

WONBOYN LAKE ESTUARINE SHORELINE HABITAT ASSESSMENT 2023

Author: Jock Mackenzie
Earthwatch Institute



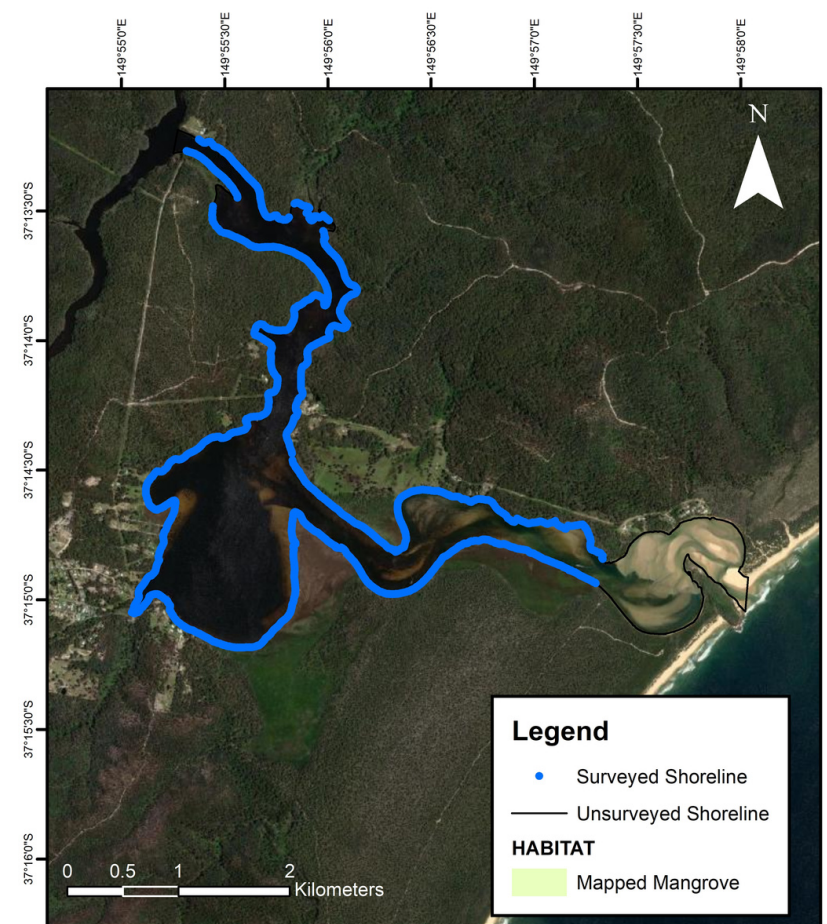
Data Collection

Wonboyn Lake Estuary Shoreline Assessed = 76%

Survey Date: 11th August 2023.

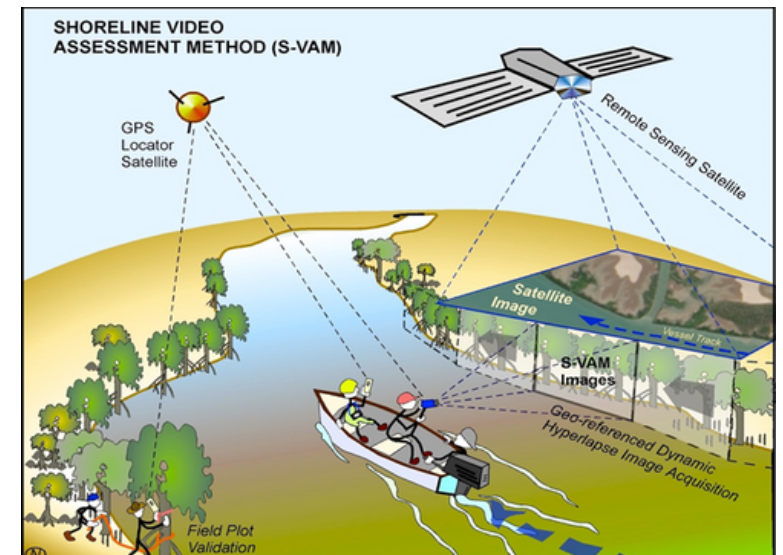
4 community members & stakeholders,

1hr 48 mins filming, 21.1km shoreline surveyed



The Shoreline Video Assessment Method (S-VAM)

S-VAM surveys were conducted to capture the main estuary channel shorelines from the mouth to upstream estuary limits for a permanent visual record of shoreline habitat. A boat traveled along the Wonboyn Lke shoreline at a speed of 6-10 kts, with observers recording continuous video footage at a distance of up to 200m from shore. The camera was held at a 90-degree angle to the boat's direction. GPS tracking was recorded, and special points of interest were geotagged. In-field observations were also recorded via voice. Data was collected at low to mid tide during a neap tide period ensure clear shoreline visibility while maintaining safe navigation.



Mackenzie, J. R., Duke, N. C., & Wood, A. L. (2016). The Shoreline Video Assessment Method (S-VAM): Using dynamic hyperlapse image acquisition to evaluate shoreline mangrove forest structure, values, degradation and threats. *Marine Pollution Bulletin*.

Wonboyn Shoreline Habitat

The Wonboyn Lake system is the southernmost extent of mangroves on the east-facing coast of Australia, with no significant mangrove stands present further south until Port Albert, east Victoria. The population of *Avicennia marina* (Grey Mangrove) in Wonboyn Lake represents a significant southern limit of the Australian east coast mangrove population. Until recently, a single stand of mangroves was present at Myrtle Cove. According to anecdotal evidence, mangroves have become established elsewhere in the estuarine system over the past 10-20 years. There are only 914m² of mangrove within the estuary, with the majority of intertidal habitat being saltmarsh dominated by Sea Rush (*Juncus kraussii*). The purpose of the Wonboyn estuary shoreline surveys was to provide a permanent geotagged visual record of existing mangrove extent from which to record future mangrove expansion or loss in the estuary.

With warming temperatures due to climate change mangroves are migrating polewards. It is expected that there will be increased mangrove shoreline establishment within Wonboyn Lake in the coming years, continuing the locally observed trend, with the estuary eventually becoming a mangrove-dominated system. The 2019/2020 bushfires impacted 51% of mangroves in the Wonboyn system (Glasby et al. 2023). The impact of the fire has set-back mangrove expansion in the estuary in the short-term. However, remnant surviving trees are still reproducing providing a local propagule source. During the shoreline surveys only one recently established mangrove seedling (<3yrs) was recorded. Additional recruitment and establishment may occur within the oncoming El-Nino climate conditions.

Four key threatening processes impacting tidal wetland habitats in the Wonboyn Lake system:

1. Shoreline erosion is impacting the majority of tidal wetland shoreline interface, suggesting ongoing habitat loss.
2. Feral Deer are impacting saltmarsh and *Casuarina* habitat in the mid-estuary
3. Vehicle damage to saltmarsh was noted near residential buildings
4. 14 items of litter and rubbish were observed along the shoreline, with substantial illegal dumping and litter in the large saltmarsh area near the estuary mouth.



Myrtle Cove Mangroves

The largest stand of mangroves within the Wonboyn Lake estuary is at Myrtle Cove. The Myrtle Cove mangrove stand occurs in a protected cove where a small creek with a natural, forested catchment, enters into Wonboyn estuary into a mini delta with a low slope profile. There is anecdotal evidence the mangrove stand at Myrtle Cove was planted circa 1950's. The size of the largest mangrove tree (girth ~1m) suggests that these mangroves may have established earlier (~1940's), although it is uncertain if planted or not.

The mangrove area is considered ecologically important by local residents and oyster farmers. The oyster farmers value this mangrove area for moderating sediment and nutrient flows from the small creek and thus protecting adjacent water quality and conditions suitable for high-quality oyster production. Myrtle cove is frequented by local residents, recreational fishers and tourists. An information sign was recently installed with support from OceanWatch Australia.

The Myrtle Cove mangrove stand is the most southern established mangrove stand in NSW. As temperatures warm, this mangrove area will facilitate mangrove southward migration and range in-filling both within Wonboyn estuary and nearby southern estuaries (Nadgee, Mallacoota, Snowy River).



Myrtle Cove Mangrove Assessment

Method Summary

The impact of fire on mangrove forest structure was measured in the field along 1 'Rapid Long Plot' belt transects in Myrtle Cove mangroves. The transects ran parallel to the shoreline to quantify impact along an elevation contour and within a tidal zone. 'Rapid Long Plot' transects are of variable length and width depending on forest stand density. Each transect captures a minimum of 25 mature trees to account for structural variability. Mangrove tree species, diameter, height and condition were recorded for each tree within the belt transect area. Above-ground and below-ground biomass and carbon stores were estimated for the Myrtle Cove mangroves using standard allometric equations to provide an estimate of mangrove biomass loss due to fire.

Mangrove Forest Attributes

Mean Canopy Height = 3.8 m

Mean stem diameter = 8.9 cm

Mean stem density = 4,505/ha

Live trees = 0% Dead trees = 100%

Mean Mangrove Biomass = 115 t per ha

Fire Impacts and Recovery

The 2019/2020 bushfire was observed to have directly impacted the area as the fire swept across the creek. Although there is no evidence of fire (charring), most mangrove trees suffered 100% leaf loss and subsequently died within 2 months of the fire. Interestingly, photos of the area approximately 2 weeks after the fire show healthy vibrant mangrove canopies with no leaf loss. It is estimated that there were 50-70 individuals in the stand of varying ages (3-80 years) at the time of the fire. 7-9 trees survived the fire, with 2 recently dying (noted by dead leaves still on tree). One surviving tree with ~50% canopy loss was noted to be prolifically fruiting. One tree with one remaining leaf present and a bare canopy was observed to have started epicormic resprouting nearly two years after the fire.

Recent seedling planting and protection efforts by OceanWatch and community volunteers appears to be mostly successful to date.



Myrtle Cove Mangrove Biodiversity

The mangrove stand and adjacent saltmarsh has high biodiversity. A species list of observations made during site visits in 2021 and 2023 is provided here. All observations were uploaded to iNaturalist and the Atlas of Living Australia database. Observations of note include the first records of Red-fingered Marsh Crab (*Parasesarma erythodactylum*) and Spotted Smooth Shore Crab (*Paragrapsus laevis*) in the estuary.

Fauna

Saltmarsh gastropods: *Ophicardelus ornatus*, *Ophicardelus sulcatus* and *Phallomedusa solida*. *Pleuroloba qouyi* may also be present. Many empty Hercules Club Mud Whelks (*Pyrazus ebeninus*) shells were observed.

Birds: Scarlet Honeyeater, Azure Kingfisher, Eastern Spinebill, White-faced Heron, Greater Egret.

Crabs: Red-fingered marsh crab, Spotted Smooth Shore Crab, Semaphore Crab

Other: Non-biting midge galls, amphipods, red mite, wallaby (tracks)

Flora

Mangrove: *Avicennia marina* subsp. *australasica*

Saltmarsh Plants:

Samolus repens

Atriplex prostrata (introduced)

Suaeda australis

Salicornia quinqueflora

Isolepis cernua

Apium prostratum

Machaerina juncea

Tetragonia tetragonoides

Plantago coronopus (introduced)

Lobelia anceps

Spergularia tasmanica

Juncus kraussii

Triglochin striata

Brachyscome graminea

Fungi

Schizophyllum commune





Call

(03) 9016 7590

Email

hello@earthwatch.org.au

Website

www.earthwatch.org.au



[@EarthwatchAustralia](https://www.facebook.com/EarthwatchAustralia)



[@earthwatch_au](https://www.instagram.com/earthwatch_au)



[Earthwatch Institute Australia](https://www.linkedin.com/company/Earthwatch%20Institute%20Australia)



[@Earthwatch_Aus](https://twitter.com/Earthwatch_Aus)



[@EarthwatchAustralia](https://www.youtube.com/EarthwatchAustralia)