BIOCHUTE

TEAM WOLF-GANG

Keep your boats clean and our waters pristine.

EXECUTIVE SUMMARY

Marine debris is a global problem where large areas of concentrated marine waste are formed by ocean currents[1]. From surface water to deep-sea sediments, approximately 80% of all these marine debris is plastic waste; equivalent to 8 million tons of plastic yearly. This threatens the marine environment in aspects of ocean health, food safety and quality, human health, coastal tourism, and climate change. Over 200 marine species have been affected by entanglement of plastic, which resulted to open wounds, infections, and deaths of organisms[2].

Noting these statistics that highlight the danger plastic puts marine life in, MARINA introduces the BioChute: a biofilter that collects drifting litter and removes minuscule plastics found in waters. In line with the United Nations' SDG 14, MARINA's mission, is "to provide customers with tools that benefit *all* the seas they traverse and those that travel with them." Our vision is "oceans with life to enhance and no pollution to collect."

PRODUCT DESCRIPTION

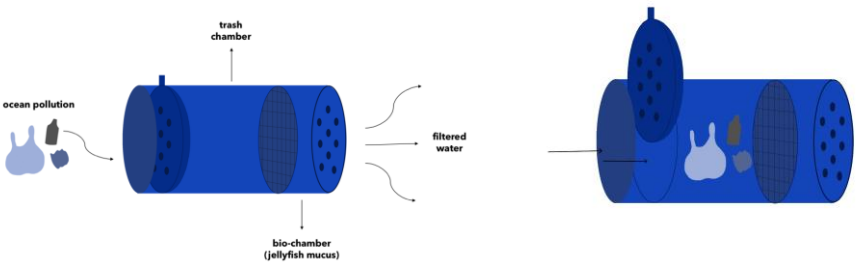
Marina's flagship product, BioChute is a non-intrusive boat attachment that uses the flow of water to collect different types of marine plastic litter. BioChute's body is a recycled PVC drum with an opening that is a mouth for the different types of trash that may be present.

There are strategically placed holes in the hind portion of the product that allows water to flow through once the plastic is filtered out of it.

As an added feature, BioChute has a filtering sheet at the back end of the drum that uses a newly endorsed glycoprotein that comes from jellyfish mucus. This material attracts and captures microplastic fragments. This ensures that the ocean ecosystems that BioChute passes through are not altered. Considering jellyfish and comb jellies naturally produce mucus with glycoproteins, the substance must be collected; there is no excessive carbon emission and waste production from this substance.

A metal hatch with grids can also be pulled up or put down by hand so fish do not get trapped and for trash not to flow out when not in use or when the speed of the boat or currents slows to almost a halt. The rubbish accumulated can then be disposed of properly.

The BioChute



THE TECHNOLOGY

Hydrokinetic Flow

The BioChute utilizes the boat's movement; stream hydrokinetics attracts trash inside. As the force of the boat pushing opposite of the water is significantly stronger, the force of the water is directed to the sides. This will coax floating trash inside of the container without utilizing power. The inserts placed on the back end of the BioChute and on the hatch which closes the chamber ensures continuously flowing water.

Jellyfish Mucus

With the increasing presence and threat of microplastic to marine life, jellyfish (*Aurelia aurita*) mucus has been promoted as a solution. The mucus, according to Akiko Masuda of the Institute of Physical and Chemical Research in Saitama, is a very simple type of mucin that could serve as a building block for more complex compounds with other properties[3]. Jellyfish have been shown to fill in the gaps of ecological niches such as overfishing and ocean acidification; however, these are seen as pests upon reaching the shores of beaches and known to clog intake pipes for nuclear plants. With the mucus' ability to bind microplastic, the researchers targeted the filter towards wastewater treatment plants as they are the largest producers of microplastic[4]. Jellyfish lives will not be compromised to collect their mucus as swirling water with jellyfish using a stick will already accumulate the mucus being excreted[5].

{1} https://coast.noaa.gov/states/fast-facts/marine-debris.html
{2} https://ocean.si.edu/conservation/pollution/marine-plastics
{3} https://www.nytimes.com/2007/07/17/science/17obse3.html
{4} https://phys.org/news/2018-10-plastic-jellyfish-filters.html
{5} https://www.nature.com/articles/srep11387
{6} https://www.worldfinance.com/markets/counting-the-cost-of-plastic-pollution
{7} https://www.nature.com/articles/srep11387
{8} https://www.cnet.com/news/seabins-want-to-be-the-garbage-cans-of-the-ocean/

OPERATIONS

Initial funds will be raised through investments from shipping industries, namely UPS, Maersk, and FedEx Corporation. When creating the product, MARINA plans to recycle 200-liter PVC bins from companies that dispose of them. The lids will be removed from the bins where other accessories attached will be removed before holes are drilled. The bin itself will have holes drilled at the bottom before attaching a screen coated with jellyfish mucus inside. A slot will be cut at the top and towards the front of the bin's opening to place the new lid.

The Company will invest in custom metal work to create beams that attach the BioChute to the boat. The bin will be attached to the beams via swivel safety hasps which will allow it to be detached to empty the contents and clean the screen. The beams themselves will be attached to the boat with corner braces and screws.

MARKET

The market is those who regularly interact with ocean waters and are therefore affected by marine debris that impact their water activities. The market can be divided into two: boat owners/users and coastline/shore inhabitants. Buyers include large overseas shipping companies such as UPS, Maersk, FedEx, Scuba Diving organizations like PADI, residents such as resort owners, and commercial fishing organizations like Yellow Boat of Hope Foundation. MARINA will have a focus in the Philippine setting as it is the third largest polluter of marine litter globally[6] but seeks to expand to other countries once specific investors can be identified and a market is established.

FUTURE DIRECTION

Overall, MARINA uses upcycled material, organic substances, and to reduce costs and CO2 emissions. Further research will be done to understand jellyfish mucin's effectiveness and possible alternatives or properties which could be added to the base compound.

PROMOTION AND MARKETING STRATEGIES

MARINA highlights a personalized customer relationship wherein customers may avail for certain services such as an installment service. In addition to that, a manual is included with every purchase of the product. In the event that any damages would occur, the consumer may contact the MARINA in order to receive assistance. Tutorial videos and QR codes will also be utilized in economically-inclined countries whereas the MARINA would reach out to local communities and non-governmental organizations to disseminate information and promote the product in platforms such as seminars.

To advertise the purchase of our product, the company will emphasize the reduction of boat damage costs caused by trash scratching the sides of boats or floating debris getting trapped in motors and propellers. Furthermore, cleaner waters will allow those aboard the boat to better see the fish and coral below. Using these as points of significance caters more to the market's interests and lessening marine debris is a secondary benefit. With regards to partnering with large industries and organizations, we can highlight how partnering with MARINA is an asset in Corporate Social Responsibility (CSR).

Initial marketing to gain partners and recognition is meetings and panels with an international audience. To establish government-relations, participation in the Intergovernmental Panel on Climate Change (IPCC) or other talks under international organizations like the UN or ASEAN is necessary. To garner non-governmental recognition, MARINA can feature in Dive Expositions. These expositions attract potential investors as the participants of such are interested in the preservation of marine life and ecosystems.

COMPETITIVE ADVANTAGE

The company's primary competitor is the Seabin Project, which uses a similar mechanism to collect trash. However, Seabin requires higher maintenance cost as it is stationary, and it requires the usage of an electric pump in order to attract trash to its compartment. Since BioChute is designed to be secured onto a moving boat to collect trash, the production of energy is no longer required to create a suction force, rather, it uses the energy already present in the waters surrounding it. Seabin has yet to successfully integrate technology that traps microplastics. BioChute utilizes a filter with a jellyfish mucus screen with glycoproteins that are shown to attract nanoparticles[8]. In addition, the Seabin can only hold 1.5 kg of waste per day while the BioChute is much larger with a capacity of 200 liters with its body which is comprised of a PVC Bucket. The use of cost-effective materials allows us to price a BioChute at $380 as compared to the Seabin at $4100[8].

FINANCE

Year 1	JAN	FEB	MAR	APR	MAY	JUN	JULY
Variable Cost per Unit	$172.00	$172.00	$172.00	$172.00	$172.00	$172.00	$172.00
Fixed Cost	$295.00	$295.00	$295.00	$295.00	$295.00	$295.00	$295.00
Expected Sales	25.00	25.00	25.00	25.00	25.00	30.00	30.00
Selling Price	$380.00	$380.00	$380.00	$380.00	$380.00	$380.00	$380.00
Total revenue	$9,500.00	$9,500.00	$9,500.00	$9,500.00	$9,500.00	$11,400.00	$11,400.00
Total variable Costs	$4,300.00	$4,300.00	$4,300.00	$4,300.00	$4,300.00	$5,160.00	$5,160.00
Monthly Profit	$4,905.00	$4,905.00	$4,905.00	$4,905.00	$4,905.00	$5,945.00	$5,945.00
Accumulated Profit	$4,905.00	$9,810.00	$14,715.00	$19,620.00	$24,525.00	$30,470.00	$36,415.00

AUG	SEP	OCT	NOV	DEC
$172.00	$172.00	$172.00	$172.00	$172.00
$295.00	$295.00	$295.00	$295.00	$295.00
30.00	30.00	30.00	35.00	35.00
$380.00	$380.00	$380.00	$380.00	$380.00
$11,400.00	$11,400.00	$11,400.00	$13,300.00	$13,300.00
$5,160.00	$5,160.00	$5,160.00	$6,020.00	$6,020.00
$5,945.00	$5,945.00	$5,945.00	$6,985.00	$6,985.00
$42,360.00	$48,305.00	$54,250.00	$61,235.00	$68,220.00

	YEAR 1	YEAR 2	YEAR 3
Variable Cost per Unit	$172.00	$189.20	$208.12
Fixed Cost	$295.00	$354.00	$424.80
Expected Sales	$345.00	$517.50	$776.25
Selling Price	$380.00	$380.00	$400.00
Total revenue	$131,100.00	$196,650.00	$310,500.00
Total variable Costs	$59,340.00	$97,911.00	$161,553.15
Yearly Profit	$71,465.00	$98,385.00	$148,522.05
Accumulated Profit	$71,465.00	$169,850.00	$318,372.05

The company will spend $134.10 and $130 for rent and marketing expenses respectively; the total fixed cost is $295. The company will spend a total of $172 for one unit. MARINA aims to create 25 units for the cost of $380. Past the breakeven, the company expects to gain $8740. MARINA needs $4595 to cover the first month's costs. As the company continues to sell BioChutes, the units to sell will increase from 25 to 30 until it reaches 35 units. Expected profit for the first year is $71,465.