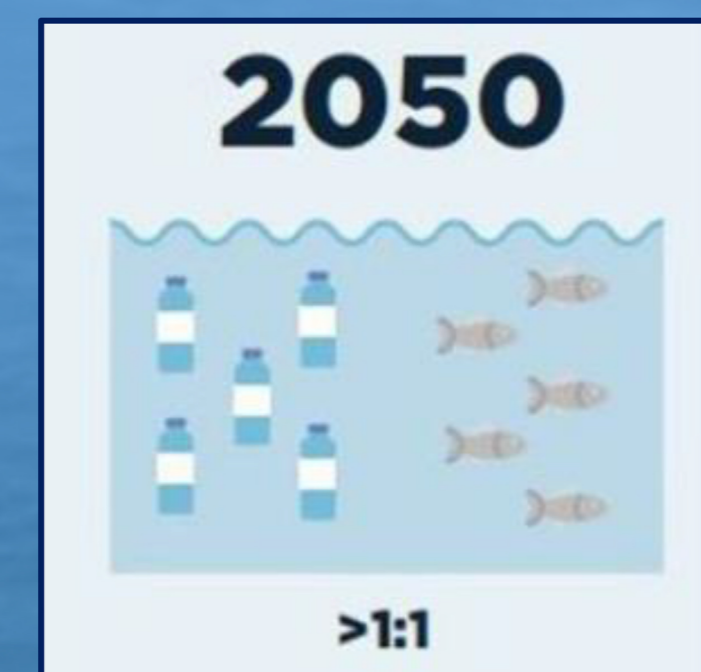
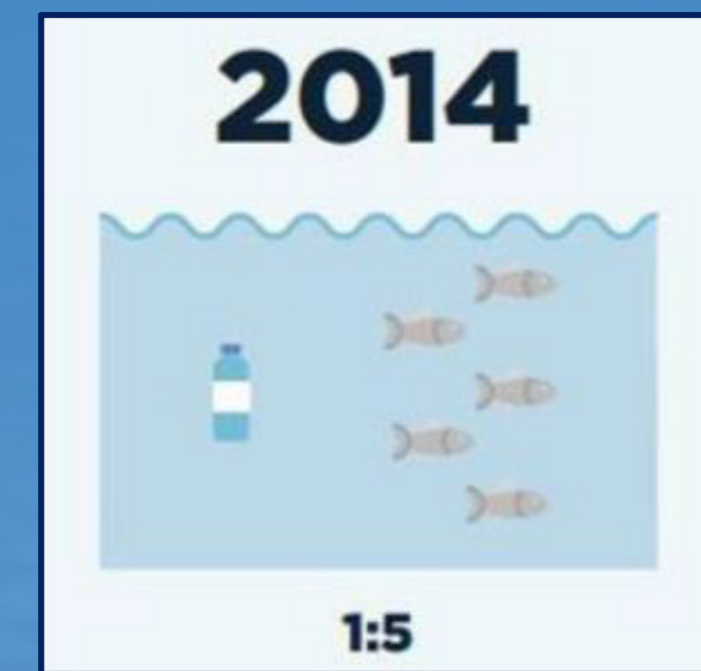


Scope of the Problem

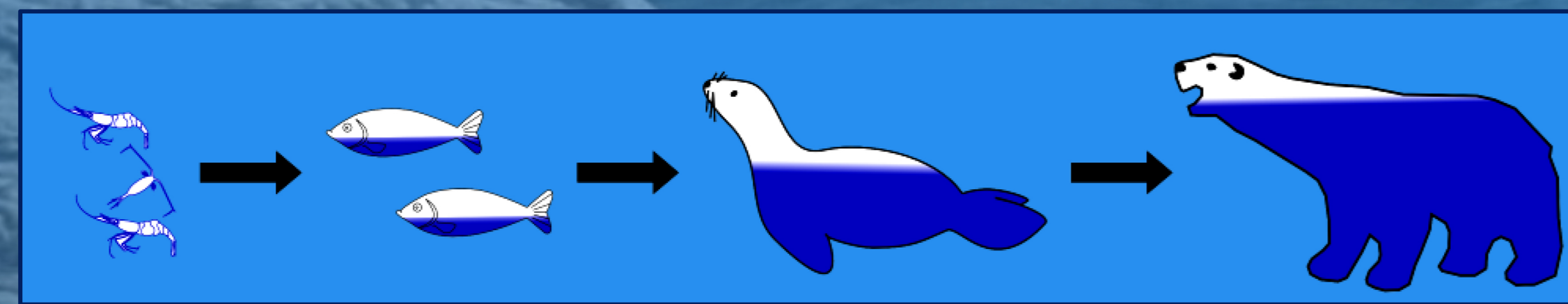


9 BILLION TONS of manufactured plastic
440 MILLION TONS produced per year
8 MILLION TONS enter the ocean per year
236,000 TONS are microplastics

Bisphenol A
 Lead Ion
 Pesticide
 Magnesium



Oceanic plastic will outweigh fish by the year 2050.



Methodology



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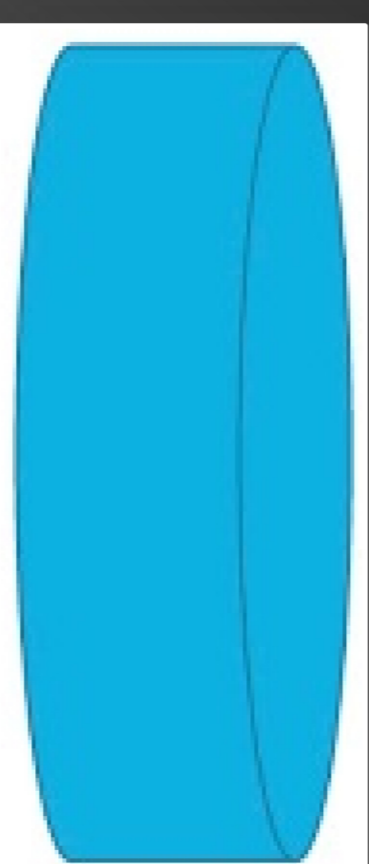
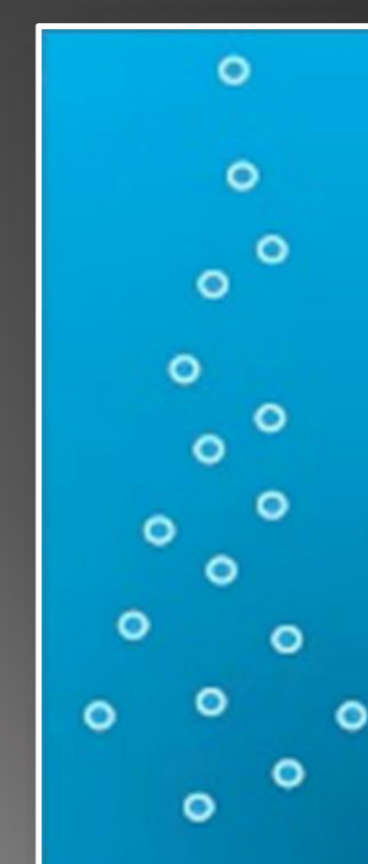



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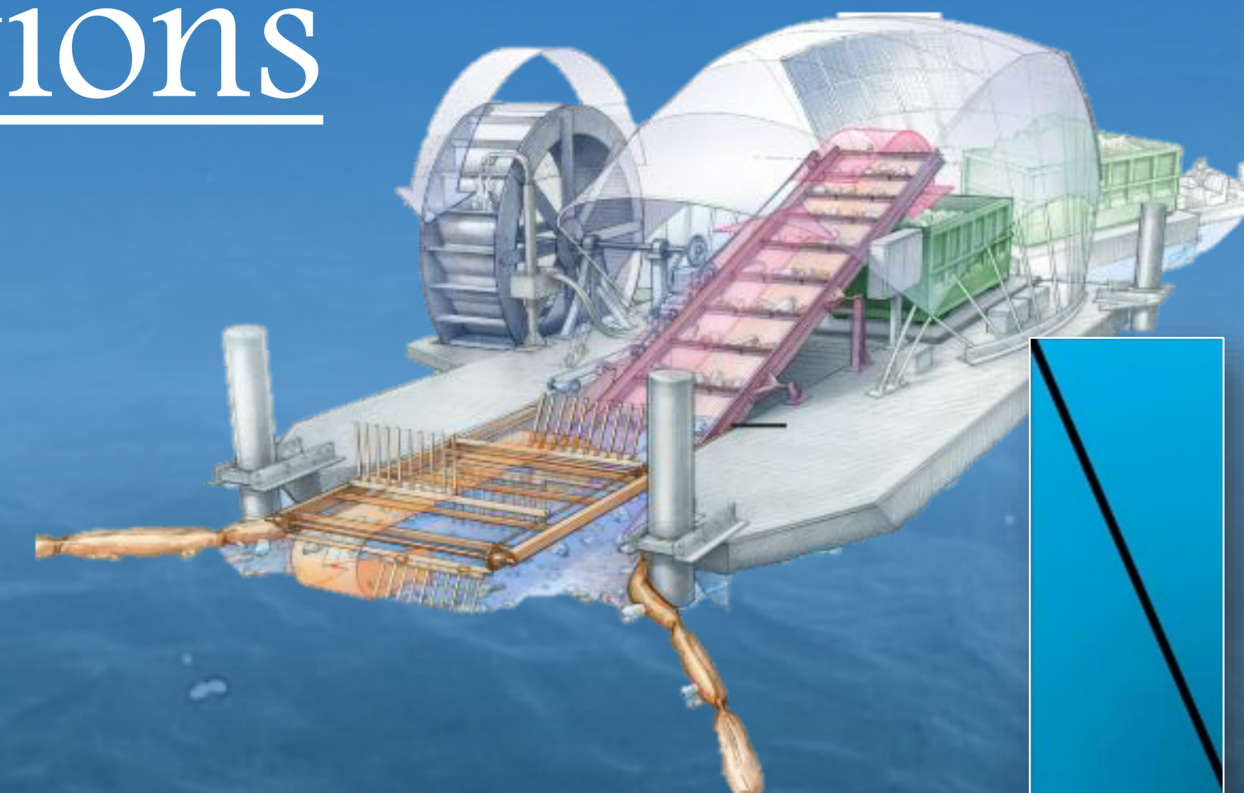
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Various technologies towards limiting the amount of plastic entering the ocean

<h3>Discfilter</h3>  <ul style="list-style-type: none"> ~ Implemented in Helsinki, Finland ~ Collects microplastics by backwashing water effluent <p>Effectiveness: 40%-98%</p> 	<h3>Dissolved Air Filtration</h3>  <ul style="list-style-type: none"> ~ Implemented in Hämeenlinna, Finland ~ Collects microplastics by using pressure to force particles to the surface for collection <p>Effectiveness: 95%</p> 	<h3>V-Barrier</h3>  <ul style="list-style-type: none"> ~ Not implemented ~ Collects plastic in the ocean ~ Collected plastic is removed from the barrier <p>Effectiveness: No Data</p> 
<h3>Rapid Sand Filter</h3>  <ul style="list-style-type: none"> ~ Implemented in Turku, Finland ~ Collects microplastics by using a sand filter to capture particles <p>Effectiveness: 97%</p> 	<h3>Membrane Bioreactor</h3>  <ul style="list-style-type: none"> ~ Implemented in Mikkeli, Finland ~ Water effluent is forced through the disposable membranes that trap and collect particles <p>Effectiveness: 99.9%</p> 	<h3>Trash Wheel</h3>  <ul style="list-style-type: none"> ~ Implemented in Baltimore, MD and Long Beach, CA ~ Collects plastic at river estuaries <p>Effectiveness: 200 tons of debris filtered per year</p>

Conclusions and Recommendations

Synthesizing the information and existing solutions, it has been determined that a Trash Wheel equivalent that uses a membrane bioreactor will be the most effective mechanism to remove debris from waterways before they enter the ocean. A system such as this could also be used to remove existing debris from the ocean.



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