

SEAGRASS IN WESTERN PORT

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INTRODUCTION

Seagrasses are flowering plants which live in the sea. They can form dense meadows and are an important cornerstone of the ecological health of Western Port.

The extent of seagrass beds is a good measure of the ecological health of Western Port. Studies of other locations show that healthy seagrass beds, which provide both a habitat and food source, support significantly more fish and other marine animals than bare sand-bottom areas. Larger fish eat small animals that live in seagrass meadows, making seagrass an important tool to maintain fish stocks for recreational and commercial fishing.

Seagrasses also help to stabilise the muddy sediments which are a feature of Western Port, reducing turbidity and helping protect the water quality of the bay.

Three species of seagrass predominate in Western Port:

- *Amphibolis antarctica* in the oceanic Western Entrance Segment
- *Zostera muelleri* on the intertidal mud flats
- *Heterozostera tasmanica* occurring mainly in the shallow subtidal areas and on the lower intertidal mud flats.

The small seagrass *Halophila australis* also occurs in Western Port but its distribution is normally sparse and scattered.

SEAGRASS DISTRIBUTION AND PREVIOUS MAPPING

Seagrass was first mapped in detail for the *Western Port Bay Environmental Study* in 1973/74. At that

time, there was concern about seagrass dying in the north and north-east corner of Western Port, however the study concluded that damage was of minor significance and localised.

Although aerial photographs of Western Port from 1970 indicate a good vegetation cover over most of the intertidal mud flats – including the tidal divide – photos taken in 1975 of the north eastern part of the upper north arm indicate significant decline in seagrass cover.

By the time of the next survey in 1983/84, it was calculated that 70% of the area covered with seagrass in 1973 was bare, and biomass was reduced by about 85%.

The problem of identifying the cause or causes of the seagrass decline is compounded by the time that has elapsed since the start of the event and the size and complexity of the biological and physical system of Western Port. Results of scientific studies in the 1980s into the initial cause or causes of seagrass decline were inconclusive.

It is not known if a single cause or event was responsible for the decline of seagrass in Western Port. Given the complexity of Western Port, it is likely that a number of factors – possibly natural and caused by human activities – acted in combination to precipitate the decline. Once significant decline had started, processes such as the remobilisation of sediments due to the loss of seagrass cover on the mud banks added further stress to the system, accelerating the decline and potentially masking any initial cause or causes of the event.

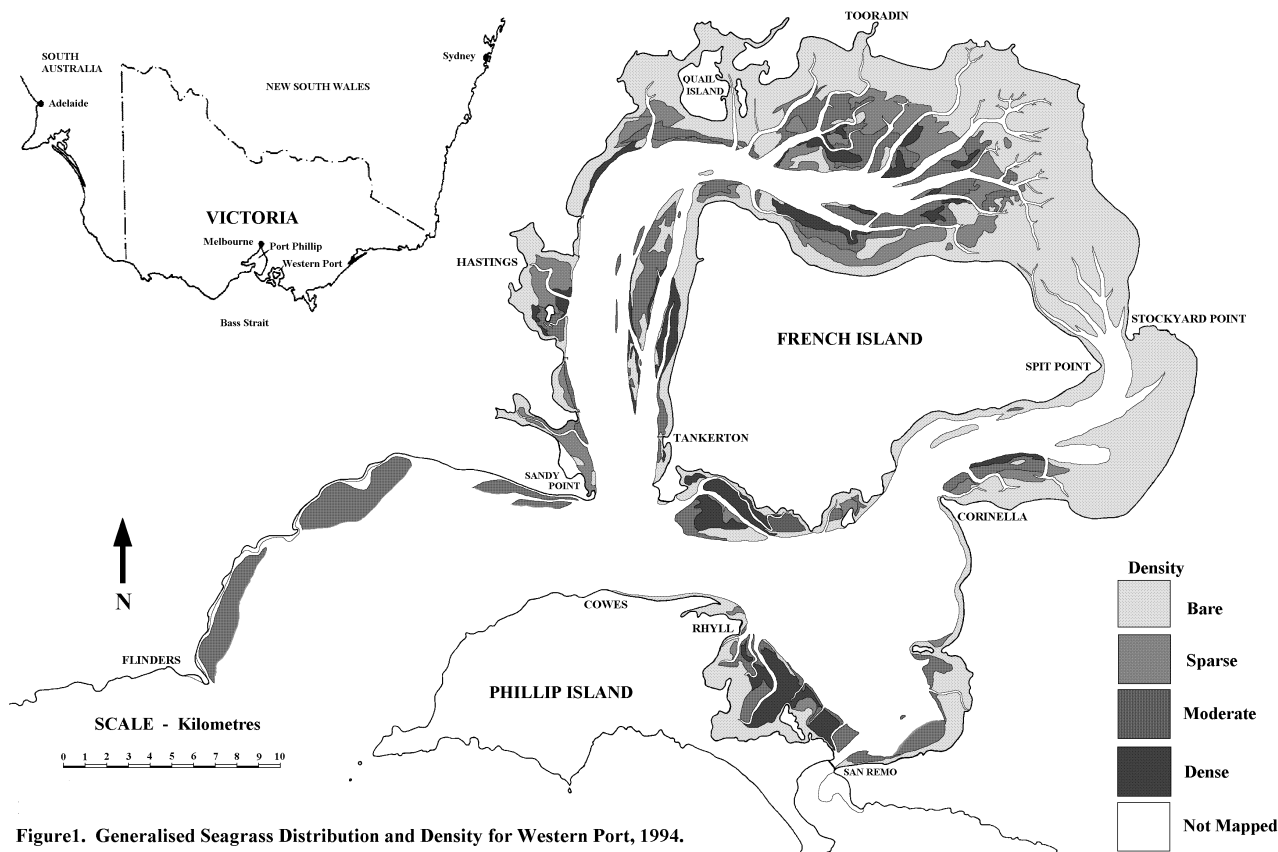


Figure1. Generalised Seagrass Distribution and Density for Western Port, 1994.

Figure 1: Generalised seagrass distribution and density, 1994

As part of EPA's commitment to Western Port, the distribution of seagrass in the bay was mapped from aerial photography taken in May 1994. (Figure 1.)

Results from the survey showed that some recovery had taken place since the 1983/84 survey. Of the area that had declined between 1974 and 1984, about 20-30% had revegetated to varying degrees of density by 1994. The size of this recovery indicates that it could not be attributed solely to seasonal variations.

The result was encouraging but further monitoring will be necessary to see if the recovery is sustained.

CONDITION OF SEAGRASS BEDS TODAY

EPA commissioned further aerial photography in February 1997 to determine whether distribution of seagrass in Western Port had changed since the 1994 survey.

To help describe the condition of seagrass in Western Port from these photographs, Western Port can be divided into a number of segments (Figure 2). These segments were used in a number of previous scientific studies.

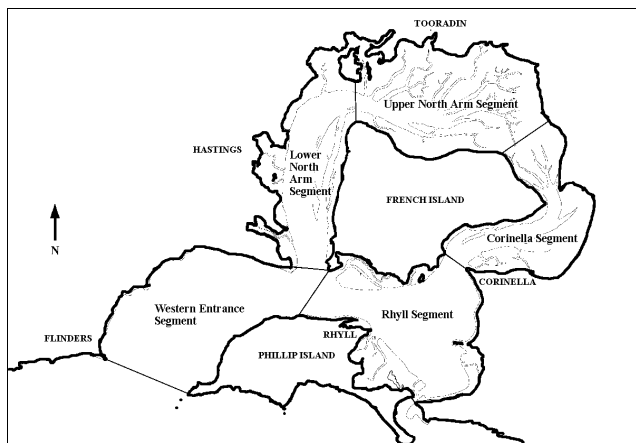


Figure 2: Segments of Western Port

Upper North Arm Segment

Although the overall distribution of seagrass in this segment does not appear to have significantly changed since 1994, some localised bare areas within the general area of distribution have recolonised. At the eastern boundary of seagrass distribution, some small areas have expanded while others have diminished.

Observations made during site visits to the central part of the segment suggest that biomass of *Heterozostera* may have increased.

Lower North Arm Segment

Coverage of seagrass in the Lower North Arm Segment is generally similar to 1994. In Hastings Bight, the biomass of seagrass appears to have increased. However, the more seasonally variable seagrass *Zostera muelleri* has displaced the perennial seagrass *Heterozostera tasmanica* which declined.

Seagrasses – such as *Zostera muelleri* – that colonise the intertidal zone can be severely scorched during spring low tides in summer. If the plants are not well established significant localised dieback can occur. This means that an area which can look bare in late summer and autumn will recover with a fresh bloom of seagrass by spring into summer. By late summer the seagrass once again gets scorched as the cycle continues.

Corinella Segment

There is no significant improvement in this segment. Seagrass on the intertidal bank close to Corinella township appeared poorer in condition than when it was surveyed in 1994. There was very little green leaf material apparent on the seagrass stems although there may be viable rhizomes in the sediment from which recovery could occur.

This segment is in the path of an often highly turbid ebb flow, generated from the bare tidal divide (the boundary between the Upper North Arm Segment and Corinella Segment). The seagrass in this segment may therefore be subject to more continued stress than in other segments and take the longest to recover. Consequently, the potential for seagrass recovery in the Corinella Segment depend on seagrass recovery across the tidal divide.

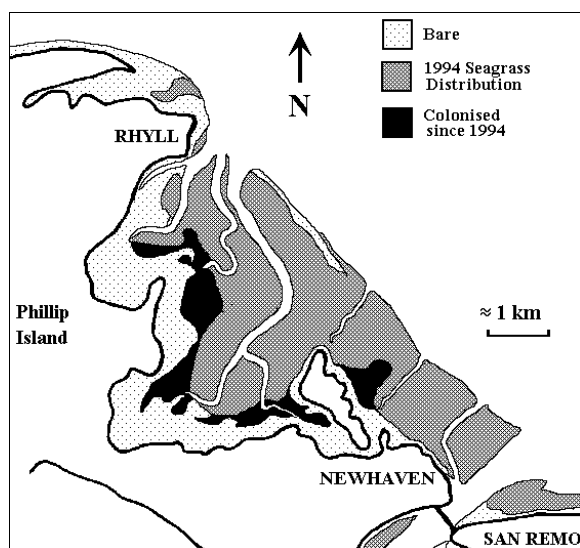


Figure 3: Seagrass recovery – Rhyll to Newhaven

Rhyll Segment

The Rhyll Segment shows the most obvious improvement in seagrass distribution. Some areas around Churchill Island that were bare in 1994 now have a covering of seagrass. The seagrass beds close to Rhyll which showed small bare patches in 1994, are now more fully covered (Figure 3).

The area of seagrass between Rhyll and Newhaven has increased by about two square kilometres since 1994.

Western Entrance Segment

Seagrass in this segment is the more oceanic *Amphibolis antarctica* and is not considered to have been in decline. However surveys of its distribution have been limited in the past, as the extent of these beds – which grow in deeper water – have not shown up well on aerial photographs. Water clarity was particularly good in the Western Entrance Segment when the photographs were taken for the 1997 survey.

The *Amphibolis* beds, as indicated on the 1997 photographs, are consistent with the results of the 1974 survey.

WHAT NOW?

There are signs that the overall condition and distribution of the seagrass beds in Western Port have improved slightly since 1994. Although seagrass distribution has improved significantly since 1984, the slow rate of recovery observed since 1994 suggests that it will take many years until substantial improvements are observed.

The mid and lower intertidal flats in the Rhyll and Lower North Arm Segments are fairly well covered with seagrass, however only parts of the Upper North Arm Segment could be considered well grassed. The Corinella Segment is in poor condition and has not improved.

Seagrasses are sensitive to changes in their environment. In other locations, human activities such as dredging, contaminated land runoff and excessive levels of nutrients have been shown to contribute to a decline in seagrass meadows. As meadows decline, turbidity increases – which can in turn put additional pressure on existing meadows and lead to further decline.

Overseas studies have shown that recovery of seagrass meadows is possible, provided the factors stressing the system have been reduced or eliminated. However until these factors are identified, it is not possible to provide a prognosis for seagrass recovery in Western Port.

The cause or causes of the catastrophic seagrass decline that started in the early 1970s may never be known but this should not hinder the effective management of the bay and its catchment.

The challenge is to identify all current and possible threats and processes that have the potential to impact on seagrass and the Western Port ecosystem as a whole. These can then be minimised or eliminated by effective management.

EPA is reviewing the State environment protection policy for Western Port. The review process will bring together information and ideas from previous studies and strategies, and local knowledge and experience to develop a community owned statutory framework for the protection of Western Port and its catchment as a whole.

RELATED EPA PUBLICATIONS

The Distribution of Seagrass in Western Port, Victoria (Publication 490)

The Western Port Marine Environment (Publication 493)

Western Port Action+ Program (Publication 582)

Western Port Action+ Program Information Bulletin (Publication 587)

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