

# Macroalgae in the Leschenault Estuary 2016–23

The Department of Water and Environmental Regulation (the department) monitors the presence and area of macroalgae in five estuaries in south-west Western Australia (WA), along with seagrass monitoring. This report describes changes in macroalgae abundance in the Leschenault Estuary between 2016 and 2023.

The Leschenault Estuary is a long, shallow coastal lagoon located north of Bunbury. The estuary is permanently connected to the ocean by an artificial channel called The Cut. Despite being known as ‘weeds’, seaweeds (or macroalgae) are a vital component of the estuary ecosystem as they produce oxygen and provide food and habitat for animals.

**Understanding macroalgae presence over time helps to guide how we manage our estuaries**



## What are macroalgae?

While they may look similar, macroalgae should not be confused with seagrasses. Macroalgae derive nutrients directly from the surrounding water through their tissues, in a similar way that a sponge soaks up moisture. Seagrasses, on the other hand, are more closely related to plants on land, producing flowers and having roots that anchor them to the seabed. Both seagrasses and macroalgae can grow from soft, sandy sediment; however, macroalgae can also grow attached to rocks or reef, on other plants such as seagrass, or be free-floating in the water.

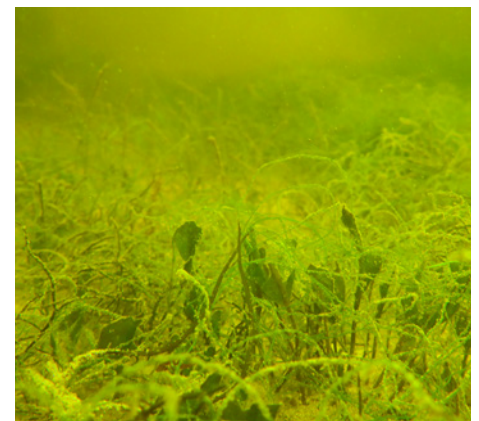
About 1,000 species of macroalgae have been described in marine and estuarine environments in WA. Macroalgae fall into groups (or phylum) based on the appearance and colour of their tissues. These groups include Rhodophyta (red algae), Ochrophyta (brown algae) and Chlorophyta (green algae).



*Acanthophora* is a type of red algae (Rhodophyta)



*Caulocystis* is a type of brown algae (Ochrophyta)

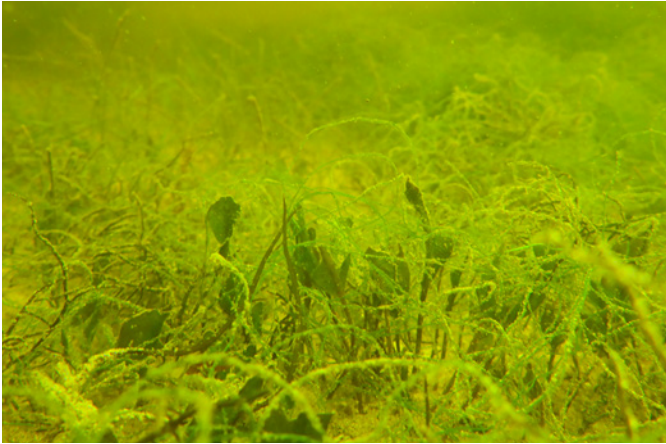


*Chaetomorpha* is a type of green algae (Chlorophyta)

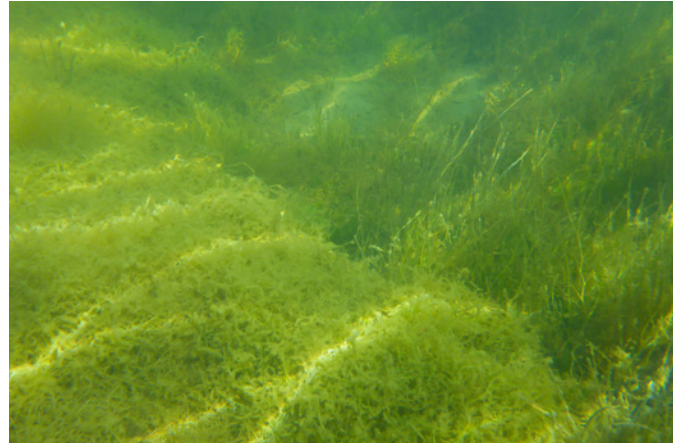


## How we monitor macroalgae

The department monitors macroalgae in estuaries to develop an integrated understanding of estuary health. These surveys include a snapshot of macroalgae extent, which shows where macroalgae is present in the estuary. When macroalgae are observed, we also record the percentage cover using categories to understand its density.



Low cover of *Chaetomorpha* (green macroalgae) dispersed through a seagrass meadow



High cover of *Chaetomorpha* (green macroalgae) smothering a seagrass meadow

## Is macroalgae a problem?

While macroalgae are an important part of estuarine ecosystems, some types of algae can become overabundant in our estuaries because of eutrophication.\* As an example, some species of green macroalgae respond rapidly to increased nutrients, resulting in prolific growth which can smother seagrasses, clog waterways and accumulate as smelly wrack along the shoreline.

There are several examples of major macroalgal blooms reported in the Leschenault Estuary since the late 1980s:

- A bloom of green macroalgae was reported to persist for over a week in Vittoria Bay in 1988.
- Regular reports of nuisance algal blooms started in 1995.
- In the spring of 2009, a large bloom of green macroalgae occurred along the northern and eastern shorelines.<sup>1</sup>
- In September 2017, a large bloom primarily of *Cladophora*, but also *Chaetomorpha*, *Rhizoclonium* and *Ulva*, occurred along the eastern shoreline.

\* Eutrophication is a natural process of nutrient accumulation in aquatic environments, often leading to increased plant growth. However, human activities that contribute fertilisers and other waste can speed up the process, leading to algal blooms and deterioration in water quality.

<sup>1</sup> Hugues-dit-Ciles J, Kelsey P, Marillier B, Robb M, Forbes V & McKenna M, 2012, Leschenault estuary water quality improvement plan, Department of Water, Western Australia.



Image source: George Mardon

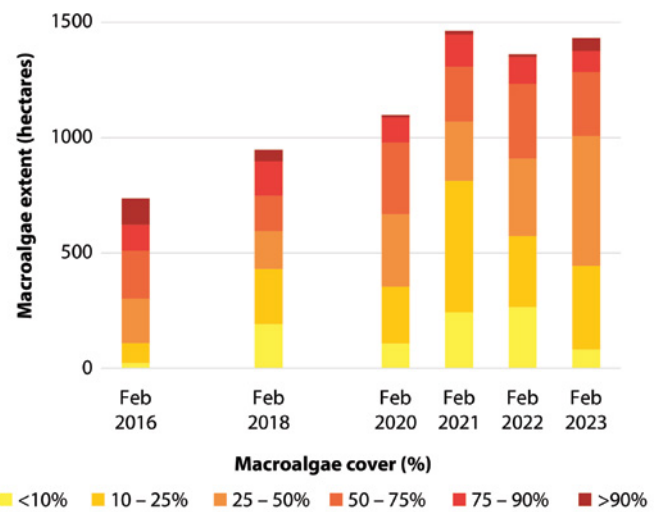




## Macroalgae extent

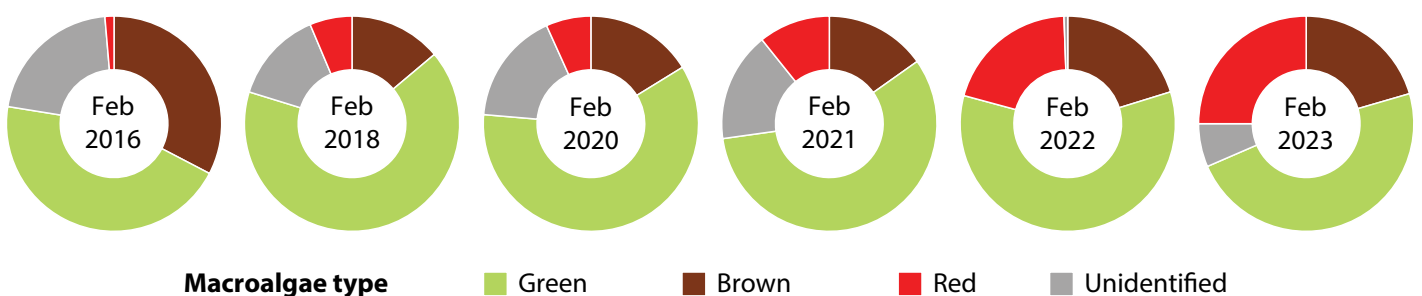
The area where macroalgae are present in the Leschenault Estuary has increased over time. In 2016, macroalgae were present across 742 hectares, or 29 per cent, of the estuary,<sup>+</sup> and were predominantly observed in the basin north of Waterloo Head. Subsequent surveys revealed a substantial increase in the extent of macroalgae in the estuary, which has nearly doubled between 2016 and 2023. While there is a clear trend of increasing area over time, this is made up of macroalgae that are generally sparser in coverage.

Green macroalgae have been consistently observed across the estuary over time, accounting for over half the macroalgae observations in most years. *Chaetomorpha* has been the dominant green species, accounting for between 57 and 90 per cent of green algae observations each year. *Caulerpa* is another green species which is becoming more common in recent years, increasing from less than 10 per cent of green algae observations in 2016 to 38 per cent in 2023. Brown macroalgae have been recorded at about a quarter of observations each year, particularly



*Caulocystis* which accounted for at least 40 per cent of brown algae observations each year. Red macroalgae are often the least abundant, however *Acanthorhpora* was observed more frequently in 2023.

<sup>+</sup> The total area of the estuary is about 2,532 hectares.

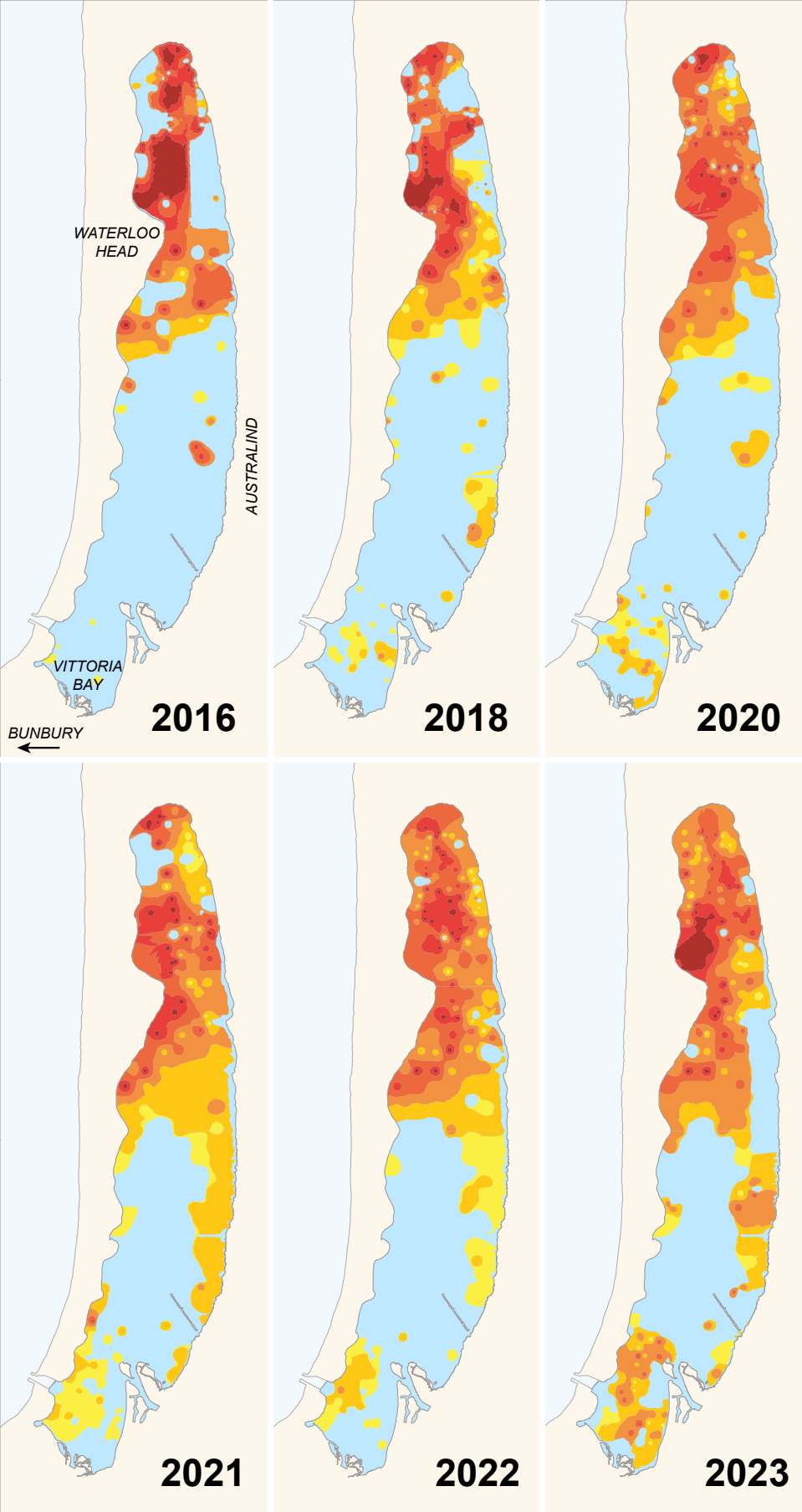


## Macroalgae across the estuary

Macroalgae has been consistently abundant in the northern basin, which is where we typically find the greatest cover. It is possible that dense macroalgae growth in this part of the estuary is smothering seagrass and restricting seagrass recovery following observed loss between 2009 and 2015.<sup>2</sup>

To a lesser extent, macroalgae has also increased in the south of the estuary near Vittoria Bay close to the mouth of the Preston River. Declining water quality in the Preston River may be contributing to increasing macroalgae abundance, and further deterioration could pose a risk to the health of the estuary. Macroalgae have remained absent from large sections of the central basin over time.

<sup>2</sup> Further information is available at [estuaries.dwer.wa.gov.au/estuary/leschenault-estuary/estuary/condition/#Seagrass](http://estuaries.dwer.wa.gov.au/estuary/leschenault-estuary/estuary/condition/#Seagrass)



## Macroalgae over time

The increasing extent of macroalgae over time is often an indication of declining estuary health. A change from the ecosystem being dominated by seagrass to macroalgae or cyanobacteria, alongside decreased biodiversity, could be a risk in the Leschenault Estuary. Seagrass recovery in the northern basin of the estuary has been slow and highlights the importance of continuing work to improve water quality and reduce nutrients that enable excessive growth of macroalgae.

Visit the Healthy Estuaries WA website to learn about current work to improve the health of the Leschenault Estuary.

