



Healthy Mangroves

Calls for Action

We seek State Government support to strengthen the protection of Lake Connemare and its connected Barwon Estuary, including consideration of transitioning Lake Connemare from its current Game Reserve status to a stronger conservation status. We also seek funding support for the following priorities:

- Support Parks Victoria's initiatives by providing funding for the proposed extended boardwalk and designated fishing platforms to reduce trampling of mangrove roots, and for its work with the Ocean Grove Golf Club to address identified concerns relating to water discharge, nutrient runoff, and turf extending to the water's edge of the mangrove ecosystem.
- Help secure funding and strengthen coordination with the City of Greater Geelong to upgrade drainage infrastructure and improve the quality of water entering the Barwon Estuary.
- Invest in science, inclusive community education and engagement, and regular monitoring to detect environmental change early by supporting dedicated mangrove expertise and an Earthwatch Australia/MangroveWatch citizen science monitoring programme for the Barwon Estuary.

Proposal Overview

- Protecting and restoring the Barwon Estuary mangroves
- Why mangroves matter
- Why the Barwon Estuary matters
- Current observations
- Visual evidence (2019–2026)
- Opportunities for action
- Future opportunities



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Mangroves from the Water

Mangroves from the Water (MFTW) is a long-standing art campaign that connects communities with mangrove forests through immersive art experiences. It began in the United Arab Emirates in 2013 and has continued in Australia since 2017. MFTW is also the title of my PhD, completed at Deakin University in 2025, which further developed this field-based artistic practice and its contribution to environmental engagement and community education.

Dr Zahidah Zeytoun Millie | Founder, Mangroves From the Water.

Our Recent Exhibition

The recent Mangroves from the Water exhibition was held at the Barwon Heads Arts Hub from 24 April to 3 May, supported by dedicated volunteers and partially funded by the Corangamite Catchment Management Authority (CCMA).

Presented as an interdisciplinary group exhibition, MFTW brought together visual artists, a choreographer, poet, photographer and sound artist, alongside Barwon Heads Primary School students, creating an immersive art experience inspired by the mangrove ecosystem.

The programme also included a scientist-led walk-and-talk, extending environmental engagement beyond the exhibition space.





Walk and Talk with a Scientist
during our recent *Mangroves
from the Water* exhibition in
Barwon Heads, supported by
MangroveWatch and the
Corangamite Catchment
Management Authority (CCMA).

Protecting and Restoring the Barwon Estuary Mangroves



Why Mangroves Matter

The accelerating threats of global warming demand urgent action, yet vital carbon-sink ecosystems such as mangrove wetlands remain critically undervalued and are rapidly diminishing. Mangroves are among the world's most effective nature-based climate solutions, storing substantial amounts of carbon while protecting coastlines from storms and erosion, improving water quality, and supporting interconnected coastal ecosystems. Together with seagrass meadows, they provide essential nursery habitats where fish, crabs, and other marine species feed, breed, and mature, while also sustaining diverse birdlife. Conserving and restoring mangroves is therefore critical to strengthening biodiversity, climate resilience, and the long-term health of coastal communities.

Why the Barwon Estuary Matters



Ongoing field observations

Since 2019, I have undertaken ongoing field observations of the Barwon Estuary, which also formed the basis of my PhD research. Through regular visits, I have documented the ecological condition of the estuary, including the health of its mangrove ecosystems, the pressures they face and their importance to the broader coastal environment. The following images illustrate these observations and highlight both the ecological significance of the estuary and the challenges it faces.

My field observations are consistent with the climate risk projections outlined by Phillip B. Roös in the chapter A Landscape at Risk in Geelong's Changing Landscape: Ecology, Development and Conservation. Roös identifies significant risks to the Geelong region arising from climate change, including rising sea levels and habitat loss (Roös, 2019). Barwon Heads is particularly vulnerable, with sea levels projected to rise by up to 1.9 metres by 2100 (Roös, 2019, p. 204). Such changes are expected to affect surrounding farmland, residential areas and coastal communities, reinforcing the need for integrated coastal management that protects critical ecosystems such as the Barwon Estuary while strengthening the resilience of both natural and human environments.

Current Situation

Since 2019, I have observed mangroves gradually migrating inland in response to rising sea levels. However, their natural landward movement is increasingly constrained by farmland and residential development.

- **Recreational activity:** Fishers and crabbers are frequently observed within mangrove stands, including standing on exposed mangrove root systems. Recreators light fires along the bank of the estuary for cooking fish.
- **Drainage discharge:** Water from surrounding urban, residential, agricultural, and recreational areas is regularly discharged into the estuary, potentially affecting water quality and mangrove health.
- **Nutrient runoff:** The estuary is bordered by the Ocean Grove Golf Club, farmland, and residential areas where fertiliser runoff may influence water quality.
- **Riverbank erosion:** Areas of erosion, saturated mud, and mangroves affected by wax scale are evident, particularly along the river margin adjacent to the Ocean Grove Golf Club.
- **Bird habitat:** I have consistently observed fewer birds in the Barwon Estuary than in other mangrove ecosystems I have visited.
- **Mangrove health and stress:** Ongoing observations show signs of mangrove stress, including wax scale infestation, dead and declining trees, and flowering outside the typical seasonal period. A MangroveWatch scientist advised that unusual flowering may be associated with environmental stress.
- **Seagrass condition:** Large quantities of detached seagrass are frequently observed entangled within mangrove roots and accumulating along the estuary.

Recreational Fishing in the Mangrove Habitat

Recreational fishing activity observed within the mangrove zone, with foot traffic on exposed mangrove root systems.



Evidence of fishing and cooking activities along the water's edge of the Barwon Estuary, including burnt vegetation and disturbed shoreline, illustrating visible human impacts on the estuarine environment.

Recent photograph supplied by Margaret Griffith



Long-Term Field Observations - Barwon Estuary (2019–2026)

- Regular water discharge into the estuary.



Ocean Grove Golf Club

Parks Victoria and CCMA have identified water discharge from the Ocean Grove Golf Club and turf extending unlawfully to the estuary's edge, raising concerns about impacts on the adjacent mangrove ecosystem.



Riverbank Erosion



Riverbank Tree Collapse

A collapsed tree along the Barwon Estuary, illustrating riverbank instability and the need for ongoing monitoring and restoration of vulnerable shoreline areas.



Mangrove Decline



Collapsed mangrove observed along the river margin adjacent to the Ocean Grove Golf Club, illustrating the urgent need of ecological assessment and collaborative management of this section of the estuary.



Mangrove Decline

Areas of mangrove decline associated with wax scale infestation, documented during ongoing field observations of the Barwon Estuary.

Wax scales are sap-sucking insects that produce a waxy coating, often associated with environmental stressors such as changes in salinity, pollution, or climatic shifts. These stressors can weaken mangroves, making them more susceptible to infestations.



Changes in Mangrove Health

The same mangrove photographed in 2021 (left) and 2026 (right). The later image shows extensive wax scale infestation, illustrating a marked change in the tree's condition over time.





Repeated observations of declining and dead mangrove trees in and around the channel adjacent to the Ocean Grove Golf Club.

Declining Mature Mangrove



Algae on Mangrove Roots

Algal growth observed on mangrove root systems in the Barwon Estuary, photographed on **19 July 2026**. Continued monitoring is recommended to better understand its extent and any implications for mangrove health.





Repeated observations of dead seagrass in and around the channel adjacent to the Ocean Grove Golf Club.

Elephant Fish migrate seasonally into the Barwon Estuary (February–May), using its soft-sediment habitat for egg laying.

Observation of a dead Elephant Fish, showing signs of a collision with a boat, among mangrove roots in the channel adjacent to the Ocean Grove Golf Club.



The Case for Stronger Protection

1- Lake Connewarre and the Barwon Estuary

- Seek MP support to raise with the Victorian Minister for Climate Action and relevant State authorities a review of the protection status of the Lake Connewarre State Game Reserve and its connected Barwon Estuary, with consideration of stronger conservation protection for this interconnected ecosystem.
- Victorian Fisheries Authority research identifies the Barwon River Estuary as an important elephant fish breeding and egg-laying area (February–May), raising questions about whether current seasonal protections are sufficient.

2- Monitoring and Protection

- My field observations and PhD research document pressures on mangrove habitat from root trampling, boating and jet skis, wave erosion, unleashed dogs, regular drainage discharge, and adjacent land use.
- Seagrass loss and water discharge, Parks Victoria has identified water discharge from the Ocean Grove Golf Club and turf extending to the estuary's edge. Together with my observations of dead seagrass and declining mangroves in the adjacent channel, this warrants coordinated scientific monitoring and, where necessary, restoration
- Federal support could help connect State agencies, local government and scientific expertise to strengthen long-term monitoring and protection of the Barwon Estuary.

Opportunities for Action

Several of these initiatives have been identified through discussions with CCMA, Parks Victoria and MangroveWatch. Further funding and support are needed to progress their implementation and strengthen the health and resilience of the Barwon Estuary.

- Support Parks Victoria's initiatives — the proposed mangrove boardwalk at Barwon Heads, including designated fishing platforms to reduce trampling of mangrove roots, and the survey of the Ocean Grove Golf Club to inform measures addressing water discharge, nutrient runoff and appropriate vegetated buffers along the estuary.
- Enhance drainage infrastructure by supporting collaboration with the City of Greater Geelong to improve water quality as drainage systems are upgraded for climate adaptation.
- Invest in science and monitoring by funding dedicated mangrove expertise, developing a Barwon Estuary Mangrove Management Strategy, and supporting a MangroveWatch citizen science monitoring programme for the estuary.

Protecting the Barwon Estuary today will strengthen biodiversity, climate resilience and the wellbeing of future generations.

Suggested Follow-Up

- **Parks Victoria**

Brooke Connor, Parks Victoria, has indicated that MP support could help progress key priorities, including the Barwon Heads boardwalk and fishing platforms and the Ocean Grove Golf Club survey.

Engage with **Lee Miezis, CEO of Parks Victoria**, to reinforce support for these priorities.

Source: Brooke Connor, Parks Victoria, correspondence, 4 August 2026.

- **Earthwatch Australia / MangroveWatch**

We can facilitate contact with Jock Mackenzie, MangroveWatch scientist, to explore opportunities for a Barwon Estuary Mangrove Management Strategy and a citizen science monitoring programme for the estuary.

Source: Discussion with Jock Mackenzie, MangroveWatch.

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THANK YOU



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Mangroves from the Water