



Filters and Water Quality

Island Pathways Class
MDI High School



Island Pathways



Island Pathways is a co-curricular program now in its second year that offers a hands on approach to learning at MDI high school.

We do lots of leadership activities and our learning units focus on real-life local and community issues.

Our Arsenic Lab

The students were tasked with finding out which water filter would filter out the most arsenic and other water contaminants.

We tested six filters for multiple contaminants in the water from a local well and found results in arsenic, total dissolved solids (TDS), hardness and pH.

We then designed brochures and this slideshow to spread awareness about arsenic and the varying quality of home pitcher filters.

Water Quality Concerns

Arsenic: Ingesting too much arsenic can cause arsenic poisoning, which can lead to loss in red blood cells, shock, and maybe even death. The EPA designates that drinking water must have less than 0.01 ppm.

Hardness: The amount of dissolved minerals in water, especially calcium and magnesium. The safe range of the hardness in your water is 55 ppm or less according to the EPA.





Water Quality Concerns, continued...

pH: The measure of hydrogen ions. It can range from 0 (very acidic) to 14 (very basic). The EPA safe drinking range is from 6.5 to 8.5 but the ideal is a pH of 7.

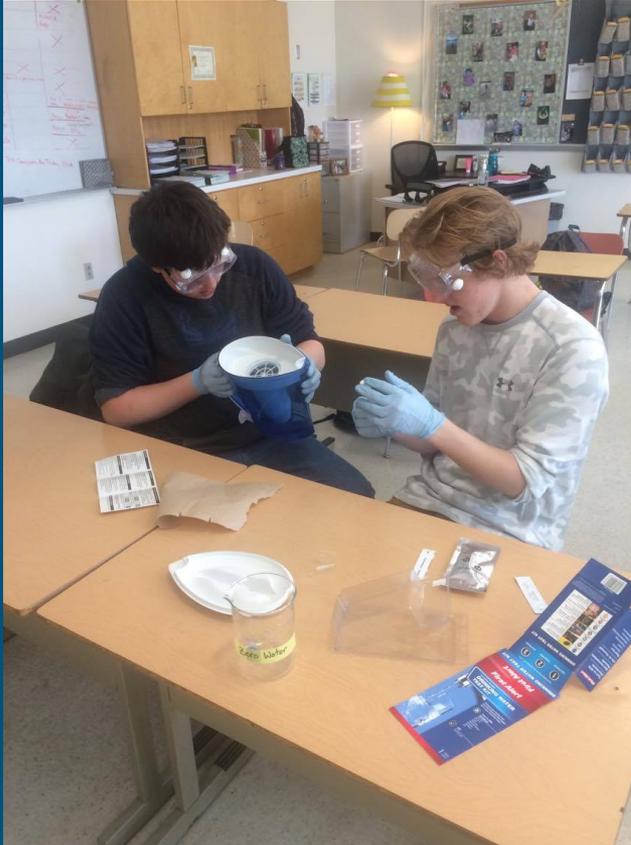
Total Dissolved Solids (TDS): Total dissolved solids are a measure of all inorganic and organic substances contained in a liquid. It's used as an indicator of the presence of many chemical contaminants. The EPA designates 500 ppm as the safe limits for TDS.



Procedure

Island Pathways got water from a local with high arsenic to test how well different pitcher filters would remove arsenic and other contaminants. We filtered the water through 6 different standard water filters that ranged in price from \$15-\$33.

We used “First Alert” drinking water test kits (\$10 on [amazon.com](https://www.amazon.com)) to test for bacteria, lead, pesticides, nitrates/nitrites, chlorine, hardness, and pH. We used “Quick” arsenic test kits to test for arsenic. Once our tests were done we compared our results to the control sample test that was not filtered.



Filters



Wamery, 8 cup, LED indicator, 42 gal/filter. Ionizer filter is NSF (National Sanitation Foundation) certified to reduce cadmium, copper, mercury, lead, other metals and chlorine.

PUR: 11 cup, LED indicator, filters fast. Carbon ion-exchange filter certified to remove lead.



Brita: 8 cup, LED indicator, 40 gal/filter, filters fast, BPA-free. Advertises “better taste”.



Filters

ZeroWater, 8 cup, TDS indicator, spigot on bottom, filters slowly, BPA-free. 5-stage filter NSF-certified to reduce lead and chromium.

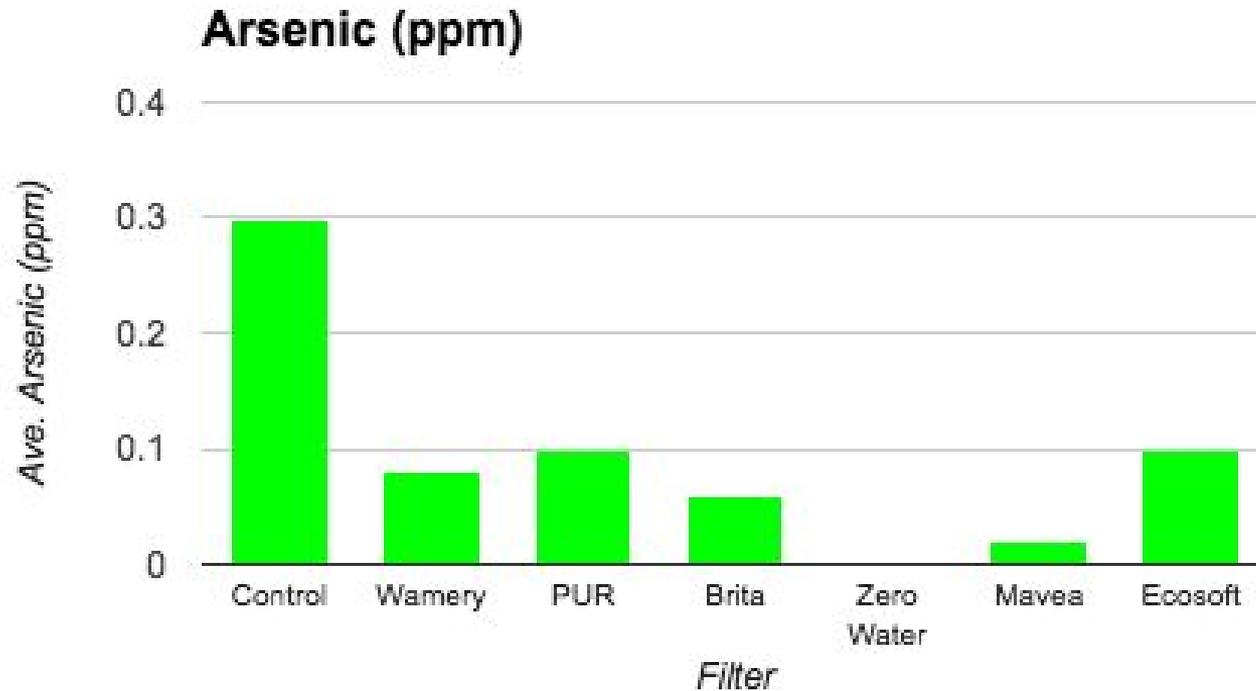


Mavea, 8 cup, LED indicator, BPA-free. Micro-screen filter reduces carbon flecks in water. Advertised as “stylish”.

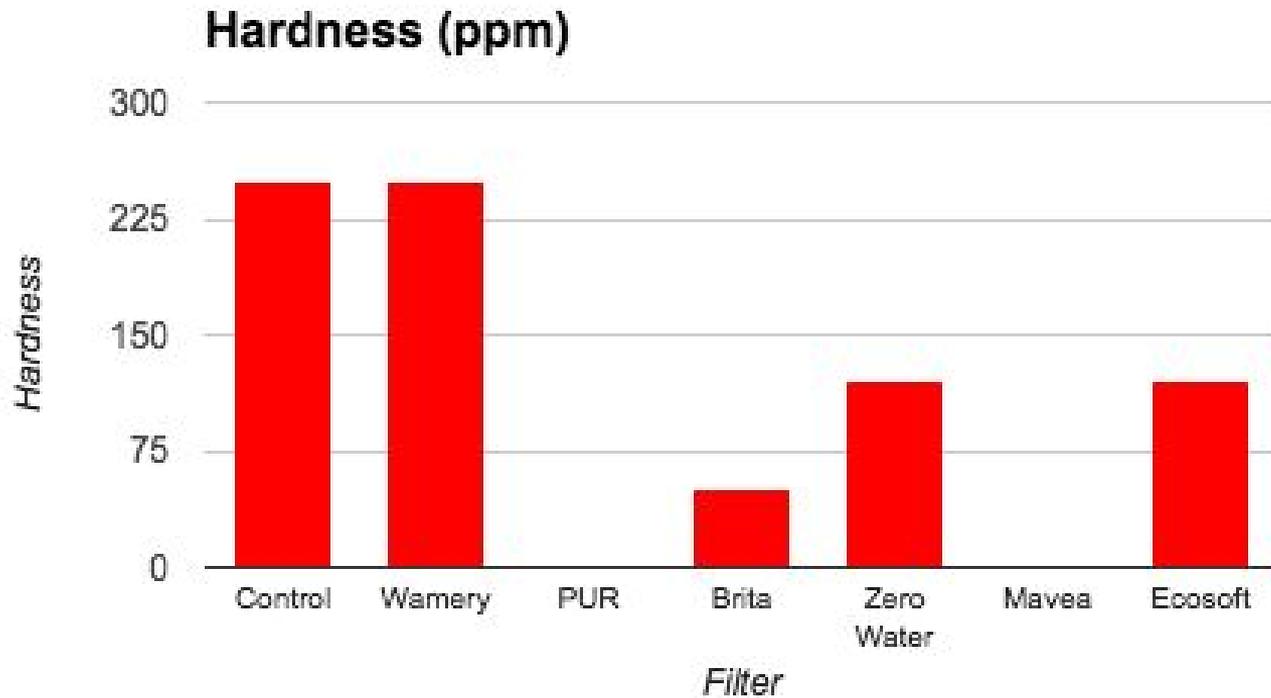
Ecosoft: 8 cup, filters fast, BPA-free. Fine mesh filter advertised to reduce chlorine, salinity, tannins, hardness, metals, etc. Least expensive option.



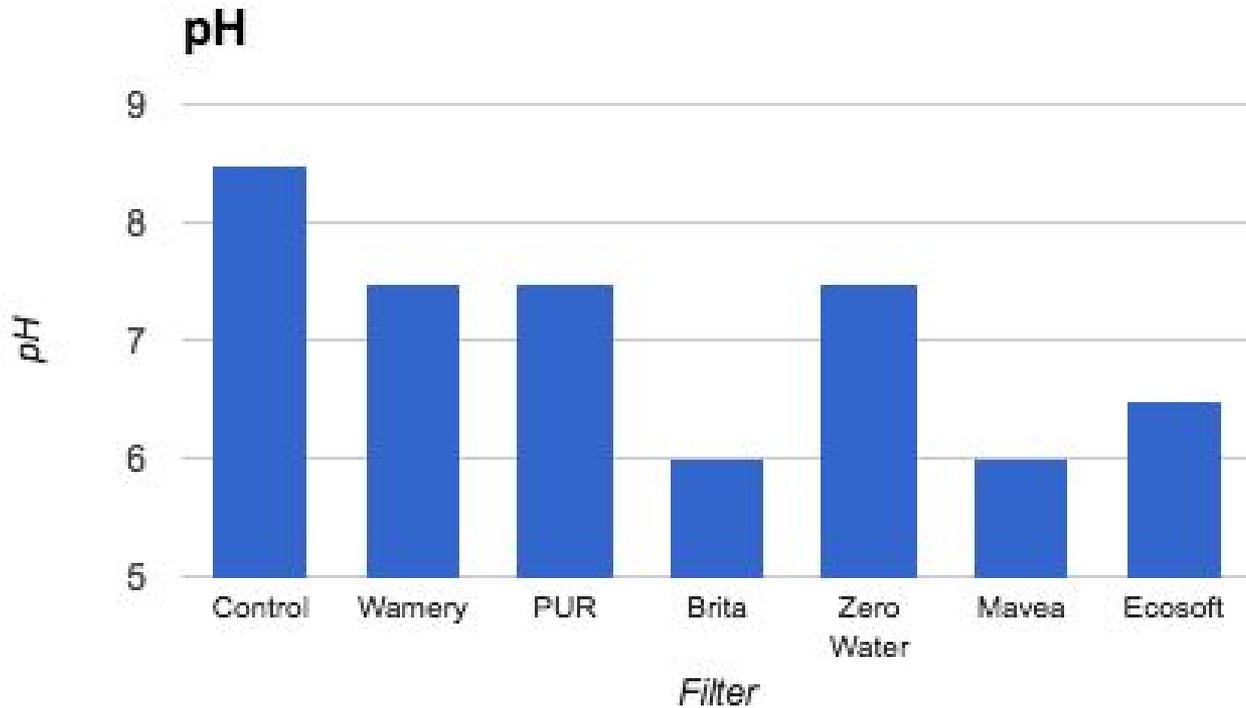
Results



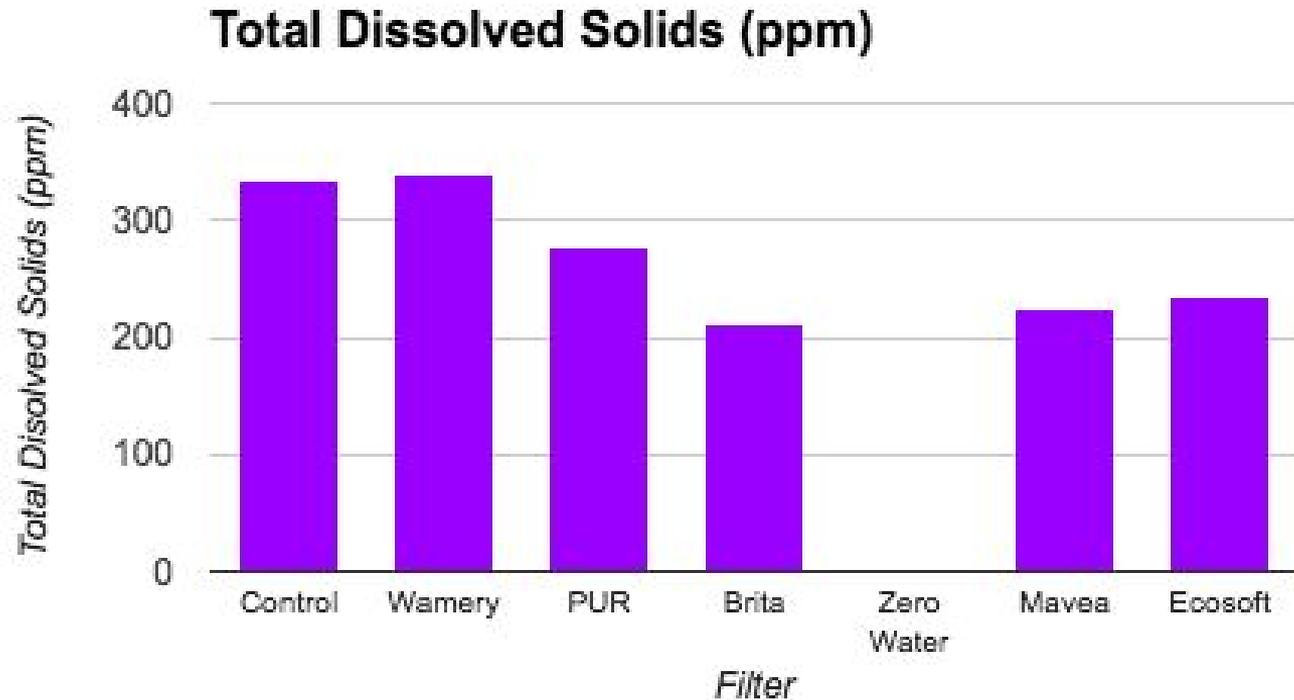
Results



Results



Results



Conclusions

The **Zero Water** filter is the best filter for removing Arsenic & Total Dissolved Solids (TDS).

The control had 0.3 ppm of Arsenic and 335 ppm TDS.

The ZeroWater filter removed all the arsenic and reduced TDS to 1 ppm.

Resources

Curious about your own well?

Below are some local organizations that can help you test and improve your water:

- **Healthy Acadia** can help connect you with resources for testing and reducing contaminants in well water.
- **Washington Hancock Community Agency** (WHCA) can also help connect you mitigate contaminants in your well water.
- **Maine Center for Disease Control** offers FAQs, treatment options, and arsenic information.

Thank You!