

## Noosa River Rubbish Audit – March 2021

The Noosa River Rubbish Audit was organised as part of NICA’s Clean Up Australia Day on 7 March, 2021<sup>1</sup>, to collect and analyse the rubbish along a stretch of the lower Noosa river and riverside land at Tewantin. Similar surveys have been conducted around the same location in each of the past 3 years.

Besides cleaning-up a significant part of the Noosa river system, the purpose was to assess the amounts and types of rubbish and how they enter and behave in the river system, in order to understand better the rubbish problem and ultimately how to address the underlying causes.

The River Rubbish Audit was carried out by teams of local volunteers, including Tewantin State School students, parents and staff, members of the public, and a collaborative group of community organisations including NICA, North Tewantin BushCare, OzFish Noosa, Tangaroa Blue and Unity Water community program.

### Collection Sites and Method

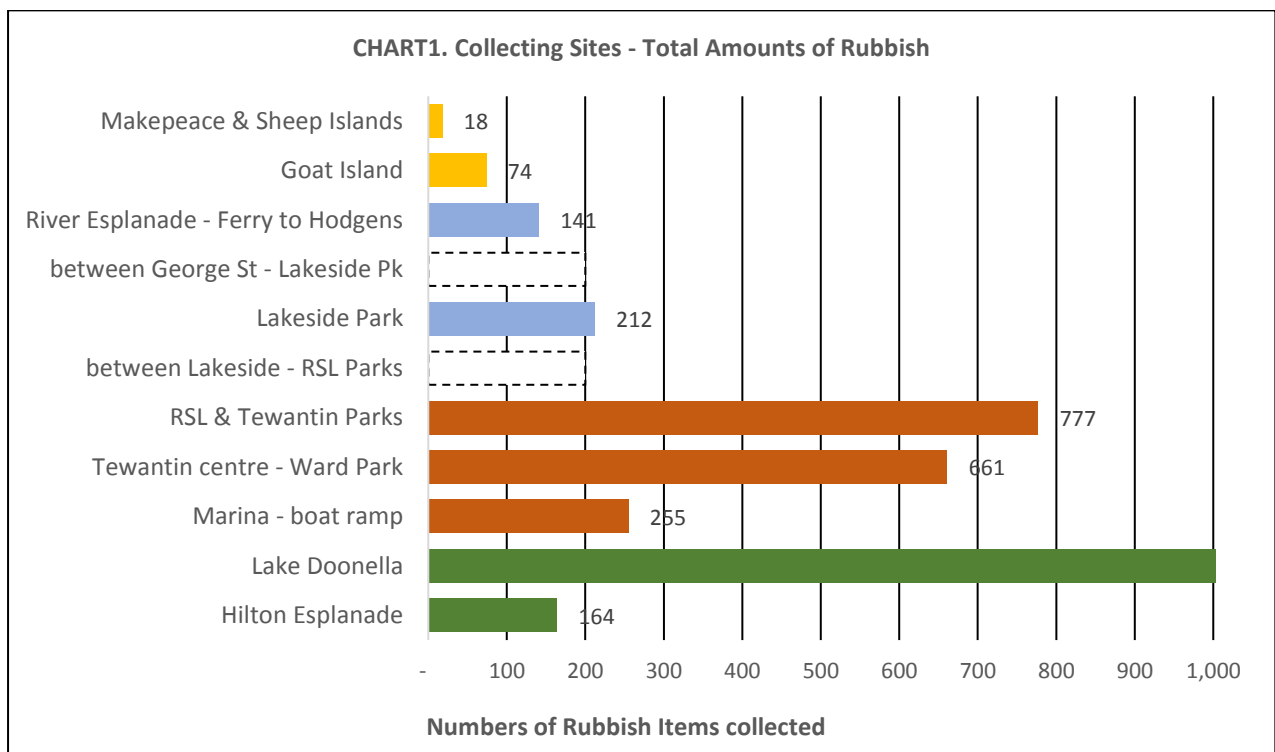
The rubbish was collected from approximately 4 kms of river and riverfront land, wetlands and bushland in Tewantin – from Ferry Park downstream along the River Esplanade, Lakeside Park, Ward Park, central Tewantin & RSL Parks and the Marina, to Hilton Esplanade and into Lake Doonella. Collections were also made around Pig (Makepeace), Sheep and Goat islands.

For efficiency the total area was divided into 11 sections – refer to Chart 1.; however collection was not possible in 2 sections where private properties restrict public access to the riverside – between George St and Lakeside Park (approx. 6 properties); and between Lakeside, Ward and RSL Parks (approx. 15 properties).

A total of 70 volunteers picked up all the rubbish they could see, working from roughly 08:00 to 10:30h; total collecting time was estimated at 110 person-hours. Low tide at Tewantin was around 10.00h. Most collectors walked in small groups through one or two of the 7 ‘mainland’ sections, while 6 kayaks and 3-4 boats were also used to search the river shallows, mangroves and shoreline as well as round the 3 islands.

Every item of rubbish seen was collected. Most were small and medium-sized pieces of litter and rubbish picked up singly into bags; large items were retrieved by boat or trailer. The collecting method did not find items that were completely buried or underwater; and nor of course did it pick up materials fragmented into small particles or dissolved and dissipated in the water.

The rubbish from all 9 sites was carried to Tewantin Park boat ramp for sorting and counting. The numbers of items of each type of rubbish collected from each site were recorded onto standard forms. After recording, the rubbish was separated into locally re-cyclable and non-recyclable, and put into disposal bins.



<sup>1</sup> For Clean Up Australia Day 2021 in Noosa, the community group NICA (Noosa Integrated Catchment Association) organised 20 collection sites across the Shire where volunteers registered and collected rubbish. A total of X tonnes was collected by over Y volunteers.

## RESULTS

Roughly 30 sackfuls plus a number of bulky items (crab-traps, mattresses, parts of bikes, boats and cars) were collected from the 9 accessible sections of river, riverfront and islands. The rubbish was sorted by hand into 7 major categories and then into 53 sub-categories of different types of rubbish items for counting.

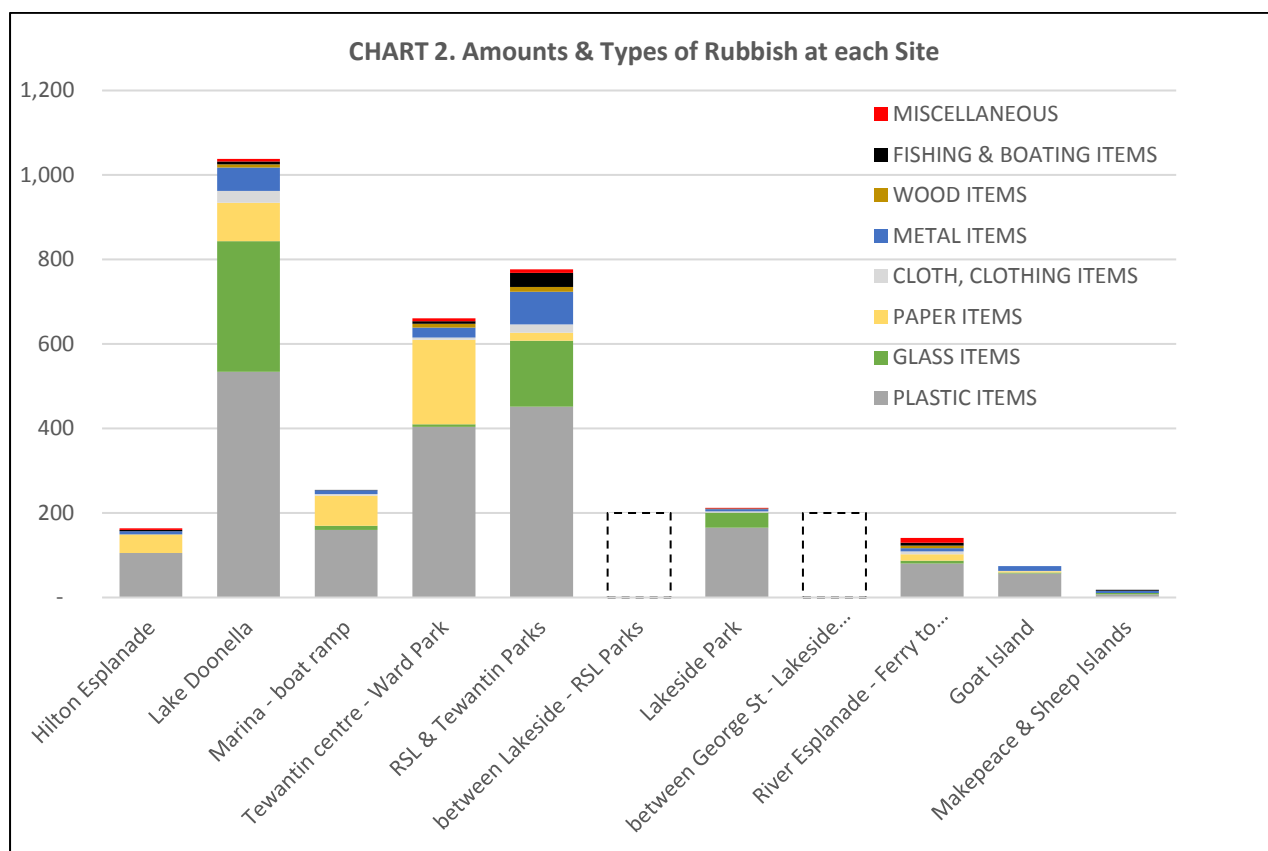
A total of 3,340 separate items were sorted and counted<sup>2</sup>. CHART 1 shows the amounts collected at each site, ranging from 18 to 1038 items, an average of over 370 per site. The data recorded are presented in the appended table.

### The Distribution of River Rubbish

CHART 2. shows the 8 major categories of rubbish and the amounts of each type collected from each section of the survey area. The amounts varied widely, mainly because some sites were much more littered than others. However, other factors make interpretation of the data less straightforward: for example the sites differ in size and in the effort that went into collecting – the numbers of collectors and time spent searching and collecting each area.

The general distribution of rubbish along the 4kms stretch of river and riverfront land at Tewantin was as follows:

- Over 50%, 1693 items of rubbish came from the central Tewantin riverside area, including the areas around Tewantin Park, the Marina and Boat ramp, RSL Park, Ward Park.
- The second largest amounts (36%, 1,202 items) were collected from the Doonella Bridge area, Hilton Esplanade and parts of Lake Doonella.
- 11% of items (353) were collected from the riverside land and water through Lakeside Park, along the north Tewantin River Esplanade, to Ferry Park.
- Small but significant amounts (3%, <100 items total) were collected from the small estuarine islands – Pig (Makepeace), Sheep and Goat.



<sup>2</sup> It is difficult to obtain useful measures of the amounts of rubbish: alternative methods – counting numbers of items, volumes or weights – pose various problems when measuring small broken fragmented materials that vary widely in density.  
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The results indicate that different types of rubbish are distributed in different ways across the 9 river and riverside sites; some types of rubbish were found mainly at a few sites rather than being distributed evenly. For instance **Plastic items** comprised roughly half the rubbish (44-78%) at each site, whereas **Glass pieces** were abundant (17-30%) at 5 Sites but scarce (0-5%) at the other 4 sites. While Plastic items are readily carried by wind or water (or people) throughout the area, Glass may be thrown into the river at a convenient spot – next to a picnic area perhaps – and will stay at that spot forever unless physically removed.

The distribution of **Paper items** was also uneven, comprising 27-30% of all items at 3 sites close to urban road reserves; but <4% at the 4 “least busy” sites.

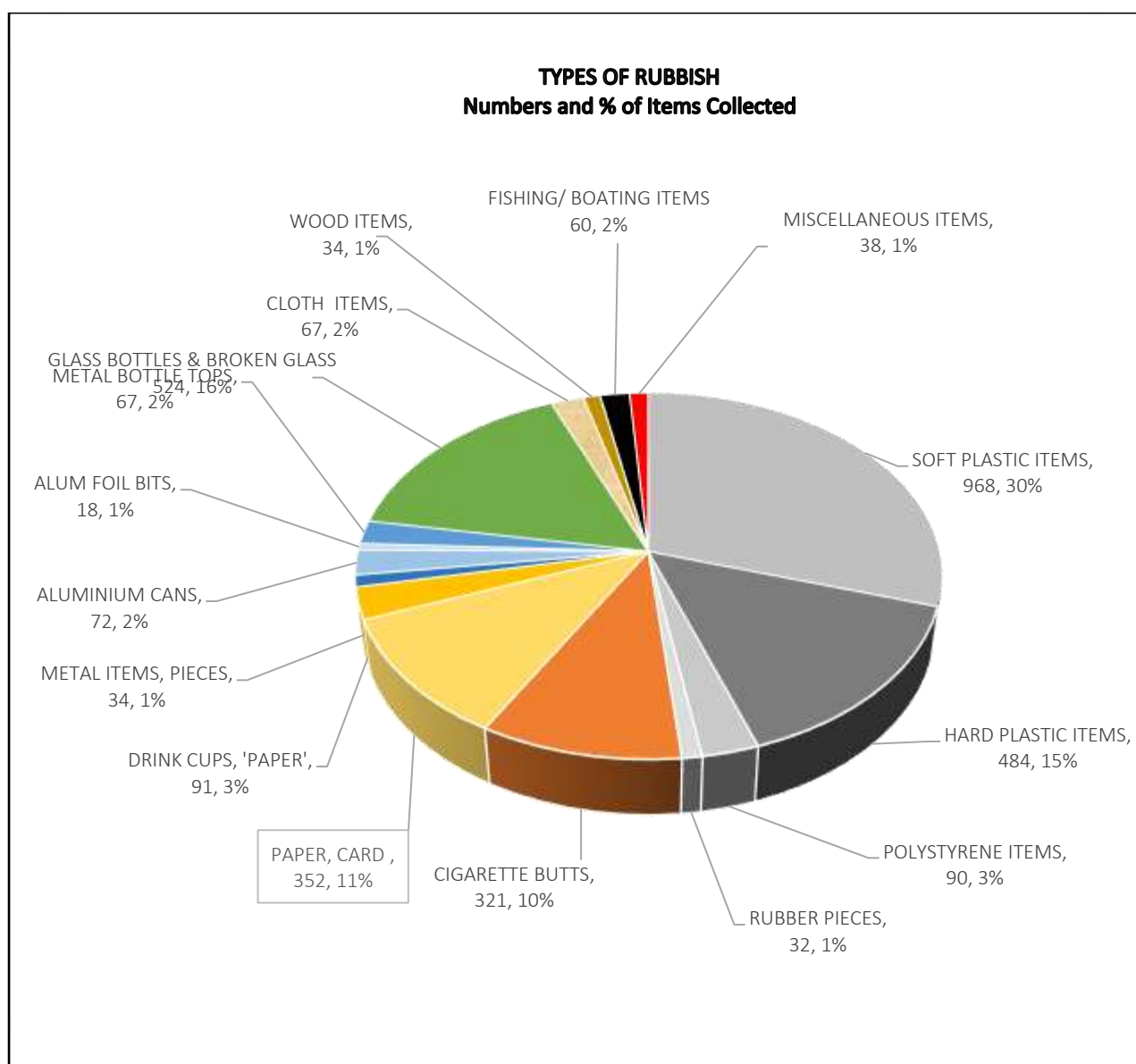
Similarly, while some discarded fishing gear was found at each of the ‘mainland’ Sites, over half of all **Fishing & Boating** rubbish was collected from the busiest stretch of river shoreline and shallows adjacent to Tewanin and RSL Parks.

The data indicate that the amounts and types of rubbish found along the different sections of shoreline and riverside land in Tewanin are governed by a number of factors, reflecting both the behaviour of people discarding rubbish and the behaviour of the rubbish in the river environment; these include:

- Numbers and behaviours of people using different parts of the area for various activities.
- Use and management of some sites for urban infrastructure and/or recreational facilities.
- Behaviour (mobility, durability, buoyancy in water) of different types of rubbish in the river environment.
- Condition of riparian vegetation buffer between urban and river ecosystems.

### Types of River Rubbish

The rubbish collected from the Tewanin riverside sites comprised both large amounts and diverse types of items. All items (3,340) were identified, divided into sub-categories and counted. The categories used and the numbers and percentages of each type collected are shown in the pie chart below (excluding categories with fewer than 10 items).



The main categories of rubbish found and their impacts on the river's ecology and users are outlined below:

PLASTICS	<ul style="list-style-type: none"> <li>• Plastics are by far the most abundant and diverse type of rubbish (1,574 pieces, 48% of the total).</li> <li>• Plastics are readily thrown, blown or washed into the river; they are highly mobile and long-lived; they can smother, degrade and choke aquatic and shore life and substrates; they are very difficult to remove once in the river.</li> <li>• 14 sub-categories with &gt;5 items were identified.</li> <li>• Soft Plastics (968 pieces, 30% of all items) were the most abundant rubbish type at all sites, and have the highest impact on both the ecology and amenity.</li> <li>• Hard Plastic items were the second most abundant type of Plastic (484 pieces, 15% of all items), with a highly diverse range of items.</li> <li>• Styrofoam (90 pieces, 3% of total) and Rubber (32 pieces, 1%) were also common but highly variable between sites, reflecting their buoyancy and transportability by water and wind.</li> </ul>
GLASS ITEMS	<ul style="list-style-type: none"> <li>• The second most frequent rubbish item in Noosa river in 2021; 524 items (16% of total) were mostly broken pieces of glass.</li> <li>• The majority had been dropped on the riverside or into the river at central Tewantin sites (Doonella – Hilton Esplanade – Marina – RSL Park)</li> <li>• Glass rubbish becomes a permanent contaminant, dangerous to river and riverside users.</li> </ul>
PAPER & CARD	<ul style="list-style-type: none"> <li>• The third most abundant category in 2021: 443 items (14% of total).</li> <li>• A very wide variety of paper and packaging products, often combined with plastics.</li> <li>• Unightly and smothers substrates and organisms, may get buried or fragment and drift.</li> </ul>
CIGARETTE BUTTS	<ul style="list-style-type: none"> <li>• Large numbers collected from river edge and shallows: over 320 (conservatively) counted (10% of all items).</li> <li>• Concentrations round river access, parking and picnic sites, stormwater outfalls.</li> <li>• Degrade and pollute water quality and sediments as well as amenity.</li> </ul>
METAL ITEMS	<ul style="list-style-type: none"> <li>• Fifth most common category with 191 (6%) items; included 72 aluminium drink cans and 67 metal bottle caps.</li> <li>• Most items had been discarded on riverbanks or thrown directly into river, from land or boats.</li> </ul>
CLOTH	<ul style="list-style-type: none"> <li>• Variety of polyester, nylon and cotton cloth and clothing/ headwear items (67 pieces)</li> <li>• Readily blown or dropped into river; smother sediment; slow to decompose.</li> </ul>
FISHING & BOATING ITEMS	<ul style="list-style-type: none"> <li>• Variety of discarded and mostly broken items of fishing gear and pieces of boat equipment (60 items collected)</li> <li>• Includes traps, netting and hooks that continue to catch, entangle and kill fish and invertebrates; sharp and rusty items dangerous to people on shore and in shallow water.</li> </ul>
TIMBER	<ul style="list-style-type: none"> <li>• Total of 34 broken pieces of wood items; float and easily transported along shoreline.</li> </ul>

Additional ITEMS OF CONCERN – because of their potential damage to the river's ecology, amenity and users:

- Aerosol cans
- Batteries
- Bed mattress
- Crab pots and ropes
- Fishing lines & weights
- Fishing netting
- Hypodermic syringes
- Lighters
- Lures
- Nappies
- Ropes
- Mobile phone

## KEY POINTS from the 2021 Audit

### Size and Shape of the Problem

1. The 2021 Audit found large amounts (3340 items) and diverse types (>50 categories) of rubbish along the riverfront land, shoreline and shallows of the lower Noosa river at Tewantin.
2. The amounts found are likely to be only a fraction of the total rubbish contaminating the lower Noosa river: only solid macroscopic rubbish items were collected; the survey did not measure microscopic items soluble pollutants in the river; the survey did not find or remove rubbish buried in sediments or lying, drifting or dissipating in deeper water.
3. This is the fourth year of the River Rubbish Audit, and although not precise measures, the amounts do not appear to have changed meaningfully over this time<sup>3</sup>, indicating little or no change in littering behaviours or control efforts.
4. The persistent amounts of rubbish in lower Noosa river cannot be considered reasonable or acceptable. This small Queensland coastal river system is the heart of an iconic Biosphere Reserve, highly valued by the local community, and integral to Noosa as a thriving eco-tourism destination.

### Sources of Noosa River's Rubbish

5. All of the rubbish items found are man-made, short-lived consumer items; it is clear that only a handful of the 3,340 items might have been designed and manufactured to be used more than once or for any length of time.
6. It is apparent that the great majority of the rubbish items came from someone's hand, pocket, bag, boat or car; most items were probably dropped or thrown by a Tewantin or Noosaville resident or visitor directly, or then blown or washed into the river, probably quite recently. Concentrations of some rubbish items are around boat ramps, shore access and landing points, in riverside road reserves and recreation areas. There is no evidence that rubbish items enter the estuary from the sea or from upstream via the tidal lakes.
7. The results indicate carelessness or disregard in the local community about using and disposing of myriad items of "single-use" packaging and consumer items, and for the rubbish's impacts on the Noosa river, its ecology, wildlife and amenity, for other river users.
8. Urbanisation is a root cause of the lower river's problems: very little buffering has been maintained between the urban and river ecosystems; much of the naturally extensive and complex riparian zone is now road reserve, residential development or recreational parkland with sparse remnants of vegetation; the river, creeks and wetlands are canalised with extensive surface hardening and shoreline structures including stormwater outfalls, boat ramps, jetties.
9. As reported in previous surveys an unknown but possibly significant proportion of rubbish gets onto the shore and shallows from the stormwater outfalls that drain the road reserves and parks along the Tewantin and Noosaville riverside. The old-fashioned designs are not "eco-friendly", nor adapted to climate change impacts such as increased flooding and rising sea-levels; the concrete structures pipe run-off onto the shore, causing shore erosion, and into the river with no devices to filter, retain or 'clean' the water-borne materials – rubbish items, pollutants, soil and plant fragments, including weed seeds.

### The Impacts and Fate of River Rubbish

10. The nature and extent of rubbish found in the lower Noosa river impact both the ecological health and the natural amenity and attractiveness of the place for all river and riverside users.
11. The types of rubbish behave differently in the river system: dense items will sink and permanently contaminate the river bed. Some items contain toxins that will disperse and poison susceptible plants and animals. Many of the rubbish items are mobile in the river environment, readily transported by wind or water (surface rain flow, river flow, tidal flow, wave action) to different parts of the river system; some will be transported out to sea, others upstream into tidal creeks and lakes. Some items accumulate as flotsam on shorelines and get trapped in shoreline vegetation and debris. Some items become waterlogged and sink; some form sheets that smother the shore or riverbed, stopping flow of water and dissolved oxygen and destroying benthic habitat. Some items may be ingested and may choke the fish, bird or invertebrate animal.
12. Unless physically removed, virtually all the types of rubbish will be long-lived or permanent pollutants in the river – estuary – marine environment.

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<sup>3</sup> The results this year are comparable with those in 2020 and 2019, with similar numbers and no clear trends apparent. For example there have been similar numbers each year of readily found and counted items such as aluminium drink cans and glass bottles – 83 and 82 respectively in 2019; 36 and 30 in a smaller sample in 2020; 56 and 72 of each in 2021. Inconsistencies between years can be readily explained: for example an unusually large amount of broken glass was found in 2021 by searching at a site more thoroughly, using kayaks.

## Managing Noosa River Rubbish

13. The survey indicates that current efforts to manage the river rubbish problem are inadequate; and that it is not practical to try to “clean up” the rubbish once it is in the river system.
14. The ideal perhaps is to avoid generating or importing consumer materials destined to immediately become “waste”; it is difficult to imagine that any of the rubbish items collected had been designed to not become waste. It should be feasible in the short-medium term to ban a much wider range of plastic consumer items and packaging than at present, from entering the region in the first place.
15. Practical solutions are needed to prevent rubbish items from reaching the river.

## **RECOMMENDED STRATEGIES**

The following are recommended:

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- **Educational Campaign** – for all residents and visitors, about how and why they should keep their rubbish away from the river and riverside precincts.
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- **Riverside Restoration** – to systematically strengthen<sup>4</sup> the ecological health and resilience of the river littoral and riparian zones, including mangrove, riparian and wetland “gardens” and conversion of ecologically-damaging stormwater outfalls and other structures.
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- **Noosa Biosphere Monitoring** – develop the Rubbish Audit to be a part of regular River Biosphere Monitoring, engaging the whole community in understanding the problem and whether and why the river is improving or continuing to deteriorate.
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- **Major ‘one-off’ CleanUp** – as rubbish entry sources are blocked, conduct a major thorough CleanUp of residual rubbish in the lower Noosa River.
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<sup>4</sup> Starting with a pilot project on the Tewantin-Noosaville riverside, to design and test effective solutions  
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NOOSA RIVER RUBBISH AUDIT 2021			Hilton Esplanade	Lake Doonella	Marina - boat ramp	Tewantin centre - Ward Park	RSL & Tewantin Parks	Lakeside - to - RSL Parks	Lakeside Park	George St - to - Lakeside Pk	River Esp - Ferry to George St.	Goat Island	Makepeace and Sheep Islands
RESULTS	TOTALS	%											
<b>TOTAL No. RUBBISH ITEMS</b>	<b>3,340</b>		<b>164</b>	<b>1,038</b>	<b>255</b>	<b>661</b>	<b>777</b>	<b>-</b>	<b>212</b>	<b>-</b>	<b>141</b>	<b>74</b>	<b>18</b>
	<i>Site % Total</i>		5	31	8	20	23		6		4	2	1
<b>PLASTIC ITEMS</b>	1,965		105	534	160	404	452		165		80	57	8
<i>Plastic Items as % of Total</i>		59	64	51	63	61	58		78		57	77	44
soft plastic bags, film, pieces	968	49	43	363	21	169	227		95		40	10	
cigarette butts	321	72	12	8	137	52	72		3			37	
hard plastic pieces	248	13	38	75		84	27		13		11		
styrofoam pieces	90	5	2	46	2		26		6		8		
plastic bottle tops	86	4				57			25		4		
plastic food containers + plastic bottles	70	4	6	14		3	38				2	7	
straws	60	3		16		7	18		4		8		7
thongs, shoes	55	3	4	6		18	12		12		3		
rubber bits	18	1				3	7				4	3	1
cable ties	14	1		6			8						
plastic toys, poppers, etc.	9	0					9						
cigarette packets	7	0					7						
hair bands	6	0				5	1						
shade cloth	5	0				5							
trimmer line	4	0				1			4				
	4	0							3				
<b>GLASS ITEMS</b>	529		0	309	10	6	156		36		7	2	3
<i>Glass Items as % of Total</i>		16	0	30	4	1	20		17		5	3	17
broken glass pieces	468	88		300	8		124		36				
drink bottles, jars	56	11		9	2	6	27				7	2	3
glassware, ceramics, pottery	5	1					5						
<b>PAPER ITEMS</b>	443		44	91	71	200	19		0		15	3	0
<i>Paper items as % of Total</i>		13	27	9	28	30	2		0		11	4	0
paper, card items, pieces	352	79	41	39	71	183	18						
coffee/ drink cups	91	21	3	52		17	1				15	3	
<b>CLOTH, CLOTHING ITEMS</b>	67	3	0	28	4	5	19		3		7	1	0
pieces of cloth, clothing	67			28	4	5	19		3		7	1	
<b>METAL ITEMS</b>	204	2	8	56	9	24	78		5		8	11	5
drink cans (aluminium)	72	35	1	13	4	13	27		5		6	3	
metal bottle tops	67	33	5	16	5		29					8	4
pieces of iron, steel, posts	34	17	2	21		1	9						1
al foil	18	9				10	8						
ring pulls	6	3		6									
metal tins, small	4	2					3				1		
aerosol cans	3	1					2				1		
<b>WOOD ITEMS</b>	34	0	0	7	0	9	11		1		6	0	0
bits of timber	34			7		9	11		1		6		
<b>FISHING &amp; BOATING ITEMS</b>	60	1	3	7	1	6	33		1		7	0	2
ropes	21	35		2	1	4	12		1		1		
fishing lines & weights	18	30				1	15				2		
crab pots and ropes	12	20	3	4			4				1		
fishing net	6	10				1					3		2
fishing rod	2	3		1			1						
lures	1	2					1						
<b>MISCELLANEOUS</b>	38	0	4	6	0	7	9		1		11	0	0
lighters	7	18		1		1			1		4		
balls, tennis, beach	6	16									6		
bed mattress	3	8	1	2									
hypodermic syringes	3	8					3						
corks	2	5				1	1						
batteries	2	5				1	1						
traffic cone	2	5		1		1							
bike handle, cover	2	5	1								1		
car hub caps	2	5		1		1							
pegs	2	5					2						
wrench	1	3				1							
bones	1	3				1							
chair	1	3		1									
drain cover	1	3	1										
toy car	1	3	1										
nappy	1	3					1						
wine bladders	1	3					1						