dominant species for decades.



Macroalgae over time

Between 1964 and 1982, macroalgae began to accumulate throughout the harbour as water quality deteriorated. *Cladophora prolifera* mats up to 0.6 metres thick were observed smothering seagrass meadows.

- By 1984, *Cladophora prolifera* was highly abundant at water depths between 2 and 5 metres
- Managing macroalgae by harvesting was quickly abandoned as a long-term strategy due to ongoing cost and potential ecological impact on bottom dwelling organisms
- In 2006, large accumulations of macroalgae, particularly *Cladophora prolifera*, were still present

A detailed comparison of macroalgae distributions over time is not possible due to a lack of historical data.

Macroalgae distribution in January 2021

In January 2021, the department estimated that macroalgae were present across 2,265 hectares, or 79 per cent of the harbour. Macroalgal cover across the harbour was very high, with most observations recording greater than 45 per cent cover. Large accumulations occurred in the central basin of the harbour, as well as in the western area, north of Rushy Point. Observations were dominated by *Cladophora prolifera*.

The continued prevalence of macroalgae across Princess Royal Harbour highlights the need to continue investment in catchment management to reduce nutrient runoff and improve water quality.

