



The Werribee River *'A Stream of Litter'*

Litter Research

Werribee Diversion Weir to Werribee Park Historical Ford 2014-2015





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– Werribee Diversion Weir to Werribee Park Historical Ford

A Werribee Riverkeeper/ Deakin Uni Project 2014 - 2015

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Context:

The litter research fits within the purpose of the Werribee River Association (WRivA):

- Encourage an appreciation of the Werribee River for the amenity and health of the whole community.
- Protect and enhance the diversity of unique flora and fauna in the Werribee river catchment.
- Maintain excellent quality water flows in the waterways of the Werribee river catchment to ensure a healthy eco-system.

Threats:

- A. Poor water quality. Major reports about the river and other catchment waterways show ongoing poor water quality. Source: <http://cleaneryarrabay.vic.gov.au/report-card>
- B. Poor water flows. Environmental flows are beneficial, but the reality of climate change calls for more flows which will provide swimmable, fishable, drinkable water for the community.
- C. Inadequate litter legislation. Litter and plastic threaten platypus, fish, birds, infrastructure, amenity, and tourism. Voluntary clean ups cannot cope, costs are rising for all levels of government, and harmful chemicals are entering the human food chain. Government, manufacturers, retailers and consumers must work together to lower this ever growing threat.
- D. Lack of protective planning and setback controls. These will ensure the community has ample physical and visual access to a natural river, vegetated waterways and wild spaces in the environment.
- E. Lack of recognition and status. There will be 749,000 people living in 3 towns along the River in the River's 3 municipalities by 2036. The river needs its values and qualities secured and proclaimed, to protect the river for the people for all time.

The Werribee Riverkeeper / Deakin Uni Litter Research Project examined the state of litter as it impacts on the ability of the river to continue to provide health giving benefits to the people of Werribee.

Below the diversion weir in Werribee, the Werribee River is currently notable for its locally endangered platypus population and for its eucalypt woodlands. The urban area now adjacent to the river has grown rapidly since the 1970s. The numbers of people accessing the river in parks and reserves or along the river has risen as pathways are constructed allowing people to see the river and enjoy its health giving benefits. But the amenity and benefits it offers people are facing a number of threats.

Focus of project:

This project set out to investigate the sources, distribution and amount of litter in the river between Werribee Diversion Weir and Maltby Bypass Werribee.

Litter was defined as including all forms of discarded litter or rubbish, shopping trolleys and any other items, manufactured or altered as they would not normally belong in a river environment.

Findings are described in this report and recommendations made to further advance WRivA's work.

Method:

The river was divided into four sections to assist analysis, and these were:

1. Werribee Diversion Weir to Shaw's Bridge Heaths Road.
2. Shaw's Bridge Heaths Rd to Cotterell Street
3. Cotterell Street to Werribee Street Road Bridge
4. Werribee Street Road Bridge to Maltby Bypass

Each section was inspected by walking each side of the river, including through thick vegetation close to the water except in impenetrable, steep, or otherwise unsafe places. Observations were taken at points of interest from both sides of the river.

Stormwater outlets were mapped and some notes made:

- on where the outlet was in relation to the river
- on the condition of the outlet,
- whether a litter trap was in place, and
- whether litter and other items were present

Reed beds were mapped and notes made:

- with beds defined as reeds growing in water and not just on banks
- if longer than 10 metres in length
- whether litter and other items were present

Litter data was gathered:

- from stormwater outlet – Bridge St
- by surveys conducted at two transects – Maltby Bypass and Werribee Park Fishway
- by case studies at Bulban Drain, Guyra Court and Old Farm Road
- by observation during environmental flows and in various WRivA activities
- by on river kayak trips
- using Tangaroa Blue data collection sheets for guidance

Notes on Mapping Data (31/03/2015 -25/04/2015):

Stormwater outlets or drains were mapped from Riverbend Historical Park (Southern Rural Water Diversion Weir) to Maltby Bypass. The sections of the river walked and monitored between the two points (Riverbend and Maltby) are 13.53km distance return. Purpose was determining the amount of drains in the area as sources of litter and reed bed coverage for filtration.

Diversion Weir to Shaw's Bridge Heaths Rd

- Reed Coverage = 620m²
- Drains = 0

Shaw's Bridge Heaths Rd to Cottrell St Bridge

- Reed Coverage = 960m²
- Drains = 14
 - o Drains ranging from 900ml to 3000ml (total also includes 1 drain swale)

Cottrell St Bridge to Werribee St (Chirside Park)

- Reed Coverage = 20m²
- Drains = 10
 - o All drains leading to the river, 3 are located slightly off the riverbank.

Chirside Park Werribee St to Maltby Bypass

- Reed Coverage = 1950m²
- Drains = 16
 - o Including 2 x roadside runoff drains with concrete slide exit
 - o 1 x drain at Purcell Court was noted to have heavy erosion eating away at soft sediment underlay.
 - o Werribee Anglers Club drain noted as blocked.

Total:

40 drains located in 6.76km of river monitored between the 31/03/2015- 24/04/2015

There is an estimated total of 3550m² of reed beds between Historical Park and Maltby Bypass.

It was noted that there were high levels of litter in areas with drainage exits as opposed to other areas of the Werribee River, such as Riverbend Historical Park to Shaw's Bridge where there appears to be no drains within the stretch of river. This is strongly indicating that the drains are providing the river with high levels of rubbish intake. (See case study Guyra Court).

Other Notables:

- Shopping Trolleys
 - o < 24 older trolleys in vicinity of Wyndham Park Piazza Bridge previously reported to Melbourne Water
 - o 8 new trolleys noted between Heaths Rd Bridge and Cottrell St reported via twitter to MW west team and others
- Large areas of mown grass and lack of riparian vegetation were seen in areas of the river
- Blue green algae noted commonly at sites from diversion weir pools to K Road cliffs, most commonly downstream from Maltby Bypass
- *Azolla* sp. coverage providing a 'snapshot' of floating litter items which would normally flow downstream or enter into reed beds
- Polystyrene foam present in litter findings and particularly serious load present in swale drain leading from Riverwalk Estate

Conclusion:

It is estimated that over 50,000 floating bottles and other plastic containers, toys and general litter were present in the water during this study. The vast majority of the litter encountered was of plastic origin. Points of entry to the river for the plastic include the stormwater outlets, mown grass areas, steep embankments with none or very little vegetation cover, pathways close to the river, and car parks adjacent to the river where consumption of take-away food is convenient in vehicles.

Recommendations:

Education

1. Encourage the existing work being done in schools with litter and plastic recycling
2. Encourage a 'save your locals' campaign based on the platypus, led by Werribee Open Range Zoo

Enforcement

3. Lift levels of fines which can be imposed on offenders for all categories of rubbish and littering
4. Introduce a program of active management and enforcement on trolley accessibility and recovery
5. Introduce a program of active management and enforcement aimed at developers and property owners and managers to control litter coming from their land

Flows

6. Undertake a major review of flows in the river in order;
 - a. To lower frequency levels of nutrients
 - b. To allow safe and hygienic entry to the water by residents, volunteers and work crews

Infrastructure

7. Commence a major program of upgrading or installing litter traps on existing stormwater outlets
8. Commence a review of specifications for all new stormwater inlets and outlets, creating a standard whereby litter from there does not enter stormwater systems
9. Place floating litter traps at strategic points on the Werribee River

Management of immediate surrounds

10. Carry out a major review of maintenance regimes for mowing and cease mowing close to the river.
11. Carry out a program of strategic plantings to minimise litter entry to waterways
12. Widen and infill gaps in riparian vegetation
13. Fence or otherwise block access to sensitive and susceptible river areas where vehicles and passers-by.

Personnel

14. Fund a waterways in-water clean-up crew with appropriate training and equipment
15. Ensure volunteers, businesses, employees of water authorities and municipalities can enter the water safely to remove litter

Policy

16. Introduce a policy on removing plastic bags and containers from usage in Wyndham and other localities
17. Introduce a container deposit scheme into Victorian litter legislation
18. Introduce smart litter laws with incentives to recycle plastic, stop take-away food packaging being discarded, and encourage smarter packaging
19. Proclaim the Werribee River as a linear park, with local laws stopping access into riparian areas by vehicles, the dumping of rubbish, mowing and destroying of native vegetation, removal of firewood, and the consumption of alcohol.

Bridge St Drain



Litter Transect Maltby Bypass



Fishway Werribee Park

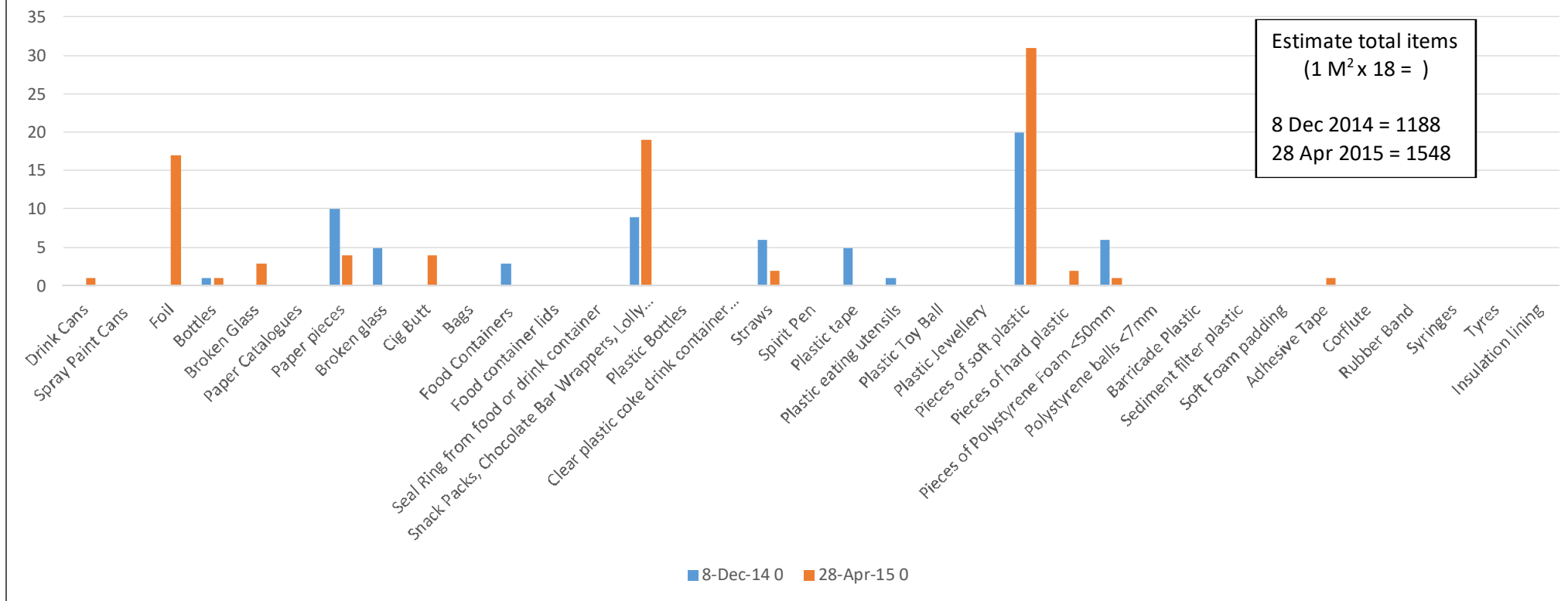


Shopping Trolleys



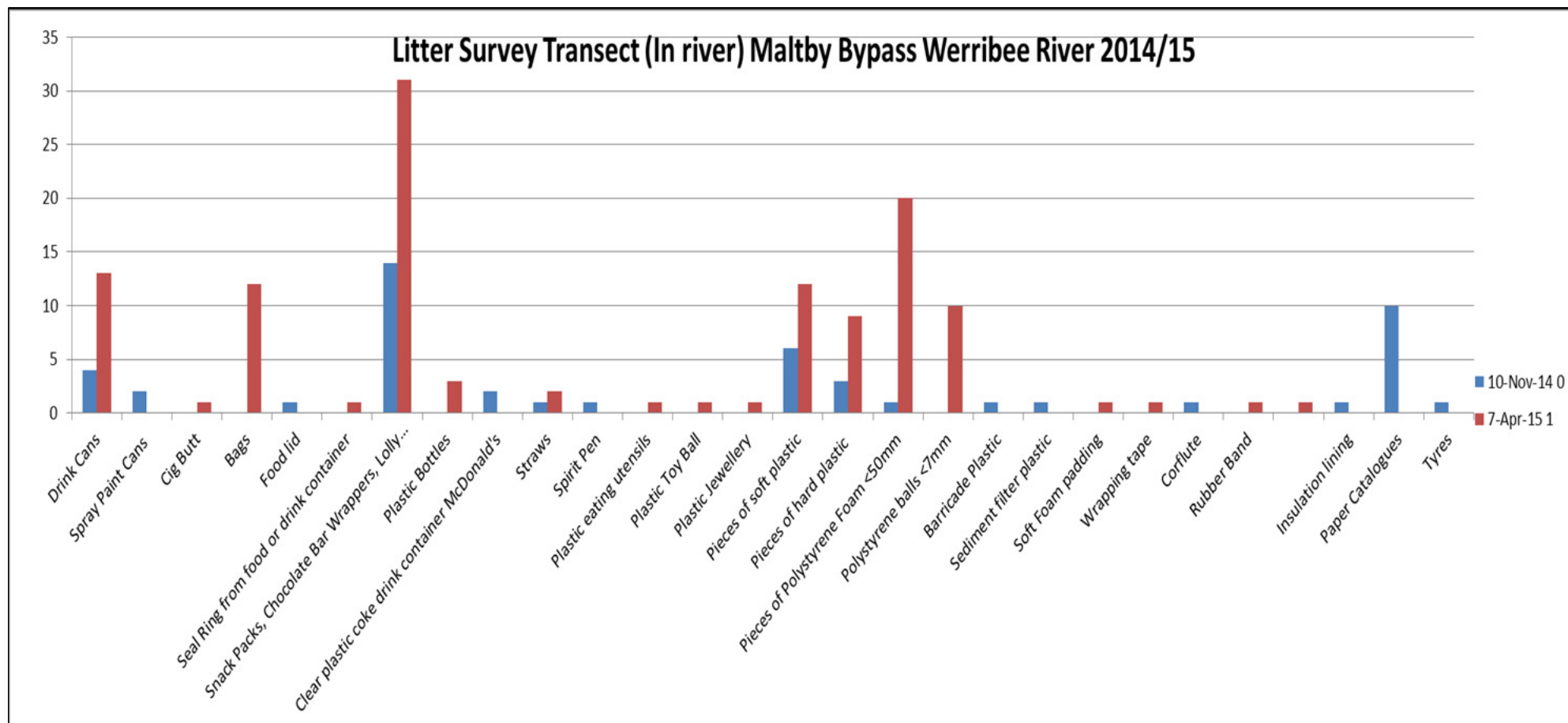
Bridge St Drain 1 sq m Grid 2014/15

(Total items estimated over 18sq m apron)



LITTER DATA 1

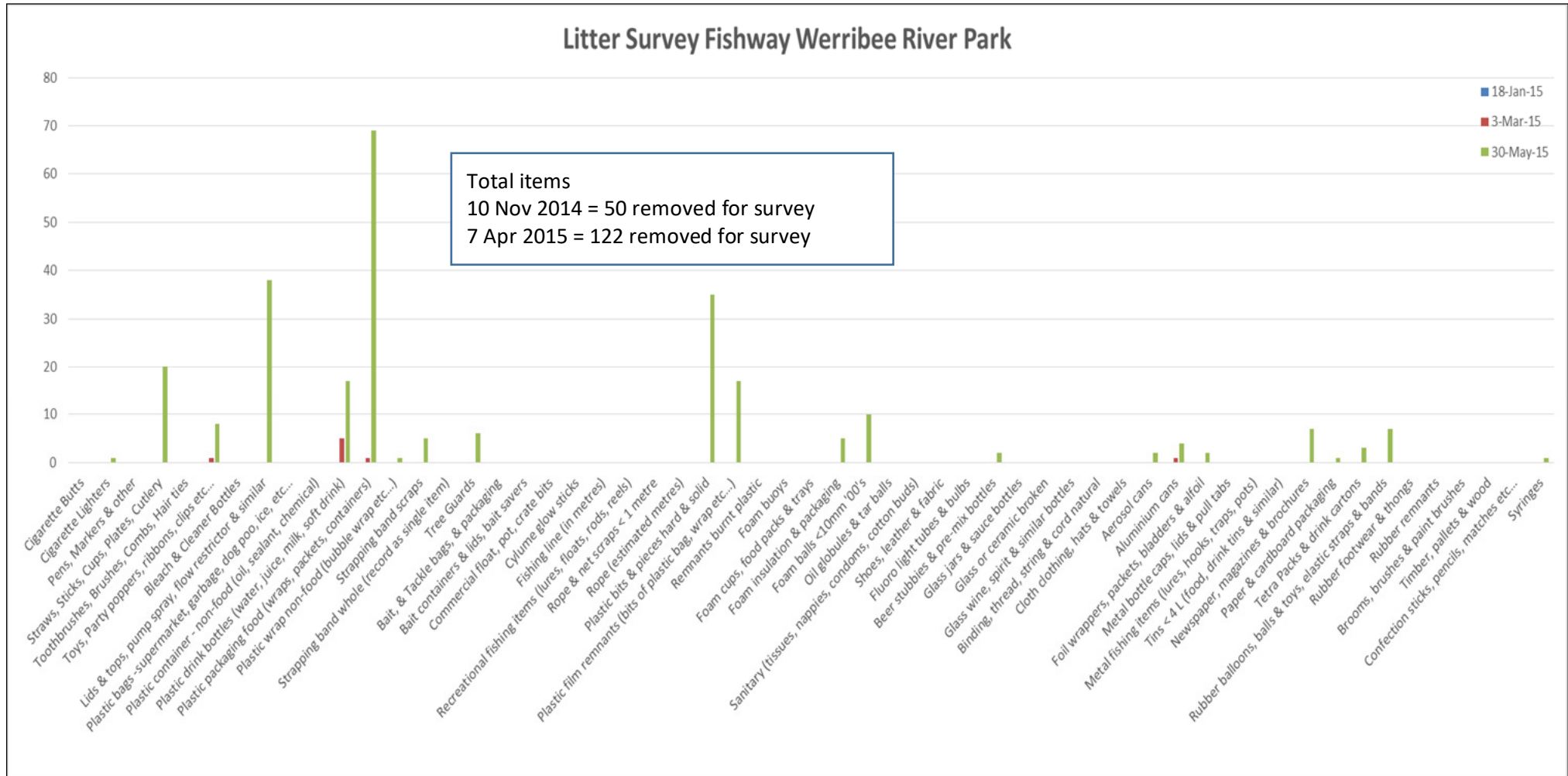
Notes: This site drains some of the central area of the CBD. The site is not attractive, with exposed litter in the drain apron, broken footpaths with graffiti ridden signage, unsightly wooden walls lining the ramp down to the main path, and at least one traffic divider in the water. The amount of plastic litter deposited by stormwater on the apron is disturbing. The lack of plastic bottles and other containers at the drain may be due to weekly clean-ups by City of Wyndham, some of whose workers spoke with the research team during the survey on 28 Apr. However, plastic bottles are very evident under the railway bridge, where accumulated piles exist behind a wire mesh fence on railway property, spilling down into the river below the elevated walkway. *Azolla* sp. and scattered litter on the surface of the water make a picture here which shows a considerable litter load on the river at this point. What can't be seen are the immeasurable numbers of items of plastic which have gone into the river over the life of this drain.



LITTER DATA 2

Notes:

This transect survey was undertaken by collecting litter found on the bottom of the river at a point where the water is shallow over the top of a 'ford' which is man-made. This transect is 20m downstream of a large drain on the east side, which appears to bring stormwater from the Concorde Cres area. The adjacent reed beds here are full of plastic containers and many plastic bags, including many used clothing collection bags. It is likely items do not stay long in this transect as even minimal flows in this shallow section were causing movement.



LITTER DATA 3

Notes:

The 18 Jan 2015 data of zero for all categories was done when the fishway was just completed, and the visual survey in very clear slow moving water showed no litter was present at that stage.

The 3 Mar 2015 data showed minimal data, totalling 8 items, but the survey was done by visual survey only, while an in-water, thorough hand search survey was completed on 30 May 2015, which resulted in finding 261 items. Drink containers found showed signs of being in the water for a long period, and polystyrene foam balls are estimated only (estimated in excess of 1000) as they were numerous and very difficult to see and collect

Case Study Bulban Rd Drain:

The Bulban Rd Drain area of the river was visually surveyed by WRivA members at the Clean-up Australia Business Day Tues 24 Feb 2015. At the time there was a conservative estimate made by the Werribee Riverkeeper of over 5000+ plastic bottles in the water or in reed beds. Melbourne Water reported that the drain litter trap contained 18³m of litter.



Photo left:

This large drain deposits all forms of litter into the river, and has a mal-functioning litter trap 3-4 metres inside the opening. There is an artificial rock wall 3-4 metres high immediately below the drain, the mesh of which captures many fragments of plastic bags, and many other items. The wall possibly assists the plastic to be fragmented into smaller pieces.



Photo left:

This sample of litter in a trailer was taken from the river below the drain, and shows some of the containers, cans, bottles and other plastic which was lying on the ground in the reed beds.

Photo below left:

Beside the water hole below the Bulban Rd Drain, this section of the reed beds was knee deep in places with litter, much of which was containers and other plastic.



Discussions with Melbourne Water and City of Wyndham reveal that the Bulban Rd drain has not been cleaned on a regular basis for some years. It was noted the design of the litter trap poses problems due to dangers of a confined space.

Case Study Guyra Court:

Guyra Court is located at a point where the river narrows. Within 500 metres upstream of this point at least three drains deposit stormwater and it appears, a considerable litter load. It was noted that the current coverage of *Azolla* sp. has left floating litter on the surface. Just upstream of this point was the Golden Ave area where many items were seen in reed beds or amongst tree roots and branches. In the pool at Guyra Court, it is estimated that 200+ items were clearly seen in *Azolla* sp. affected areas, and most of that was plastic drink containers. Many more items can be seen held within reed beds or among woody debris.

At the time the river had more than four kilometres of *Azolla* sp. coverage at 90+% of the surface. In all of those areas, adjacent to stormwater outlets, litter can be seen floating. Reed beds whether in *Azolla* sp. affected areas or not also hide a large number of floating litter items from view.

Photos below: *Azolla* sp. covered river with view of litter strewn surface and litter in reeds and river snags



On river Survey Guyra Court Sat 5 Sep 2015:



We surveyed the river by kayak in this location from a point four hundred metres upstream from where the river narrows at Nadda Court. Entering the water from the upstream end of Manorvale reserve, we travelled downstream to the narrows, and returned. Observation while travelling showed an item of litter every two metres in the Azolla coverage, which at the time was covering about 75% of the river surface. The items ranged from dozens of drink containers, hundreds of polystyrene balls up to 10mm in size, chocolate or other snack bar wraps, snack pack wrapping, an inflatable device, toys, balls, plastic bags, clothing items and a shopping trolley. Our estimate of litter items of visible size to be more than 10,000.



Photo left: This shot shows a typical scene around woody debris. Azolla coverage holding containers, a ball, polystyrene foam pieces and plastic bag in the locality. **Photo below:** Large container which had travelled 200 metres since Mon 31 Aug 2015.



Photo left: This scene was photographed at the end of the narrows at Nadda Court Sat 5 Sep 2015.

Video footage of litter seen during the on-river survey shows a huge load of litter and rubbish in this area of the Werribee River.

Case Study Old Farm Road – Polystyrene Foam

This site was monitored over a period of time due to the unusual building of a deep swale with steep sides in a housing development. The Riverwalk Estate is being developed by Excell Gray Bruni for Vic Urban. The swale takes stormwater to the Werribee River, passing water under Old Farm Rd on the way to the river through the pipe in the photos. Litter of all kinds around here upstream of Old Farm Rd, and there appears to be no effective control or management of the litter.

Sun 10 May 2015:



Wed 15 July 2015:



Sun 6 Sep 2015:



Tue 8 Sep 2015



(L Below) Polystyrene in channel on way to river Tue 8 Sep 2015. (R Below) Polystyrene at end of swale



Case Study Environmental Flow Thur 12 Feb 2015:

The Environmental flow was to improve water quality for fish and platypus, clear sediments from riffles and move the blue-green algal bloom which stretched from Maltby Bypass to K Road Cliffs in the estuary. It also partially removed the Azolla cover through Werribee CBD as well, and also uncovered and moved many items of litter caught in reeds.



Photo above: This jar was photographed as it passed under Cottrell St bridge on Thur 12 Feb, and was identified when next seen two kilometres downstream in the old swimming pool at Bungey's Hole on Tue 24 Feb 2015, when WRivA carried out an inspection of Bungey's Hole for Clean-up Australia Day. See our articles on the CuAD activity and tracking an environmental flow:

<http://werribeeriver.org.au/attachments/article/55/WRivA-Riverkeeper-News-No22-Apr2015.pdf>

Windblown litter in WRivA experiment with local School Mortimer St 2014



On Wed 5th Nov, about 70 Year 3 students from St Andrew's School walked along a part of the river with the Werribee Riverkeeper, in order to develop their understanding of this beautiful natural asset. The impact of humans living close to the river and how we can help it were discussed. Topics covered included water quality, aquatic plant life such as Azolla, native vegetation like gum and wattle trees, animal life like birds and platypus, and that great scourge - litter. A plastic bag experiment allowing wind to blow a bag and timing it showed it only took two minutes to travel fifty metres to the river from a path, over mown grass.

See our articles on this and other activity in:

<http://werribeeriver.org.au/attachments/article/55/WRivA-Riverkeeper-News-No20-Dec2014.pdf>

Litter load under Rail Bridge, from railway property Wyndham Park



There is a heavy concentration of litter here, much of it fully visible in Azolla, giving the researchers an excellent snapshot of litter passing by this point.



Litter is a threat to, and killer of Werribee River platypus

Litter is impacting on the local platypus population, as has been shown in a number of platypus surveys since the 1990s. A Melbourne Water (Cesar) survey 2007 found one in four platypus are hurt by litter.



Report from Josh Griffiths Cesar Australia, on a survey of his on the Werribee River, Concorde Cres Werribee June 2014:

“Just before midnight, we caught our only platypus for the night. This continued the very low captures we have recorded in Werribee in recent years. The platypus was an adult male, previously not known to us, and unfortunately highlighted one of the issues we encounter too often in Werribee. He had a silicon wristband caught around his neck! Platypuses are prone to getting tangled in any enclosed loops due to their streamlined body shape and foraging behaviour. Once entangled, the individual is usually doomed to a slow death from starvation or drowning. Luckily, in this instance we were able to remove the band, found no underlying damage and he was able to be released to hopefully live for many years to come.”

See our article on the survey: <http://werribeeriver.org.au/attachments/article/55/WRivA-Riverkeeper-News-No17-Jun-2014.pdf>

Photos below: Platypus found dead in Werribee 2004 with litter injuries, then was mounted as a taxidermy specimen for educational purposes.



