



Lotus Trash Collector

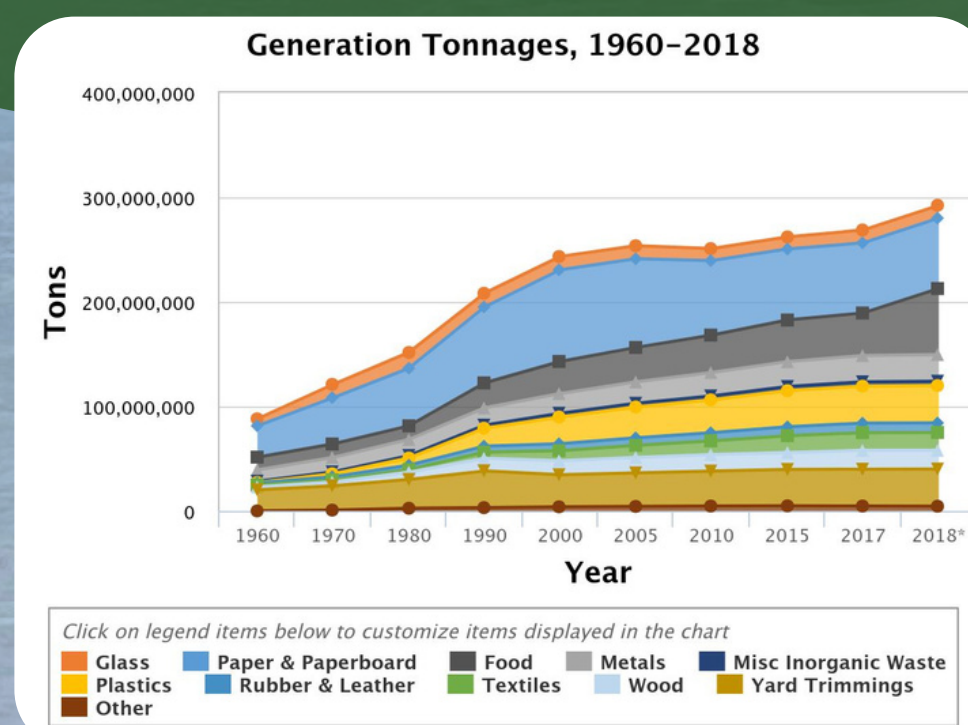
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- Over **170 trillion plastic particles**, or up to 5 million tons of plastic is in the world's **oceans**, and that number is quickly **increasing** (Eriksen et al.)
- Detrimental to aquatic ecosystems**, directly recorded killing 86% sea turtle species, 44% seabird species, and 43% marine mammal species (Laist)
- Plastic ingested by larger fish travels up the food chain and afflicts **human diet** (Springer)
- But **garbage is only increasing**... chart from the US Environmental Protection Agency (below) reveals a 4.5 lb/person/day **increase in trash disposal**:



Trash Problem

Trash

Prototype

Biomimicry

- Bright **aposematic** flower **coloration** and non-native plants make the device less appealing to wildlife, thus **reducing the risk of wildlife interference** (Prudic et al.)

- Mimics the spinning behaviour of the **phalarope** to create vortexes beneath the water, stirring trash up to the water's surface (Lipske)

Conveyer Belt

Motors

Waste Bin

Solar Panel

Engineering Process

- Brainstorming:** Considered conveyer belt, stationary, and demotorized collectors and chose conveyer belt for best debris collection.
- Prototyping:** Assembled conveyer, solar panel, motor, and waste bin.
- Testing:** Collected plastic bottles at different speeds to assess debris capture.
- Iteration:** Repeated Testing. Added side barriers, adjusted speed, and refined vortex collection to prevent trash from drifting.



Lotus

Sources

Universal Design

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How does it concern PA?

- A 2021 study found the **Delaware River** to be the most polluted river in North America (Meijer et al.)
- John Heinz National Wildlife Refuge, also draining into the Delaware River, has a **known garbage problem**

Solution

A device that curtails plastic pollution at its source, before it enters the ocean

Budget

Item	Price	Quantity	Total
Motor Speed Controllers	\$17.99	3	\$53.97
Motor	\$17.99	2	\$35.98
PVC Pipe 3/4 inch	\$4.01	1	\$4.01
20" Planter	\$16.41	1	\$16.41
Flower Lotus	\$1.32	1	\$1.32
ELEGOO UNO R3 Board	\$14.90	1	\$14.90
Brass Connectors	\$11.79	1	\$11.79
Conveyer Belt Vinyl	\$16.99	1	\$16.99
Solar Panel	\$15.88	1	\$15.88
			\$117.28

Video



- Equitable Use:** Operates autonomously, requiring no manual effort.
- Flexibility:** Adapts to currents with a conveyer belt for smooth collection.
- Tolerance for Error:** Flexible design avoids obstacles; mesh barriers prevent failures.
- Low Effort:** Works independently with minimal maintenance.
- Size & Space:** Compact, lightweight, and easy to deploy.
- Simple & Intuitive:** Mimics water birds, making its function clear.
- Perceptible Info:** Flowers mark the area; sound enhances accessibility.