



Trash Pollution in Butuanon River at Sitio Almers Brgy. Tabok, Mandaue City

A Research Report

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I. Introduction

A. Mandaue City

The City of Mandaue is one of the two cities considered highly urbanized on the island of Cebu, located in Region VII, or the Central Visayas region, of the Philippine archipelago. Being a high-urbanized city, it contains about 10,000 industrial and commercial locations, earning it the title of being the industrial hub of its region as well as the name of the “little rich city” in the country. Instrumental to its growth is its strategic location within the inner core of Metro Cebu. For one, it serves as a link from Mainland Cebu to Mactan Island through the 1st Mandaue-Mactan Bridge and the 2nd Mandaue-Mactan Bridge, also known as the Marcelo Fernan Bridge (Mandaue City Web Portal, n.d.). Despite this immense economic progress, the city has proven to have multiple challenges in balancing sustainability with development. This is particularly evident in the maintenance of rivers and creeks found all over the city. Over the years, these bodies of water have been significantly polluted by various wastes originating from domestic households, agricultural lands, and the booming industrial sector. The Mandaue City Local Government has tried to remedy this problem through the imposition of fines on businesses that were found guilty of releasing their untreated wastewater into these aforementioned bodies of water.

B. Tabok

Tabok is one of the barangays located in Mandaue City. It is part of the expanse through which the Butuanon River flows. Barangay Tabok has an estimated land area of 1.339 km² which houses an estimated population of 19,486 people as of the 2020 Census conducted by the Philippine Statistics Authority (City Population, n.d.). Part of the barangay’s population is made up of informal settlers living near or along the polluted Butuanon River, specifically within its 3-meter easement zone. Residing so close to the river, these illegal residents are severely vulnerable to floods caused by the river overflowing during periods of heavy rainfall. Furthermore, the contaminated river also renders them susceptible to a multitude of diseases, ranging from dengue to malaria and polio, among others.

C. Butuanon River

The Butuanon River is a long-winding river stretching from the mountain barangays of Cebu City down to the urbanized barangays of Mandaue City. In 1992, the river was previously declared dead as it could no longer support flora and fauna. But then, in 2002, the Butuanon River was reclassified as a Class D body that can be used for irrigation, livestock, and industrial purposes. Moving forward to 2014, the Department of Environment and Natural Resources (DENR) labeled the Butuanon River as a water quality management area (WQMA). This declaration fast-tracked the Local Government Unit’s

(LGU) river revival efforts (DENR Declares Cebu's Butuanon River Water Quality Management Area, June 30, 2014). Recently, on July 31, 2023, during the second State of the City Address (SOCA) of Mandaue City Mayor Jonas Cortes, it was announced that the Butuanon River was once again reclassified to Class C by the Environmental Bureau Region VII office. This action will enable the LGU to rigorously monitor the river quality, including the quality of effluent discharged by point sources located along the river banks. Currently, problems vary along the river's length. Upstream, people release wastewater from piggeries and poultry farms. While, from the midstream to the downstream portion, commercial businesses and industries illegally release untreated wastewater. Residential areas along the river also release their septic waste into the river. Furthermore, the downstream portion, specifically in barangays Paknaan and Casuntingan, also experiences flooding during heavy rainfall when the river overflows (ClimateCafe, 2024).

Problem Statement

The Butuanon River experiences debilitating trash pollution constantly. Due to the sheer volume of garbage present, a strong odor is present throughout the community, affecting the resident's quality of life. Additionally, the volume of trash obstructs the natural path of the river, preventing flow. In short, due to trash, little to no flow occurs in the river, stagnating the river. These stagnant waters create a breeding ground for mosquitoes and other insects. These insects can spread diseases which could potentially ravage these communities.

Objective of the Study

To propose a suitable solution to the trash pollution plaguing the Butuanon River in Sitio Almers, Brgy. Tabok, Mandaue City.

Research Questions

- What are the contributing factors to the trash pollution plaguing the Butuanon River in Sitio Almers, Brgy. Tabok, Mandaue City?
- What is the optimal solution to the trash pollution plaguing the Butuanon River in Sitio Almers, Brgy. Tabok, Mandaue City?
- How can this solution be implemented to the community surrounding the Butuanon River in Sitio Almers, Brgy. Tabok, Mandaue City?

II. Methods

Environmental Survey - to obtain an idea of the situation in Sitio Almers an environmental survey was conducted on Monday (April 15, 2024) and Thursday (April 18,

2024). The survey follows a path along the river side which was guided by barangay officials.

Focus Group - to understand the concerns of the Sitio Almers residents a focus group was conducted on Wednesday (April 17, 2024). There were a total of 20-25 registered residential participants. The meeting was filled with discussions and activities regarding the concerns of the residents and the current state of the river.

Research - to implement a solution to trash pollution online research was conducted by the group members. This method involves reviewing related literature, existing data, and similar studies within the scope of eradicating or reducing trash pollution in rivers.

III. Results

Environmental Survey: The environmental survey conducted in Sitio Almers revealed several concerning findings. Despite regulations mandating a 3-meter easement from the river's side, informal settlers and residences have encroached upon the riverbank. The lack of proper road access poses hazards during emergencies, and the river's inability to contain large volumes of water leads to flooding risks for nearby houses. Additionally, the river is being used as a sewage disposal site, and the high density of housing increases vulnerability to hazards.

Implementation of Easement (Fig. III-A1 & III-A2)



Fig. III - A1. Riverside Easement



Fig. III - A2. Riverside Easement

Hazards of Improper Road Access (Fig. III-A3 & III-A4)



Fig. III - A3



Fig. III - A4

Flooding Risks (Fig. III-A5 & III-A6)



Fig. III - A5



Fig. III - A6

Sewage Contamination (Fig. III-A7, III-A8 & III-A9)



Fig. III - A7



Fig.III - A8



Fig. III - A9

Density of Housing (Fig. III-A10)



Fig. III - A10

Research: The online research conducted by the group members identified key sources and impacts of trash pollution in the river. Findings revealed that upstream residences release wastewater from livestock, while commercial businesses and industries

discharge untreated wastewater in the midstream and downstream portions. Floods during heavy rainfall events were observed in downstream areas, indicating additional environmental challenges. The river's water quality was classified as Class C by the Environmental Bureau Region VII office, underscoring the need for urgent action to mitigate pollution levels. Guidelines for determining water quality parameters were also provided, offering valuable insights for pollution mitigation efforts.

Industry Wastewater Pollution (Fig III-B1 & III-B2)



Fig. III - B1

Fig. III - B2

Flooding in Downstream River Areas (Fig. III-B3 & III-B4)



Fig. III - B3

Fig. III - B4

River Classified as Class C (Fig. III-B5 & III-B6)



Fig. III-B5

Fig. III-B6

Guidelines on determining the Water Quality for Primary Parameters (Fig. III-B7, III-B8, III-B9, III-B10, III-B11, III-B12)

Table 3. Water Quality Guidelines for Primary Parameters

Parameter	Unit	Water Body Classification								
		AA	A	B	C	D	SA	SB	SC	SD
BOD	mg/L	1	3	5	7	15	n/a	n/a	n/a	n/a
Chloride	mg/L	250	250	250	350	400	n/a	n/a	n/a	n/a
Color	TCU	5	50	50	75	150	5	50	75	150
Dissolved Oxygen ^(a) (Minimum)	mg/L	5	5	5	5	2	6	6	5	2
Fecal Coliform	MPN/100mL	<1.1	<1.1	100	200	400	<1.1	100	200	400
Nitrate as NO ₃ -N	mg/L	7	7	7	7	15	10	10	10	15
pH (Range)		6.5-8.5	6.5-8.5	6.5-8.5	6.5-9.0	6.0-9.0	7.0-8.5	7.0-8.5	6.5-8.5	6.0-9.0
Phosphate	mg/L	<0.003	0.5	0.5	0.5	5	0.1	0.5	0.5	5
Temperature ^(b)	°C	26-30	26-30	26-30	25-31	25-32	26-30	26-30	25-31	25-32
Total Suspended Solids	mg/L	25	50	65	80	110	25	50	80	110

Notes:

MPN/100mL – Most Probable Number per 100 milliliter

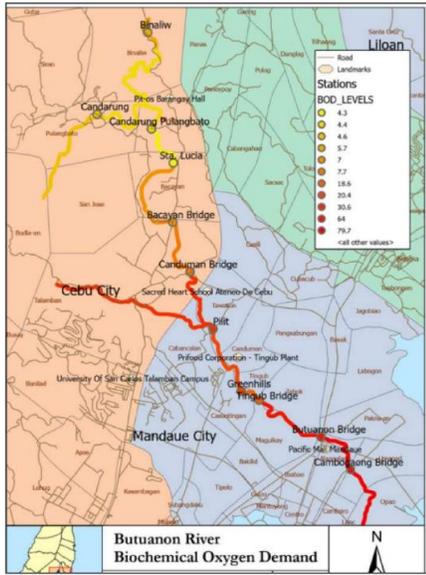
n/a – Not Applicable

TCU – True Color Unit

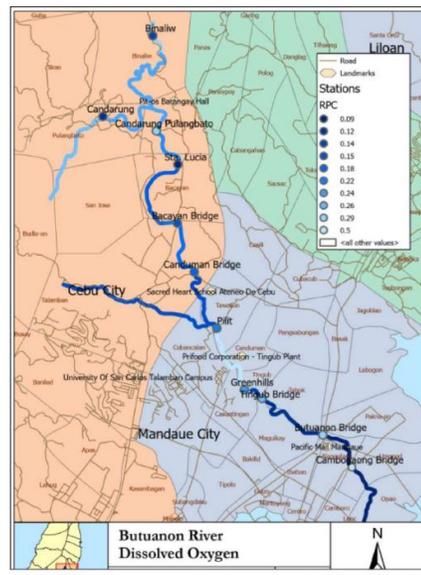
(a) Samples shall be taken from 9:00 AM to 4:00 PM.

(b) The natural background temperature as determined by EMB shall prevail if the temperature is lower or higher than the WQG; provided that the maximum increase is only up to 10 percent and that it will not cause any risk to human health and the environment.

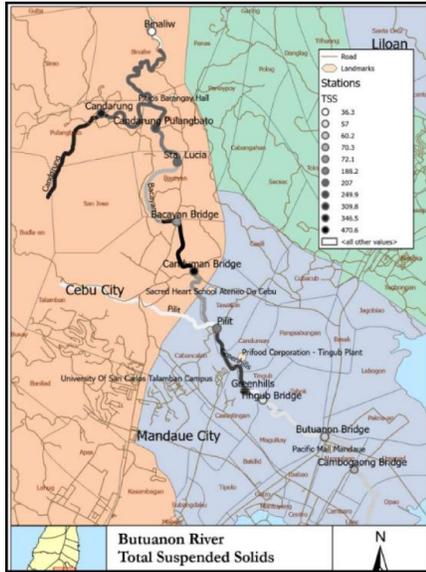
Fig. III - B7



Butuanon River Biochemical Oxygen Demand (2022)
Fig. III - B8

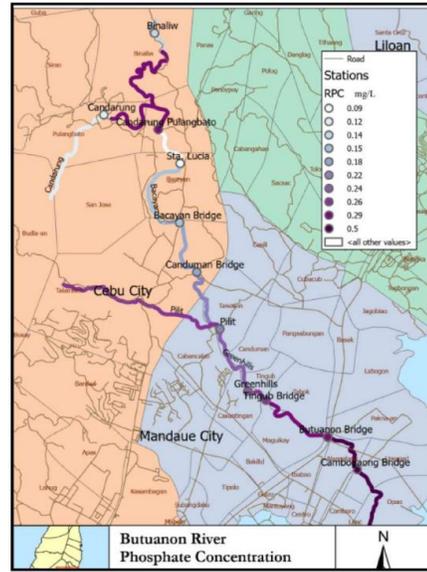


Butuanon River Dissolved Oxygen (2022)
Fig. III - B9



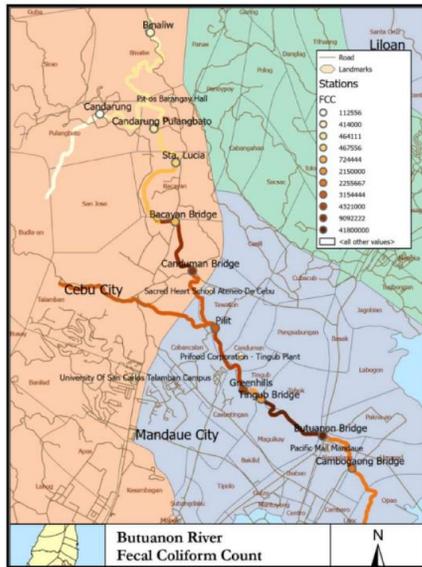
Butuanon River Total Suspended Solids (2022)

Fig. III - B10



Butuanon River Phosphate Concentration (2022)

Fig. III - B11



Butuanon River Fecal Coliform Count (2022)

Fig. III - B12

Focus Group: The focus group conducted with Sitio Almers residents highlighted several key concerns regarding the state of the river and its impact on the community. Health issues such as fever and dengue were attributed to unsanitary conditions and foul odor emanating from the river. Residents expressed significant hazards and disruptions caused by flooding, including the migration of trash downstream during rainy seasons. Despite acknowledging the negative consequences, residents admitted to disposing of waste in the river due to convenience. Proposed solutions such as relocation faced

resistance due to concerns about job proximity and increased travel time. However, community initiatives such as monthly clean-up drives demonstrate a collective effort to address pollution and preserve the environment.

Health Concerns (Fig. III-C1 & III-C2)



Fig. III - C1



Fig. III - C2

Disaster and Hazard Risks



Fig. III - C3

Trash Migration During Flooding (Fig. III-C4)



Fig. III - C4

Waste Disposal Practices (Fig. III-C5 & III-C6)



Fig. III - C5



Fig. III - C6

Relocation Concerns (Fig. III-C7 & III-C8)



Fig. III - C7



Fig. III - C8

Community WorkShop (Fig. III-C9)



Fig. III - C9

IV. Conclusion and Recommendation

Conclusion

After conducting a comprehensive analysis of the trash pollution issue affecting the Butuanon River in Sitio Almers, Brgy. Tabok, Mandaue City, several key findings have emerged. Firstly, it is evident that the river is severely contaminated by various forms of waste, including solid and liquid pollutants, which degrade water quality and obstruct the natural flow of the river. This pollution has resulted in adverse consequences for the

community, including health risks such as leptospirosis and dengue fever, as well as environmental hazards such as increased flooding and foul odors. Furthermore, our research has identified the reluctance of some residents to adhere to established waste management practices, citing inconvenience and laziness as contributing factors. Additionally, the issue of informal settlements along the riverbank presents a significant challenge to implementing effective solutions, as relocation efforts are met with resistance due to concerns about job accessibility and transportation.

In light of these findings, it is imperative to address the root causes of the trash pollution problem through a multi-faceted approach. This includes enforcing stricter regulations regarding waste disposal, improving public awareness and education on proper waste management practices, and fostering community participation in clean-up efforts. Additionally, collaboration between local government authorities, environmental agencies, and community stakeholders is essential to developing sustainable solutions that address both the immediate and long-term challenges posed by river pollution.

Recommendation

Based on these findings, we recommend the following actions to help mitigate the Butuanon River's trash pollution situation:

- **Regulation Strengthening:** Strengthen enforcement of existing environmental regulations against illegal dumping and waste disposal practices.
- **Community Engagement:** Engage the community through educational campaigns and outreach programs to enhance awareness about the proper management of waste and conservation of the river.
- **Upgrading of Infrastructure:** Invest in upgrading waste collection facilities and sewage treatment plants as a means of sanitizing the river and preventing further contamination.
- **Relocation Strategies:** Formulate sustainable relocation strategies for informal settlers along the riverbank, in concern with their livelihood and the possibility of finding access to job opportunities.
- **Collaboration:** Develop collaboration between government agencies, non-governmental organizations, and community groups in the clean-up effort and long-term restoration solutions for the river.
- In this way, the proposed actions will hopefully help restore the Butuanon River to its natural state and significantly enhance the quality of life for the people of

V. References

River Scan Challenge 2024 Manual

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