

SWIM DRINK FISH



1 WHAT IS THE OPPORTUNITY?

The goal is to improve the sustainability of Swim Drink Fish's sampling and testing procedures by minimizing the amount of single-use plastic waste produced by their current apparatus.



2 OUR PRIMARY STAKEHOLDERS

01

Staff/Data Collectors at Swim Drink Fish

02

Consumers of Harbours and Beaches in the GTA

03

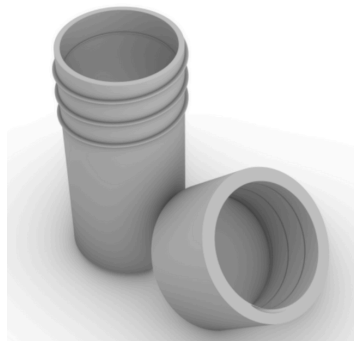
Companies and Organizations consuming the data

04

Volunteers at Swim Drink Fish

OUR RECOMMENDED DESIGN THE ICE TRAY

Our recommended solution is an ice tray which is more sustainable than Swim Drink Fish's current sampling equipment: whirl packs (which are single-use plastic sampling containers).



Our design is a 3-Part Solution:

- **Pill Bottles:** A sampling container used for manually scooping the water from the testing location
- **Ice Tray:** A tray for holding x8 pill bottles to ease transportation and make it more accessible to hold and carry around.
- **Portable Microwave Sterilizer:** For sterilizing the pill bottles to minimize cross-contamination and maintain the accuracy of the sampling container

HOW IT MEETS THE OBJECTIVES?

➡ **Sustainable:** Made from PLA (Biodegradable)
Benefits: Low carbon Footprint (80% lower than traditional plastics), compostable, made from renewable sources

➡ **Reusable and Durable:**
Lasts 12 to 18 years at room temperature because of the material properties of PLA thermoplastic

➡ **Easy to clean:**
Resources required to clean: Water, Portable Microwave Sterilizer, 1 staff member (can be cleaned in < 5 mins)

➡ **Allows for volunteer engagement:**
Allows volunteers to engage in the sampling process by allowing them to manually scoop the water

3 WHAT ARE THE REQUIREMENTS? THE DESIGN IS...

SUSTAINABILITY

- Biodegradable/Recyclable
- Minimize CO2 Emissions
- Composed of Sustainable Materials



DURABILITY

- Durable enough to withstand long periods of use.



COST EFFECTIVE

- Cheap to produce
- Cheap to operate
- Requires few staff



ACCESSIBILITY

- Allow volunteer engagement
- Can be used by people with immobility/disability
- Easy to operate



ACCURACY

- Minimize the risk of cross contamination
- Easy to sterilize



SAFETY

- Safe for Wildlife
- Safe to Operate



TIME EFFICIENCY

- Utilizing the design to collect samples should not take longer than current sampling procedures.



USABILITY

- Easy to Clean
- Easy to Transport
- Easy to utilize in conjunction with current apparatus



THE ICE TRAY

KEY DESIGN FEATURES

01

Pill Bottles: A reusable cylindrical sampling container made from PLA with a capacity of 100 ml.

02

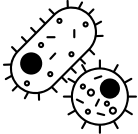
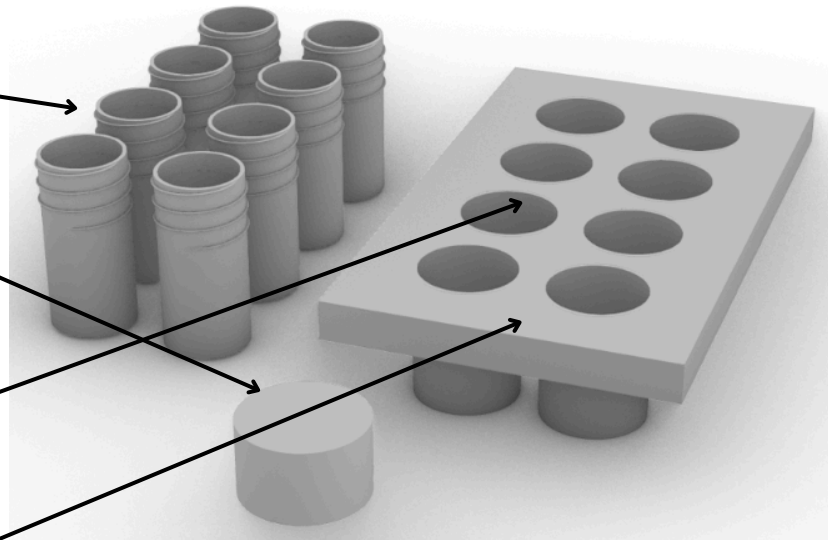
The lid: An air tight lid (made from PLA as well) that seals the pill bottle to prevent cross contamination and any accidental leakage.

03

The Tray: A 17.1 cm x 29.7 cm x 6.5 cm PLA ice tray to store x8 pill bottles to allow for ease of transportation and improve the stacking efficiency.

04

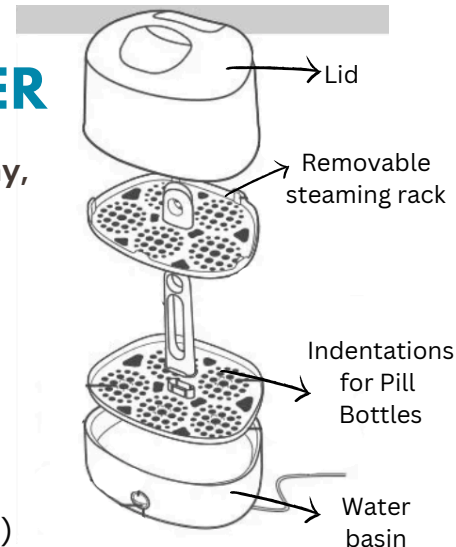
Handles: An extended surface next to the pill bottle compartments to allow volunteers to hold the tray when loaded with the water samples.



STERILIZING THE ICE TRAY USING A PORTABLE MICROWAVE STERILIZER

To prevent cross contamination and sterilize the pill bottles of the ice tray, we can use a portable microwave sterilizer in the following way:

- Pour water in to water basin of the sterilizer
- Place the pill bottles from the ice tray into the sterilizer rack in the designed indentations
- Place the sterilizer into the microwave
- Use steam to sterilize the ice tray containers
- Steam for 30 seconds to kill bacteria (like E. coli)



4 RECOMMENDATIONS/NEXT STEPS...

We recommend the ice tray, because of its material properties, reusability, durability and accessibility, however there are still few next steps that can improve the iterations and quality of the functional prototype:

01

Add indentations to the outer surface of the pill bottles, to make it easier to grip, prevent slipping and allow for easier scooping of the water sample.

02

Add a rubber layer inside the lid to prevent any possible leakage of the water sample between the two thermoplastic layer of the lid and the pill bottle and ensure that it is fully sealed.

03

Add mini-hands on the lid of the pill bottle to easily pull out the pill bottle from the ice tray use the handle as mechanism to unscrew and remove the lid from the pill bottle (improve accessibility).