

Analysis of Consigned Waste Generation and Planning for Trash Floating

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ABSTRACT

Environmental problems caused by indiscriminate waste disposal are very troubling to the local community. This problem occurs on Pasaran Island where waste enters from the Way Belau River and ends up in the waters and mangrove areas around Pasaran Island. This waste is sourced from the garbage of residents of the waterway area and consignment waste. Based on these problems, it is necessary to analyze the influx of waste as a first step in handling waste in the Way Belau River. Sampling refers to the journal, where the sampling process was carried out for one month with a frequency of twice a week by installing nets on both sides of the river for six hours. Measurement of the weight and volume of waste produced was carried out based on SNI 19-3964-1994. The results of the study showed that the average amount of waste entering the Way Belau River was 19.33 kg/day. The amount of waste generated in the research location can be caused by several factors such as the width of the river, the net used, the weather, the sampling location, and the activities of the surrounding community. The largest to smallest component of waste composition starts from organic waste (47%), plastic waste (34%), hazardous waste (8.11%), textiles (7.17%), paper (2.17%), rubber (1.71%), glass (0.28%), and metal waste (0.08%). Trash floating is a tool that will be designed to block the entry of river waste into the sea. The cost budget plan in making trash floating in the Way Belau River with a width of 8 m requires a cost of Rp. 8,898,420.

Keywords: Pasaran island, Way Belau river, Composition, Generation, Floating trash

1. Introduction

Pasaran Island is one of the islands located in Bandar Lampung city. Pasaran Island is known as one of the anchovy centers as well as a Minapolitan area with a strategy to develop economic driving areas through various useful center technologies (Perda, 2011). Therefore, Pasaran Island has the potential to become a tourist village area that can attract visitors. However, the potential for the development of Pasaran Island is hampered due to the large amount of waste that is not managed and is left to pollute the environment. Areas that are polluted by large amounts of waste are in the waters around Pasaran Island and the mangrove commodity area. Because the point is near the Way Belau River so that when the river tides occur, the garbage in the river flow is carried and stuck in the water area and mangrove area around Pasaran Island. The waste in these areas is dominated by organic waste such as twigs and wood as well as inorganic waste such as plastic (Islami, 2022). Trash located in the water area and mangrove area can have a negative impact on the surrounding community. Apart from disturbing the aesthetics of the environment, rubbish can also endanger ecosystems in rivers and even the sea, and this rubbish problem can be a factor in the spread of disease for local residents (Indirawati, et al., 2023). The Way Belau River basin is an area with a very dense and disorganized number of settlements and population with a length ± 100 km (Satiyarti, et al., 2017).

2. Material And Methods

The research was conducted in October-November 2023 in Way Belau River located in East Teluk Betung Sub-district, Bandar Lampung City. Geographically, Bandar Lampung City is located at 5°20' to 5°30' LS and 105°28' to 105°37' East. Waste generation data collection was carried out 8 times a month, where the implementation was carried out 2 times a week (Agustina, et al., 2020). The waste collection technique uses the net method which refers to the journal and Measurement of weight and volume of waste based on SNI 19-3964-1994 with equipment consisting of trashbag, net (3 cm x 3 cm), density box, scales, digital scale, gloves, and boots. The steps in sampling begin with the installation of a net for 6 hours, the netted waste is lifted and put into a trash bag, transporting the trash bag containing the waste to the measurement site, measuring the volume of waste with a measuring box, weighing the weight of the waste, sorting based on the waste component, and weighing each waste component.

To determine the amount of waste generated and the percentage of daily waste composition, we can use the formula:

1. Total daily waste generation using the formula:

$$\text{Estimated total waste generation} = \frac{\text{Average mass of waste during sampling}}{\text{waste collection time}} \times \frac{24 \text{ hours}}{1 \text{ day}}$$

2. Waste composition percentage calculation

$$\% \text{ waste composition} = \frac{\text{Wet weight per type (kg)}}{\text{Total waste per session (kg)}} \times 100\%$$

In designing trash floating requires tools and materials consisting of 600 ml PET bottle, PVC pipe, PVC pipe cover, metal clamps, screw clamps, 6 mm steel rope, galvanized steel wire mesh, squared steel tube (20x20 cm), steel sling clamps. The design criteria in the design of this floating trash floating uses data from e-commerce websites with analysis of materials available on the market by considering the cost, components and durability of the materials used. The following are the design criteria used in making floating trash in the Way Belau River:

Tabel 1. Design Criteria

Material	Size
600 ml PET bottle	Length : 22.5 cm Diameter: 6.6 cm
3 inch Pipe PVC	Length : 8 m Diameter : 8.9 cm
PVC Pipe Cover	Length : 3 cm Diameter : 9 cm
Metal Clamps	Width : 3 cm Diameter : 3 inch
Screw (bolt) Clamps	Length: 3.5 cm Diameter: 8 mm
Square Steel Tube	Width: 20 mm Thickness: 2 mm Height: 20 mm
Steel Strap	Thickness: 8 mm

Material	Size
Galvanis Steel Wire Mesh	Thickness: 2 mm
Steel Sling Clamps	Diameter: 8 mm

Trash floating that has been designed will be placed in the river where the placement of steel nets is placed at a depth of 60 cm above the water surface (Foundation, 2021). The trash floating tool is designed and designed to float and follow the current and water movement.

3. Results and Discussion

3.1 Waste Generation in Way Belau River

Based on the implementation of sampling 8 days a month, the waste that enters the Way Belau River has an average mass of 19.33 kg / day. If measured in volume units, the waste entering the Way Belau River is 0.10 m³ / day.

Table 2. Waste Generation that Enters the Way Belau River

	Waste generation	
	Weight (kg/Day)	Volume (m ³ /Day)
Day 1	15.13	0.07
Day 2	17	0.1
Day 3	21	0.06
Day 4	2153	0.14
Day 5	20.64	0.08
Day 6	21.21	0.11
Day 7	13.75	0.08
Day 8	24.36	0.12
Average	19.33	0.10

Based on the table above, the amount of waste generated is always different. This is due to several factors such as the occurrence of sea tides, the rainy season, and the activities of the community around the riverbank. Such conditions occurred on day 7 where the weight of waste generation was the least compared to other days, namely 13.75 kg / day. The factor causing the small amount of waste generated is because the Way Belau River water conditions are decreasing or receding at the time of sampling so that the garbage in the upstream river is difficult to push downstream and little is netted. In addition, at the time of sampling the activities of the surrounding community were not too heavy.

When compared to day 8, the amount of waste generated was 24.36 kg/day. This increase was caused by rain during sampling so that the river water discharge increased, which triggered the garbage on the banks and upstream of the river to be carried away more easily, so that the garbage was trapped in the nets that had been installed. The existence of community activities such as the return of fishermen from the sea and bringing their catches, which then the community processes their catches so as to produce waste from processing which is then discharged into the river. This condition contributed to the variation in waste generation during the 8 days of sampling in Way Belau River.

The length of the Way Belau River is about ± 100 km (Satiyarti, et al., 2017) and the width of the Way Belau River at the time of sampling was 8. There are several other factors that cause differences in the amount of waste generated during sampling such as weather, nets used, sampling locations, and community activities in the vicinity (Fauzia, et al., 2022). In Way Belau River, the sampling was carried out during October where there was a dry season that caused a decrease in river water discharge and a reduction in water flow.

The waste collection method only uses a net with a size of 3x3 cm so that only waste above 3x3 cm is netted. However, during sampling, waste below 3x3 cm was still netted and trapped because it was blocked by moss waste that was also trapped in the net which prevented smaller waste from leaving the net. The sampling location was carried out in Teluk Betung Timur sub-district, this location is also close to the pedestrian bridge which is about ± 64 m from the sampling point. The distance between the river and residential areas is relatively close so that local people who live along the water body can throw garbage into the Way Belau River. This supports the large amount of waste generated in Way Belau River. Based on the comparison factors that have been described, it can be seen that the river width, weather, the net used, the sampling location, and the activities of the surrounding community greatly affect the amount of waste that enters the river body.

3.2 Waste Composition in Way Belau River

At the time of sampling, waste sorting was carried out to obtain the weight of each waste component. From the sampling that has been done, there are 8 types of waste that will be measured, namely paper waste, organic waste, plastic waste, rubber, textiles, metal, glass, and hazardous waste. The following is the weight data of each waste component measured per day.

Table 3. Waste Composition

Composition	Average (g/day)	Average (kg/day)	Percentage (%)
Plastic	5993.75	5.99	34.07%
Paper	381.25	0.38	2.17%
Rubber	300	0.3	1.71%
Textile	1261.25	1.26	7.17%
Metal	13.75	0.01	0.08%
Glass	50	0.05	0.28%
B3	1426.25	1.43	8.11%
Organic	8167	8.17	46.42%

Based on waste data at the time of sampling the Way Belau River, organic waste is the largest component of waste generated, namely 8.17 kg / day. The following is the percentage of waste composition can be seen in Figure 1.

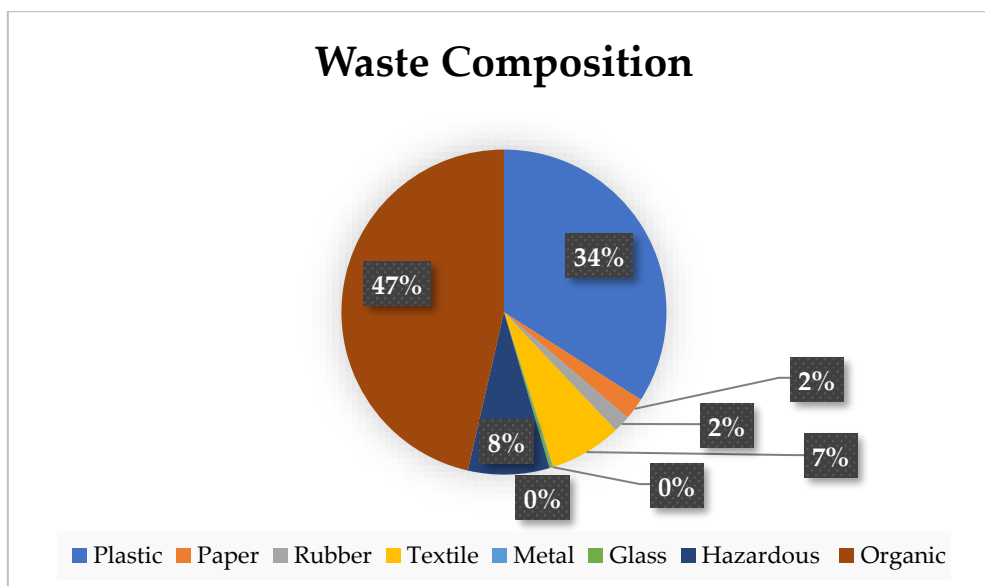


Figure 1. Waste Composition in Way Belau River

From the figure above, it can be seen that the order of the largest to smallest waste components. Starting from organic waste (47%), plastic waste (34%), hazardous waste (8.11%), textiles (7.17%), paper (2.17%), rubber (1.71%), glass (0.28%), and metal (0.08%).

3.2.1 Components of Organic Waste

The following is a detailed organic waste composition diagram.

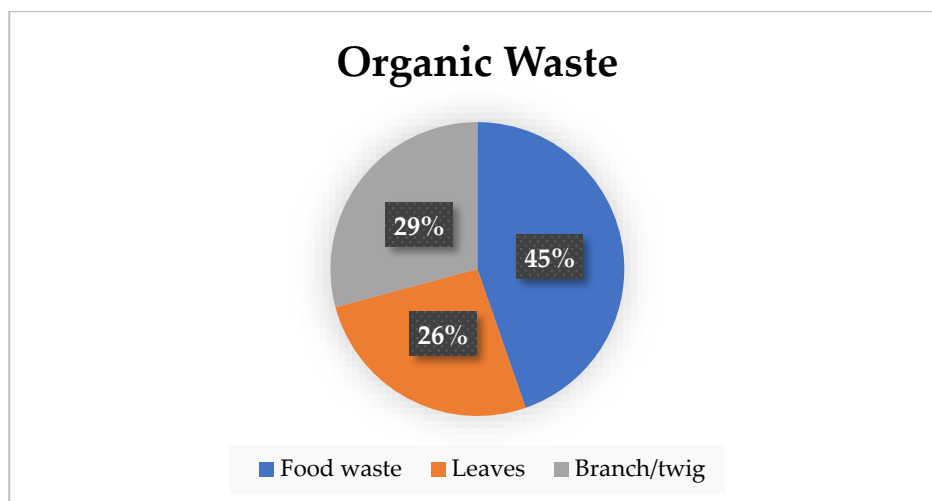


Figure 2. Organic Waste Composition

Organic waste was identified as the dominant component in the Way Belau River, contributing to 8.17 kg/day or 46.42% of total daily waste input. Within this category, the largest proportion (45%) consists of food waste. This waste primarily originates from household activities (Darwis et al., 2023), including leftover meals, spoiled or expired food, over-purchased goods, and unconsumed perishable items. The improper disposal of organic kitchen waste directly into the river by surrounding residents—often due to the absence of a proper waste management system—greatly contributes to this accumulation. In addition to food waste, wood and branch waste make up 29% of the organic waste component. These are largely derived from natural processes such as tree pruning, broken branches due to wind, or plant detritus from vegetation growing along the riverbanks. Seasonal changes, such as the dry season or high wind periods, may exacerbate the volume of this woody debris. Similarly, leaf litter, which comprises 26% of the organic waste, is primarily a result of natural leaf fall and erosion of vegetative cover along the river (Fauzia et al., 2022). Although organic waste is biodegradable, its excessive accumulation in water bodies can lead to severe ecological consequences. Decomposition of food and plant matter increases the biological oxygen demand (BOD) in water, resulting in oxygen depletion that endangers aquatic life. Additionally, stagnant food waste can become breeding grounds for insects and pathogenic bacteria, elevating public health risks in communities that depend on the river for daily use. If not addressed, continued organic pollution can lead to eutrophication, encouraging the overgrowth of algae and aquatic weeds, which further reduces oxygen availability and disrupts aquatic ecosystems. Therefore, despite its degradability, organic waste remains a critical pollutant that requires urgent management interventions such as composting, community waste segregation programs, and public education campaigns on proper waste disposal practices.

3.2.2 Plastic Waste Components

The following can be seen the components of plastic waste in the picture below:

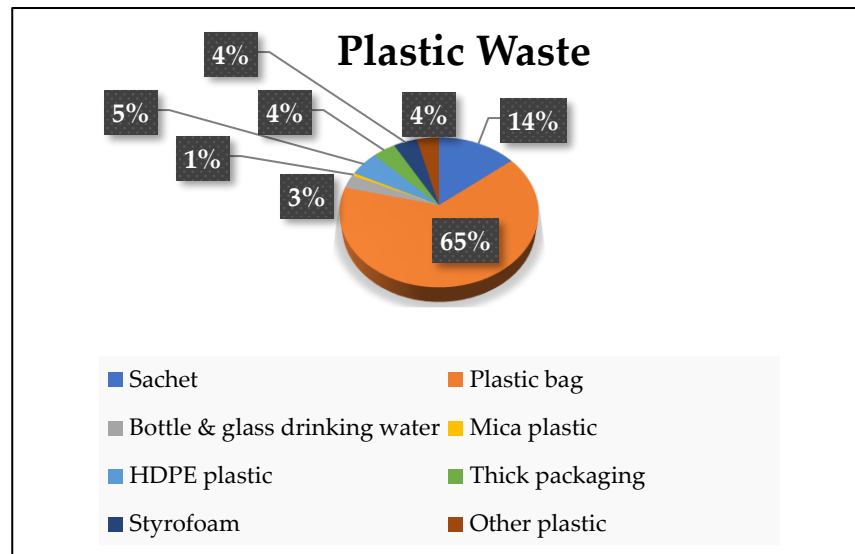


Figure 3. Plastic Waste Composition

Based on the diagram, plastic waste is the second largest contributor to total river waste in the Way Belau River, amounting to 5.99 kg/day or 34.07% of total daily waste. Among the various plastic types, plastic bags constitute the largest proportion, reaching 65%. These plastic bags are frequently used in daily household routines and in traditional markets or small-scale retail for packaging goods. Due to their convenience and low cost, plastic bags are widely used but rarely reused, resulting in high disposal rates. Improper disposal—such as throwing bags into drains or rivers—leads to their accumulation in waterways, where they clog river flows, harm aquatic life, and pose long-term pollution threats because of their extremely slow degradation rate. The second largest component is sachet packaging waste, contributing 14%. These include small, single-use plastic packs for shampoos, instant coffee, spices, sauces, and snack products. This type of packaging is heavily marketed to lower-income consumers due to its affordability but is extremely difficult to recycle, and often discarded irresponsibly. Their small size also makes them harder to collect through traditional waste management systems and more likely to end up in rivers. Next, HDPE (High-Density Polyethylene) plastic accounts for 5%, originating from items like used buckets, detergent containers, and children's toys. HDPE is more rigid and durable than LDPE but also contributes to long-lasting pollution in the aquatic environment if not collected and recycled properly.

Thick plastic packaging waste, such as food wrappers, oil pouches, and detergent bags, comprises 4% of plastic waste. These materials are often multi-layered composites, combining plastic with aluminum or paper, making them unrecyclable through most conventional methods. Other components include styrofoam waste (4%), commonly used as food containers and protective packaging for goods. Styrofoam is non-biodegradable, breaks into microplastics easily, and is frequently consumed by marine organisms, leading to fatal consequences. Plastic bottles and cups contribute 3%, often used for bottled water and other beverages. While technically recyclable, they often end up in rivers due to inadequate waste collection infrastructure and littering behavior. Mica plastics, such as transparent food containers, represent the remaining 1%, commonly used in catering and food packaging industries. Plastic waste poses serious environmental and ecological threats due to its durability, resistance to degradation, and tendency to fragment into microplastics. Once in aquatic environments, plastic waste entangles wildlife, obstructs water flow, and introduces toxins into the food chain. Moreover, under UV exposure and physical abrasion, plastic waste can degrade into smaller particles (microplastics), which are ingested by fish, invertebrates, and eventually humans through the food web. To address the issue, strategies such as plastic bag bans, mandatory producer responsibility for packaging waste, and plastic buyback programs could be implemented. Moreover, community-level education, improved waste segregation at source, and the development of plastic waste recycling cooperatives can support systemic change. The high prevalence of plastic waste in the Way Belau River reinforces the urgency of adopting circular economy approaches and sustainable packaging solutions to reduce plastic leakage into natural ecosystems.

3.2.3 Hazardous and Toxic Waste Components (B3)

The following can be seen as a diagram of the hazardous and toxic waste components generated:

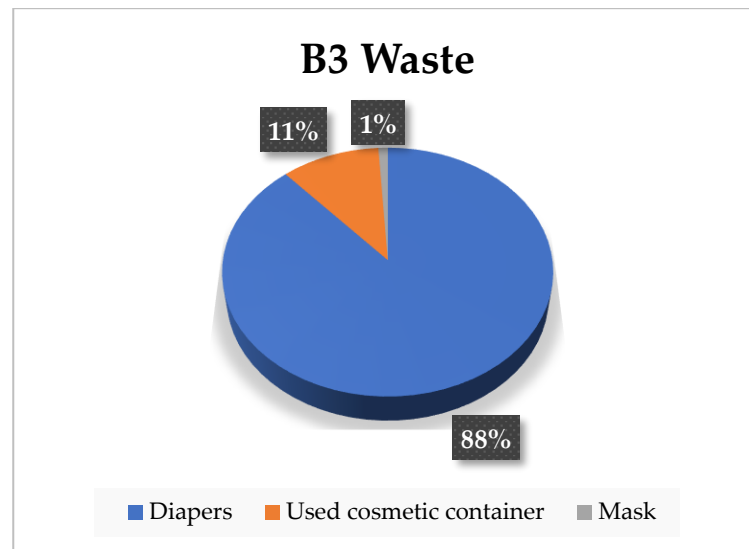


Figure 4. Hazardous Waste Composition

From the diagram above, it is explained that 88% of the waste generated is diaper waste, 11% is generated by used cosmetic container waste, and mask waste is about 1%. This diaper waste comes from household waste that has babies. Where used diapers that are not reused will be disposed of carelessly into the river (Febriana, et al., 2022). The reason many people throw diaper waste into the river, because the diapers used are disposable diapers made from pulp or polyacrylate superabsorbent polymer which functions as an absorbent material, requiring special waste management (Sisworini, et al., 2017).

Disposable diapers are included in the specific waste category because the waste contains hazardous waste (Purningsih, 2019). Disposable diapers contain human waste such as feces and urine that contain *Escherichia Coli* (*E.Coli*) bacteria that are a factor in the spread of disease and harm. *E.Coli* is a microorganism that is naturally present in the gastrointestinal tract and can cause moderate to severe gastroenteritis in humans and animals. *E.Coli* can even cause acute diarrheal disease (Melliawati, 2015).

Cosmetic waste can be said to be dangerous because the ingredients contained in cosmetics such as mercury, microbeads, parabens, BHT (Butylated Hydroxytoluene) can damage the environment, humans, and animals if they enter the waterways and are eventually consumed by aquatic biota. Masks are included in household hazardous waste, where waste that is not handled properly can trigger various problems in health, the environment, and can even be misused by irresponsible parties (Nabilah, 2021).

3.2.4 Components of Textile Waste

The next waste generated is textile waste weighing 1.26 kg/day. The following is a diagram of textile waste.



Figure 5. Textile Waste Composition

The diagram above shows that the largest component of textile waste is clothing waste at 56%. Textile waste that enters the Way Belau River is in the form of used clothing waste that is no longer used, such as damaged clothes, cloth used for bathing bodies, and so on. Next is bag waste at 43%, most of the bag waste that enters the river is unused children's school bags, totebags, which are directly thrown into the river. The next waste is other textiles at 1%.

3.2.5 Paper Waste Component

The next waste generated is paper waste weighing 0.38 kg/day with all the waste generated in the form of cardboard waste. Cardboard waste that enters the river is sourced from household activities, as well as public facilities such as shops or stalls around the Way Belau River. This type of waste is typically associated with packaging used for consumer goods, which after serving its purpose, is often disposed of carelessly. When not properly managed, cardboard absorbs water and decomposes slowly in aquatic environments, reducing water quality and clogging waterways. Although biodegradable, its accumulation in large volumes can disrupt water flow and damage the aquatic habitat. Moreover, the presence of printed ink or coated cardboard materials may introduce additional pollutants into the river ecosystem.

3.2.6 Rubber Waste Component

The next waste generated is rubber waste with a weight of 0.3 kg/day. This rubber waste usually comes from households from daily activities with all the waste produced in the form of flip flops / shoe soles. These unused sandals are thrown directly into the river or accidentally enter the river to become a source of river water pollution. Rubber waste is classified as persistent waste due to its non-biodegradable nature. Items like discarded sandals and shoe soles are made from synthetic polymers that degrade extremely slowly, contributing to long-term environmental pollution. Once in the water, rubber waste may float or sink, making it hazardous for aquatic organisms and disrupting river sediment dynamics. Furthermore, as rubber materials age and weather in aquatic environments, they may release toxic substances such as heavy metals or leachates that pose risks to aquatic life and human health.

3.2.7 Glass Waste Component

The next waste generated is glass waste with a weight of 0.05 kg / day. with all the waste produced in the form of glass bottles. This glass bottle waste can injure feet if accidentally stepped on when fishermen or residents enter the river (Linggi & Pawarangan, 2018). Although glass is chemically inert and does not leach toxic substances, it is physically hazardous in aquatic environments. The presence of sharp-edged glass can pose a significant safety threat to communities interacting with the river, especially fishermen and children. Moreover, glass waste is difficult to degrade and often remains intact for decades. If broken, the small fragments disperse into riverbeds and can be challenging to remove during cleanup activities, further complicating restoration efforts in contaminated areas.

3.2.8 Metal Waste Component

The next waste generated is metal waste weighing 0.01 kg/day, with all the waste consisting of metal-based materials. This waste mostly comprises canned waste such as used food cans, beverage cans, and similar items. This metal waste originates from household residues that are no longer utilized and are carelessly discarded into the river (Linggi & Pawarangan, 2018). Although its contribution to the total waste volume is relatively small (0.08%), metal waste poses significant environmental concerns. Metals, especially those not protected by anti-corrosion layers, are prone to oxidation, leading to rust formation that may contaminate water with iron oxides and other by-products. In addition, certain metal containers may still hold chemical residues such as oil, soft drink acids, or preservatives, which can leach into the river and harm aquatic organisms. Sharp edges of rusted cans also present a physical hazard to humans and animals, potentially causing injuries. The accumulation of metal waste in sediments may alter the physicochemical characteristics of the riverbed and contribute to long-term ecological degradation. Effective recycling systems and household awareness campaigns are essential to prevent metal waste from entering water bodies.

3.3 Design of A Device to Prevent River Waste from Entering the Sea.

3.3.1 Alternative Design of Trash Floating

Floater can help the trash floating tool float on the surface of the water. PVC pipe is the material needed in the design of this tool. Trash floating is a barrier consisting of material that floats on the surface of the water and stretches horizontally along the width of the river.

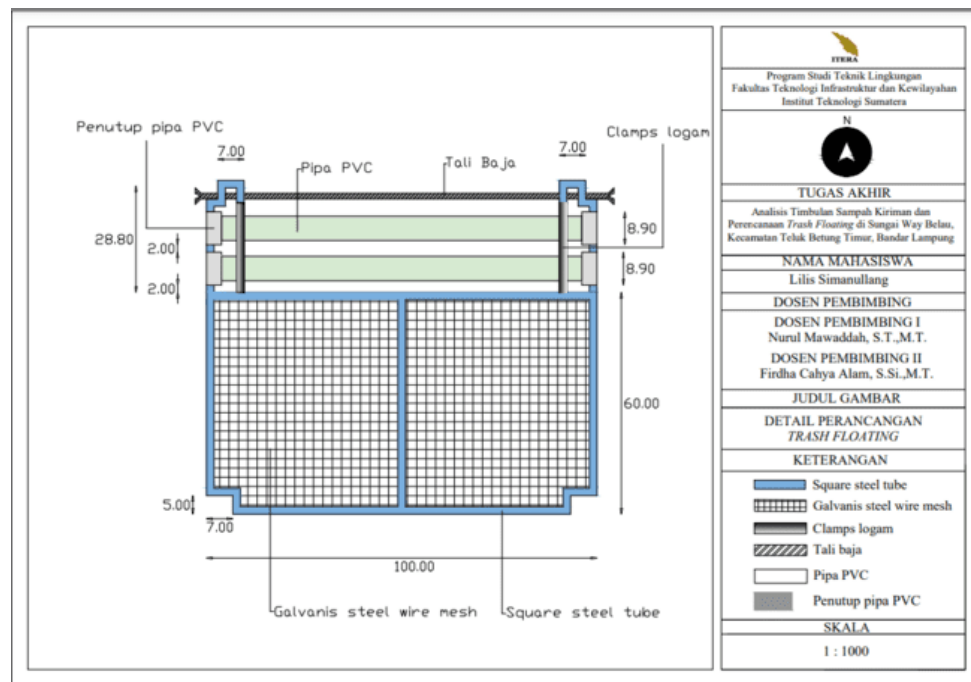


Figure 6. Trash floating design detail

Trash floating that has been designed will be placed in the river where the placement of steel nets is placed at a depth of 60 cm above the water surface (Foundation, 2021). This aims not to hinder the movement of fish in the river due to the installation of trash floating. Meanwhile, the length of one planned trash floating circuit is 1 meter. This design uses a 3-inch PVC pipe with a diameter of 89 mm according to the size on the market. For the distance between PVC pipes planned at 2 cm, it is intended that water can flow between the pipes so that the pipes are not easily damaged due to the pressure of the water flow. Galvanized steel wire mesh used is 25 mm so that macroplastic waste between 25 mm - 100 mm can be retained. The trash floating design that has been assembled is installed lengthwise from the left and right sides of the river following the width of the river. The steel rope of the trash floating device can be tied to an iron pole that can function as a support pole to strengthen the structure and increase resistance to strong river currents.

According to the literature, the effectiveness of trash floating in holding floating garbage is 36.7 kg / week or about 5.24 kg / day installed in rivers that tend to be small with a width of 3 meters (Ardiatma, et al., 2024). Meanwhile, a tool with dimensions of 1 m x 0.25 m x 0.8 m can hold garbage with a load of up to 100 kg/unit, using galvanized main material. The average age of the tools used can last up to 15 years. The tool also does not require energy in the operation of the tool. The tool can be used in various types of rivers, especially in small dimension rivers (Dzulkifli, et al., 2023).

3.3.2 Material Analysis

In designing a tool that will be used, it is very important to pay attention to the materials and materials that you want to use. Some factors that must be considered such as tool durability, effectiveness and also the sustainability of the designed tool. The following are other reasons for choosing materials and materials for trash floating design:

1. Floater

The floater used in this design is a PVC pipe or Polyvinyl chloride. The reason for choosing this material is because PVC pipes are resistant to water and have sufficient buoyancy because the material comes from plastic so that it really helps the tool to float (Dzulkifli, et al., 2023). The factor that can affect the buoyancy force is the ratio between the density of the object and the density of the fluid around it (Dosen Jurusan Teknik Meesin Institut Teknologi Padang, 2021).

2. Square Steel Tube

Square steel tube is a steel pipe in the form of a structural tube that is easily cut and joined together by welding. Square steel tube has high durability and resistance to pressure and deformation. Therefore, square steel tube is an ideal choice for building frames such as bridges, buildings, and other structures that require high stability and durability. The strength of the square steel tube is able to withstand the pressure in the river flow and the garbage that is stuck in the tool.

3. Galvanized Steel Wire Mesh

Galvanized steel wire mesh is a steel mesh made of low-carbon steel which is galvanized (galvanized) and has undergone a welding process (Dzulkifli, et al., 2023). Wire mesh is a long mesh and is formed in a repeating pattern to form a strong network

that can withstand pressure. Galvanized Steel Wire Mesh is resistant to corrosion and rust because it is zinc coated and has a variety of mesh sizes. In this design planning using a size of 25 mm so that macroplastic waste between 25 mm - 100 mm can be retained.

3.3.3 Cost Budget Plan

The unit price of workers (HSP) used in the design of this final project comes from the Unit Price List for Wages and Materials for All Districts and Cities in Lampung Province, Office of Highways and Construction of Lampung Province TA. Some goods and services that are not found in the regulation are taken from journals and e-commerce using the price analysis listed. The following is the calculation of the cost budget plan (RAB) for the design of floating trash that will be placed in the Way Belau River.

Table 4. Cost budget plan (RAB) trash floating

Trash Floating Budget Plan					
No	Work	Volum e	Unit	Unit Price	Total Price
1	Jasa				
a	Cutting	1	person/day	192.000	192.000
b	Polishing	4	person/day	192.000	768.000
c	Painting	1	person/day	192.000	120.000
d	Installation	4	person/day	192.000	768.000
	Sub Total			Rp.	1.848.000
2	Material				
a	PVC 3" Pipe	32	m	65.725	2.103.200
b	Pipe cover 3"	64	pcs	2.750	176.000
c	Pipe clamp 3"	64	pcs	2.750	176.000
d	Screw 14 mm	48	pcs	5.000	240.000
e	Steel mesh	8	m	110.000	880.000
f	Galvanized hollow iron	37.5	m	85.000	3.187.500
g	PET bottle	142	pcs	784	111.328
h	Steel slings 8 mm	12	m	14.116	169.392
i	Klem sling 8 mm	2	ls	3.500	7.000
	Sub Total			Rp.	7.050.420
	Total			Rp.	8.898.420

Based on the calculation of the cost budget plan for making trash floating in the Way Belau River with a width of 8 m, it costs Rp. 8.898.420. This calculation may change depending on the use of goods and services. While the manufacture of floating debris collectors in the Krengseng Watershed where the river sampling location point is carried out with a width of 8.38 m requires a cost in making equipment of Rp. 10.374.500. Furthermore, in the East Flood Canal Watershed with a river width of 8.8 m requires a cost in making equipment of Rp. 10.731.000. And in the Dengkeng River Watershed with a river width of 8.7 m requires a cost in making tools of Rp. 10.326.000 (Dzulkifli, et al., 2023).

Based on the above comparison, it can be seen that the RAB required for trash floating planning in Way Belau River has a lower nominal value than the RAB for trash floating planning in other rivers because the width of the river at each sampling location is not too far different. Therefore, the construction of trash floating is recommended as a tool to prevent river waste from entering the sea. Furthermore, for maintenance, the trash floating equipment that has been assembled will be fully handed over to local administrators. The local administrators have full responsibility for the maintenance and management of the tool, as well as ensuring that the tool functions optimally in accordance with its intended use.

4. Discussion

The problem of waste buildup in the Way Belau River has a significant effect on the local environment, especially the waters and mangrove regions near Pasaran Island. The research indicates that waste production in the river averages 19.33 kg daily, with organic and plastic waste being the primary contributors. Elements such as the river's width, tidal fluctuations, and community actions affect the volume of waste entering the waterway. The study recommends the installation of a floating trash barrier as a proactive solution to minimize waste flow into the ocean. This strategy is consistent with sustainable waste management practices and could assist in reducing environmental harm while maintaining the ecological integrity of the river. Nonetheless, the effectiveness of this initiative relies on community involvement, education on appropriate waste disposal, and ongoing upkeep of the installed barriers.

5. Conclusion

Waste generation entering the Way Belau River Waste generation entering the Way Belau River weighs an average of 19.33 kg/day. Factors of high and low waste generation in the research location can be caused by several factors such as river width, weather, nets used, sampling locations, and surrounding community activities. At the time of sampling there were 8 types and the components of the composition of the most sampling waste to the smallest starting from organic waste (47%), plastic waste (34%), hazardous waste (8.11%), textiles (7.17%), paper (2.17%), rubber (1.71%), glass (0.28%), metal (0.08%). The cost budget plan (CBP) in making trash floating in the Way Belau River with a width of 8 m requires a cost of Rp. 8.898.420.

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