

Preserving Aquatic Habitats: Utilising Fishing Line Bins to Safeguard Platypus Populations

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Key Points

- Discarded and abandoned fishing line can lead to entanglement with aquatic waterbirds, turtles and, in freshwater systems, platypus and rakali.
- Fishing line bins – (TAngler Bins) were installed at three popular freshwater fishing locations in the Hawkesbury-Nepean River catchment.
- Over 2.5kms of fishing line was disposed of in the TAngler Bins between April 2019 and May 2022, while 612 meters of fishing line was left on the bank.
- When installing fishing line bins, consideration needs to be given to site selection, prevention of theft and the role of community education.

Abstract

Discarded and abandoned fishing line poses a substantial environmental threat, with repercussions for aquatic ecosystems, wildlife, and public safety. While fishing line bins, commonly known as TAngler Bins, can be found in many beach and estuary areas in Australia, their scarcity in freshwater fishing locations raises concerns.

In the Hawkesbury-Nepean River catchment, wildlife, including waterbirds such as water hens and pelicans, frequently fall victim to fishing line entanglement. Notably, platypuses inhabit the Hawkesbury-Nepean River catchment, and in 2021, a platypus drowned as a direct consequence of fishing line entanglement. This project aimed to determine if installing fishing line bins at three fishing “hotspots” in the Hawkesbury Local Government Area would reduce the amount of discarded fishing line on the water’s edges.

Monitoring was conducted across three locations over a three-month period to assess the prevalence of discarded fishing line. TAngler Bins were then installed and between April 2019 and May 2022 continuous monitoring of both TAngler Bins and the riverbanks revealed that 2,662 meters of fishing line were successfully disposed of in the TAngler Bins, while 612 meters of fishing line were discarded on the riverbank.

The implementation of TAngler Bins along the banks of the Hawkesbury-Nepean River demonstrated success in mitigating the amount of discarded fishing line on the riverbank. However, the project also revealed valuable insights, highlighting considerations such as strategic site selection, prevention of theft, and the crucial role of community education and signposting in ensuring the effectiveness of TAngler Bins in freshwater systems. These learnings contribute to the ongoing refinement and optimisation of initiatives aimed at fostering responsible fishing practices and protecting the aquatic environment.

Keywords

Fishing line entanglement, freshwater fishing, platypus, wildlife, TAngler Bins, Hawkesbury-Nepean Catchment

Introduction

Recreational fishing is a popular pastime in Australia, not only in marine environments, but in freshwater rivers, creeks and lakes. Discarded and abandoned fishing line and gear pose a substantial environmental threat, with potential repercussions for aquatic ecosystems, wildlife and public safety. While the impacts of fishing line entanglement on marine and coastal species is well documented (Reinert et al., 2017; Ryan, 2018), there is a lack of published information on the impact of discarded fishing line on freshwater animals.

The platypus (*Ornithorhynchus anatinus*) is an iconic Australian species that inhabits the freshwater systems of the east coast, Tasmania and Kangaroo Island. Platypus are under threat from a number of factors, including injury and drowning from abandoned and discarded fishing line. Fishing line can become entangled in platypus and cut through skin and muscle (figure 1), reducing the ability of the platypus to move and forage, and potentially leading to infection and starvation, ultimately causing a slow, painful death (Serena & Williams 2021). Platypus are air breathers who need to surface every 3 to 4 minutes, thus, entangled platypus can also drown, by becoming entangled and unable to surface.



Figure 1. A platypus that had drowned as a result of fishing line entanglement in Berrima, within the Hawkesbury-Nepean catchment in 2021. The cut from the entangled fishing line is shown on the platypus's leg (photo: Michelle Ryan)

The Hawkesbury-Nepean River system is the largest catchment in the Sydney Basin, spanning, 21,400 km². In the Hawkesbury-Nepean River catchment, wildlife, including waterbirds such as water hens, ducks and pelicans, frequently fall victim to fishing line entanglement.

Notably, platypuses inhabit the Hawkesbury-Nepean River catchment (Ryan & Morrison, 2021; Webb et al. 2021, Warwick et al. 2024), and in 2021, a platypus was found deceased, with the drowning attributed to the direct consequence of fishing line entanglement. This project aimed to determine if installing fishing line bins at three fishing “hotspots” in the Hawkesbury City Council Local Government Area (LGA) would reduce the amount of discarded fishing line on the water's edges.

Methods

Site Selection

Three sites in the Hawkesbury-Nepean catchment, within the Hawkesbury City Council Local Government Area were selected for this study. These sites, Pughs Lagoon in Richmond, Yarramundi Reserve in Yarramundi, and Macquarie Park in Windsor were selected due to their popularity as recreational fishing sites (figure 2).



Figure 2. The Hawkesbury Local Government Area and the site locations within the Hawkesbury LGA. Orange = Yarramundi Reserve, Pink = Pughs Lagoon, Blue = Macquarie Park.

Tangler Bins

A commonly used fishing line bin, the TAngler bin, were chosen in this study due to their widespread use in coastal systems (Oceanwatch 2024). TAngler bins are designed to be installed at visible locations at recreational fishing hotspots to be a visible reminder about the correct disposal of fishing line. At each site, TAngler bins were installed at locations where people had to walk past them to get to the water (Figure 3).



Figure 3. The location of TAngler bins in the Hawkesbury LGA at Pughs Lagoon – Richmond, Macquarie Park – Windsor, and Yarramundi Reserve – Yarramundi.

Data collection

Pre-installation surveys were conducted at all three sites in January, February and March 2019. A search of the waterline along the accessible length of each site was conducted by two individuals once a month. Any fishing related paraphernalia such as line, hooks, sinkers and floats were collected and bagged.

TAnGLer bins were installed in April 2019 and from this point onwards to December 2019 bins were emptied once a month, whilst on the same day the waterline was searched by two individuals to locate any fishing gear abandoned on the bank. From January 2020 to May 2022 the bins were emptied bimonthly. The bins were removed in May 2022 due to ongoing floods and rehabilitation works needed at each site.

For each site, the contents of each bin were emptied in a white tray, a photograph was taken, fishing gear was separated, washed, categorised, weighed and fishing line measured. The same was completed separately for the fishing gear found on the bank.

Results

Fishing line was found on the bank at all sites during the pre-installation surveys with a total of 119.54m of line collected (63.04m - Macquarie Park, 52.72m - Yarramundi Lagoon, 3.75m – Pughs Lagoon). Once TAnGLer bins were installed, 2,662m of fishing line was collected from the TAnGLer bins and 612m of fishing line was collected from the bank across all three sites. At all sites, more fishing line was placed in the bin, than found on the bank with at least 300% more fishing line found in the TAnGLer bins at Macquarie Park to 940% more fishing line found in the TAnGLer bins at Pughs Lagoon than was found on the respective banks (figure 4).

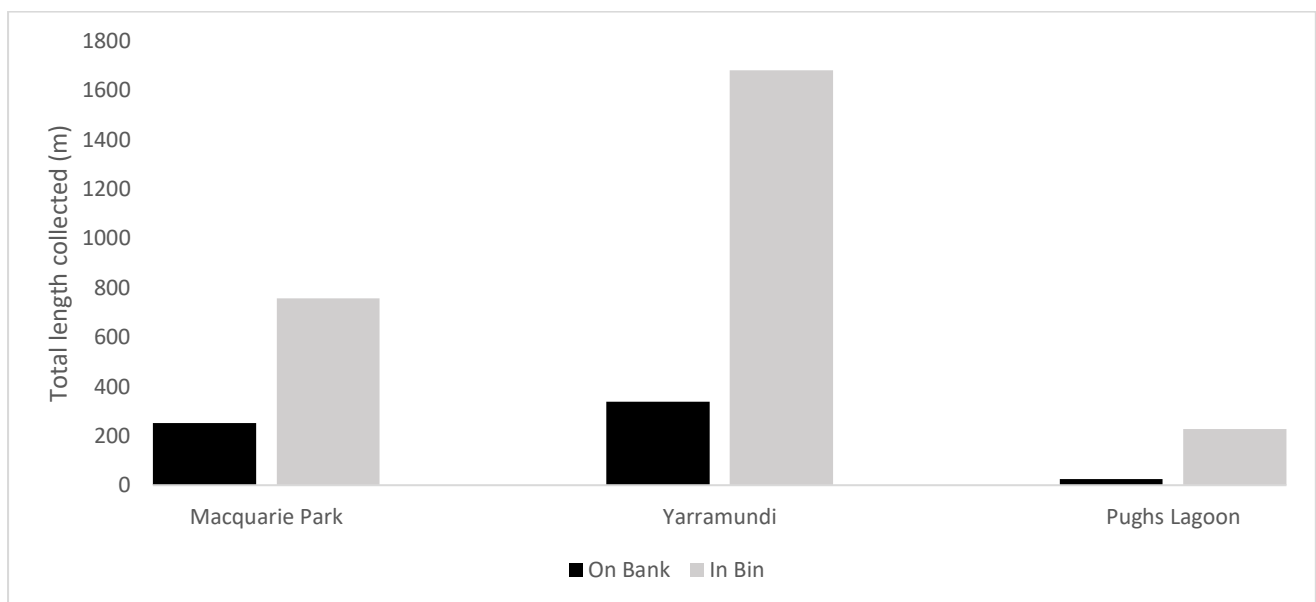


Figure 4. The total length of fishing line collected either in TAnGLer bins or on the bank at three sites in the Hawkesbury Local Government Area.



Figure 5. An example of the contents of TAngler Bins.

Other fishing gear was also found discarded on the bank and disposed of in the TAngler Bins (figure 5). This included fishing hooks, sinkers and floats (table 1). A total of 117 hooks, 39 sinkers and 12 floats were placed in the TAngler Bins compared with 38 hooks, 17 sinkers and 12 floats found on the banks.

Table 1. The number of fishing hooks, sinkers and floats disposed of in the TAngler Bins.

	Number of hooks		Number of sinkers		Number of floats	
	In TAngler Bin	Left on bank	In TAngler Bin	Left on bank	In TAngler Bin	Left on bank
Macquarie Park	69	12	12	5	1	1
Yarramundi	37	25	22	10	8	11
Pughs Lagoon	11	1	5	2	3	0
Total	117	38	39	17	12	12

Discussion

The installation of three TAngler bins at recreational fishing hotspots in the Hawkesbury LGA was a successful way to reduce the amount of fishing line and fishing gear discarded on the banks, with over 2.5 kilometres of fishing line disposed of correctly, as well as other fishing gear. The location of the bins also served as a reminder to the public about correctly disposing of fishing equipment.

There were several lessons learnt during this project which should be considered when installing fishing line bins, such as how to handle the disposal of other rubbish, potential theft and vandalism of the bin, flooding, and the need for a supporting public education campaign.

The disposal of other rubbish

When emptying the bins, it was found that on many occasions there were several pieces of other rubbish left either in or around the bin. This included cigarette butts, cans, food packages, condoms, and assorted plastics (figure 6).



Figure 6. An example of the contents of TAngler bins during this study.

While it is better that people dispose of this rubbish in the fishing bin than leaving it on the bank, it does fill up the bin quickly and therefore the TAngler bins need to be emptied more regularly in order to remain effective. It was found at Pughs Lagoon and Yarramundi Reserve that there was less rubbish in the TAngler bins due to their close proximity to garbage bins, however, the closest garbage bin at Macquarie Park was over 200m away from the TAngler bin and we were often confronted with a full and overflowing TAngler bin (figure 7). It is highly recommended that TAngler bins are installed within eyesight of garbage bins to reduce the frequency that the bins need to be emptied.



Figure 7. Rubbish left surrounding TAngler bin at Macquarie Park (photo: Michelle Ryan)

The theft and vandalism of the bin



Bins were fastened to metals poles using stainless steel worm clamps, which need a screwdriver to remove. One bin was stolen in July 2019. It was replaced in October 2019 and was not taken again. The bins are susceptible to vandalism and often have been reported in other areas to have the base unscrewed and thrown away. To combat this, a hole was drilled through the base plate into the tube and secured with a padlock (Figure 8). We had no padlocks or base plates taken during this project.

Figure 8. The TAngler Bin installed at Yarramundi showing the padlock fitted on the base plate to stop the bin contents being stolen or the lid vandalised.

Ryan – Preserving Aquatic Habitats: Utilising Fishing Line Bins to Safeguard Platypus Populations Flooding

Between February 2020 and May 2022 there were four major floods of the Hawkesbury-Nepean River with the TAngler bins submerged under floodwater. Each time, the bins remained attached to their poles in the same locations (figures 9 & 10). Other than filling with water and sand, there was no permanent damage to the bins, or the internal contents. After each flood, the TAngler bins were removed and cleaned and placed back on their pole. After the destruction of the March 2022 flood, the TAngler bins were removed (May 2022), as the sites needed to be cleaned up and restabilised (figure 11).



Figure 9 (above) and 10 (right). The TAngler Bins after the floods at Macquarie Park (above) and Yarramundi Lagoon (right)



Figure 11 (left) The aftermath of the March 2022 flood at Yarramundi Lagoon. The TAngler Bin still attached to the pole, circled in orange.

Accompanying educational campaigns

Further reduction in the amount of abandoned fishing equipment may result from an accompanying educational campaign. A study by Adedokun et al. (2023) found that fly fisherman in Tasmania were aware of their environmental impact and are on-side with environment conservation. The emotional connections that they hold to waterways drive them to tackle and solve environmental issues, such as littering. A targeted educational campaign for recreational fisher-people and those who use these waterways, such as signage (figure 12), social media posts and workshops may improve environmental outcomes by complementing other practical initiatives such as the Tangler bins, and therefore reduce the impact that abandoned and discarded fishing line has on aquatic wildlife, such as the platypus.



Figure 12. Educational signage installed at a popular recreational site on the Bargo River in the Hawkesbury-Nepean catchment (photo: Michelle Ryan).

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