

NURDLE HUNT

OPPORTUNITY

Developing a high-performing design to quickly collect and identify nurdles and minimizing physical strain on the user and disturbances to the surrounding environment.



Nurdles often wash up from water and therefore mostly rest on the surface of beaches.

Pursuing nurdles in deeper levels of sand is inefficient and causes unwanted disturbances to the beach landscape



We limit design space to dry surface sand. Since nurdles on wet sand gets displaced by water easily, while deep sand has less nurdles that are harder to collect.

Due to nurdles' small size and their dispersion in the environment, they are difficult to collect and identify.



WHAT ARE NURDLES?

Nurdles are 2-5 mm diameter plastic pellets used in the production of consumer plastics. Unused nurdles are often not properly disposed of, so thousands of them are found on Toronto beaches. They are the most-commonly found micro plastic pollutant in oceans.

Due to nurdles' toxicity to wildlife and the risk of adhesion with pathogens, they pose a threat to the environment and humans.

Key Requirements

Our team devised a set of objectives that form the foundation for our design and planning efforts. These inform our requirements by which we can evaluate the quality and effectiveness of our design.

1. Fast Nurdle Identification and Collection

The design should collect nurdles quickly while minimizing non-nurdle debris collection.

2. Minimize Force of Operation

The design must be easily operable by a wide range of volunteers and should not require excessive physical effort.

3. Minimize Noise Pollution

The design requires a low noise solution since nurdles are collected in public spaces.

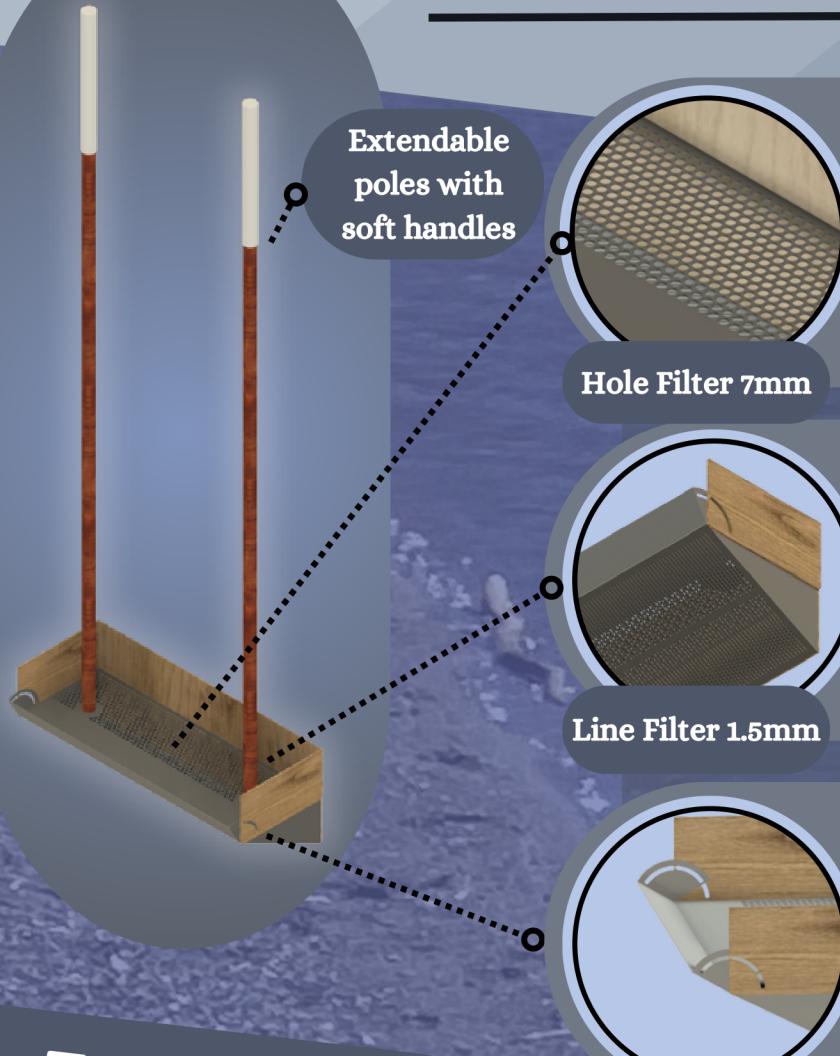
4. Be Reliable and Durable

The design should maintain functionality even through multiple uses and not require frequent maintenance.

5. Minimize kneeling/squatting

The design should aim to reduce the need for volunteers to be in uncomfortable positions, such as kneeling and squatting, as current design frequently require the user to do so.

OUR DESIGN: NURDLE NABBER

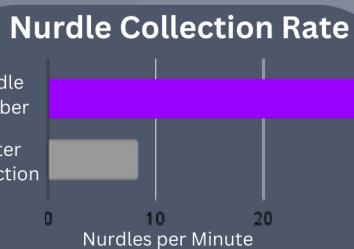


This design features a double-layer filter that aims to identify and isolate nurdles from other debris present on beaches based on nurdle's unique size and shape. The top layer consist of 7 mm diameter circular holes that blocks large debris.

The lower plate has a line-shaped filter that is 1.5 mm wide. This filter lets small debris like sand exit the design, but traps items that resemble the size and shape of nurdles. The small filter size increases the chances of catching nurdles.

The sand collection system features a 1100 sq cm shovel that efficiently gathers sand when pulled by the user, collecting ~3.5 kg of sand per 1.5 m pull. It also includes an adjustable spade to accommodate users of varying heights and sand densities, improving versatility and ease of use.

Testing



3.5 x Faster Nurdle Collection Rate

Maximal Pulling Force of 50N

Negligible Observed Change in Noise Level

Although there is some variation in the outcomes, most tests indicate improvement compared to the current solution

More than 90% of Nurdles Collected on Average

Recommendations

We recommend the use of the Nurdle Nabber on Toronto beaches.

We recommend next steps to refine our design, as we were limited by our available tools and materials limited while constructing and testing our prototypes.

Next Steps

- Implementation of an vibration motor to assist filtration process
- Further durability testing to determine the design's mean time to failure
- Conducting tests on higher-fidelity prototypes using the recommended materials