

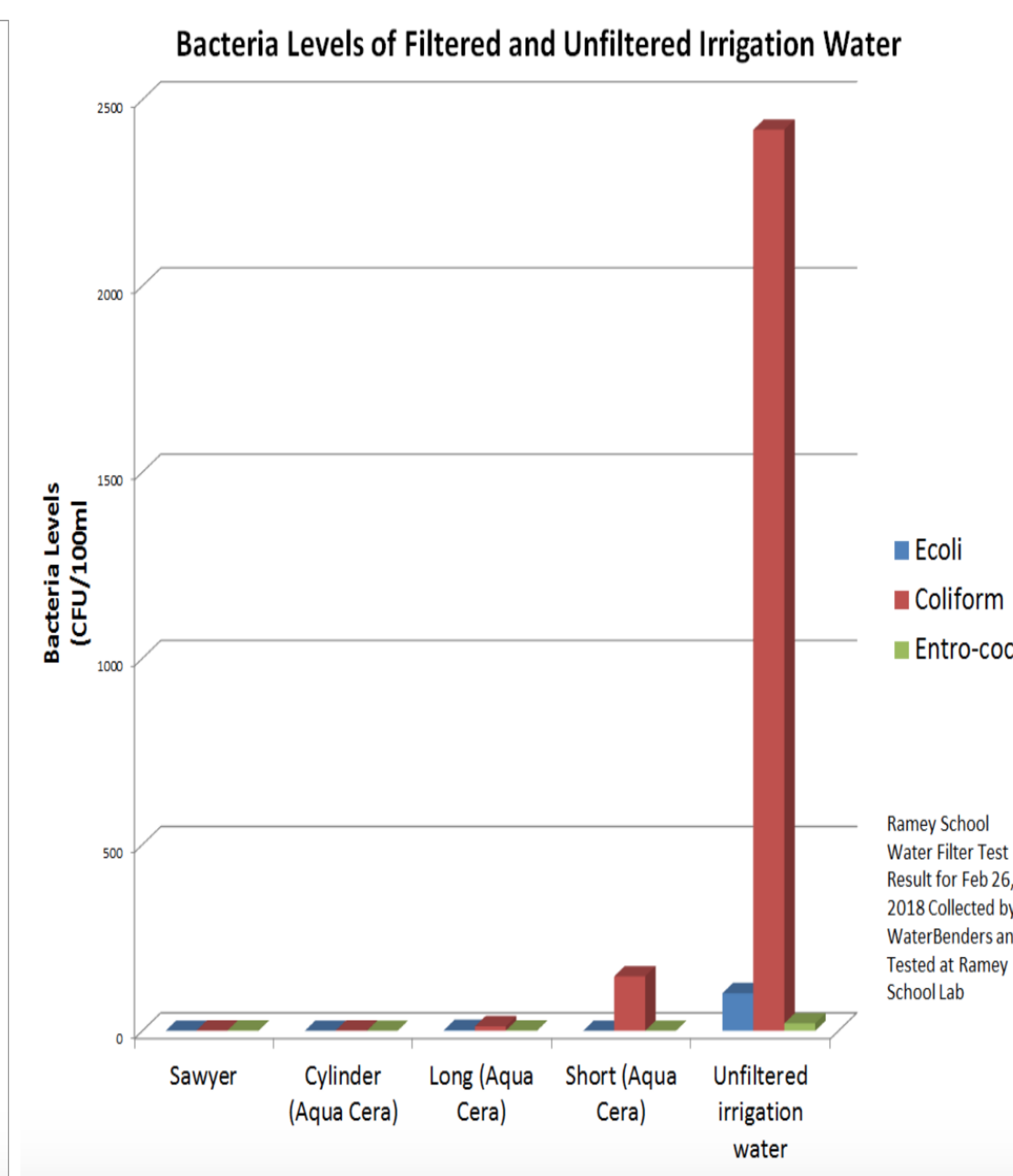
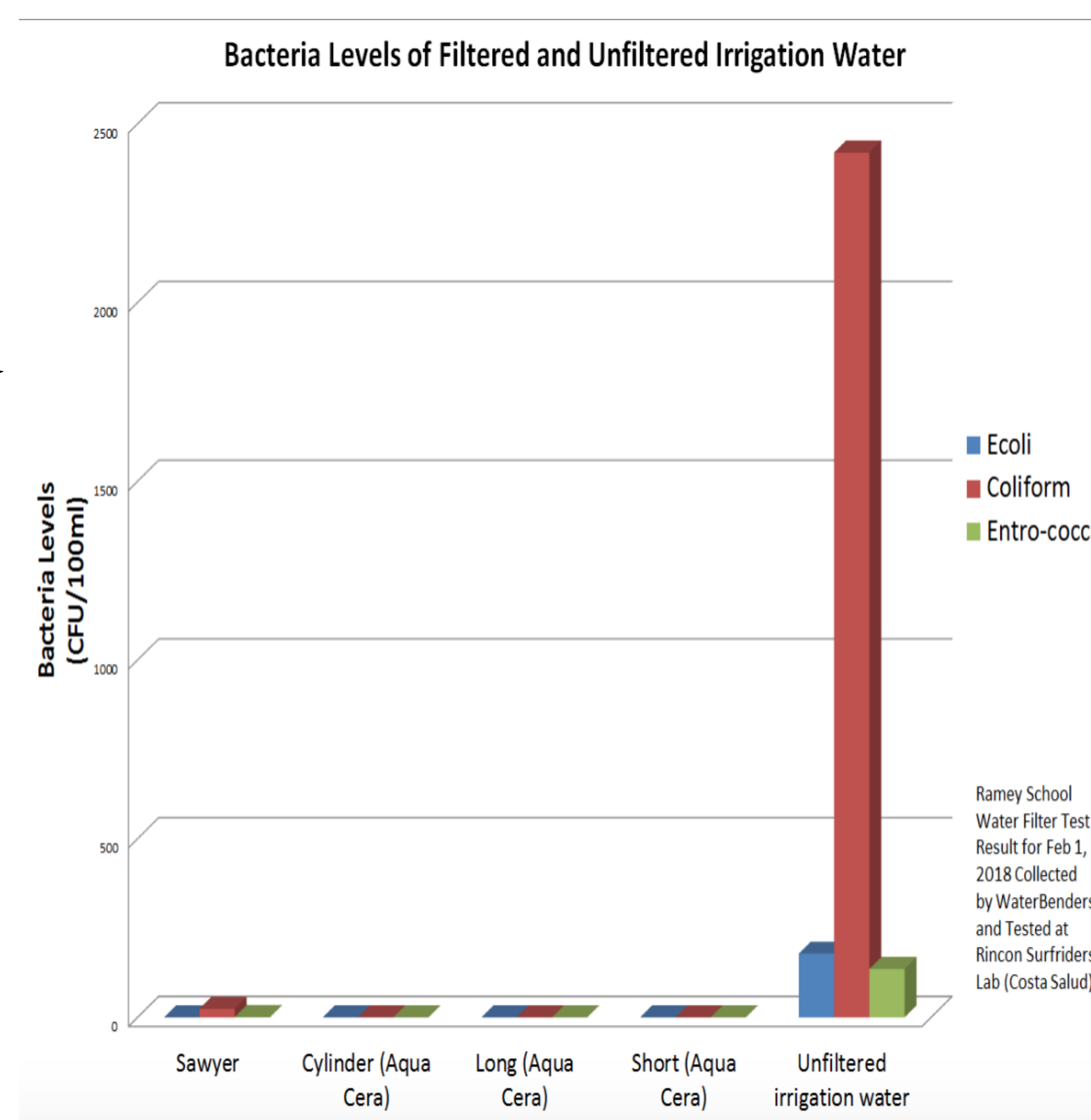
## Evaluating Bacterial Levels in Filtered Water after Hurricane Maria Devastated Puerto Rico

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Results February 1, 2018

Results February 26, 2018

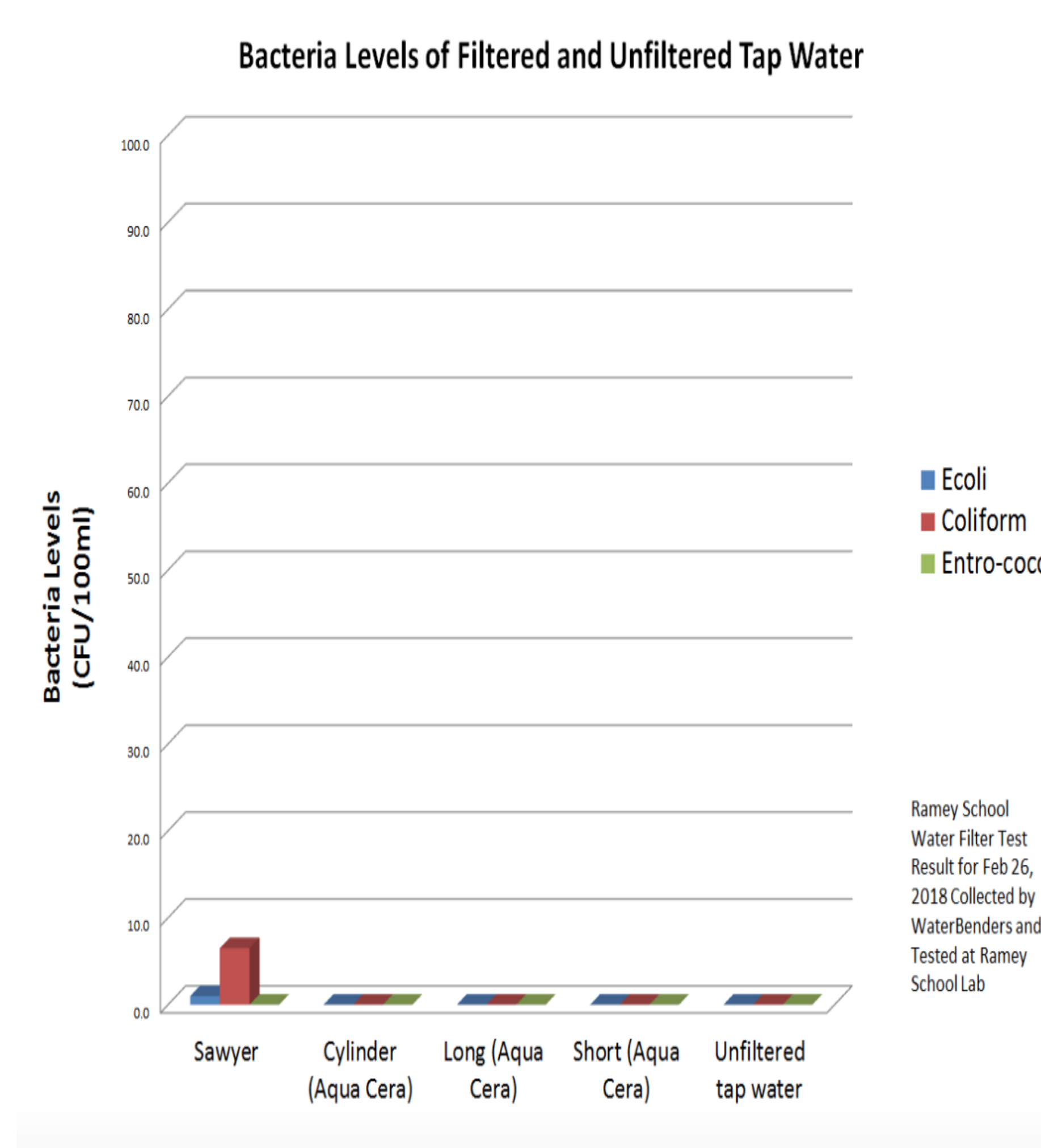
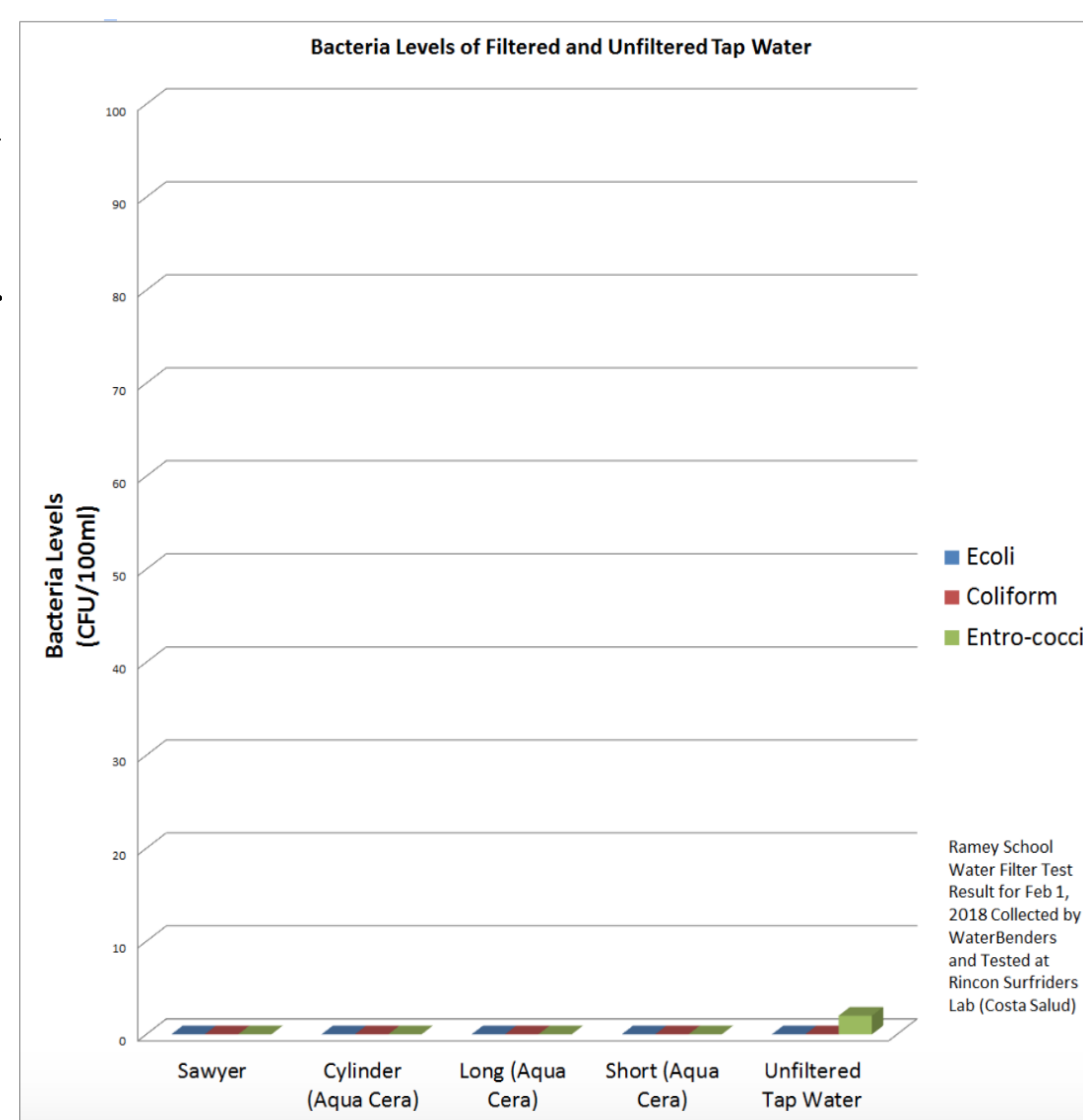


The unfiltered irrigation water had high levels of total coliform (>2419.4 CFU/100 ml), E. coli (178.2 CFU/100 ml), and enterococci (135.4 FU/100 ml).

The unfiltered irrigation water had high levels of total coliform (>2419.4 CFU/100 ml), E. coli (101 CFU/100 ml), and enterococci (20.1 CFU/100 ml).

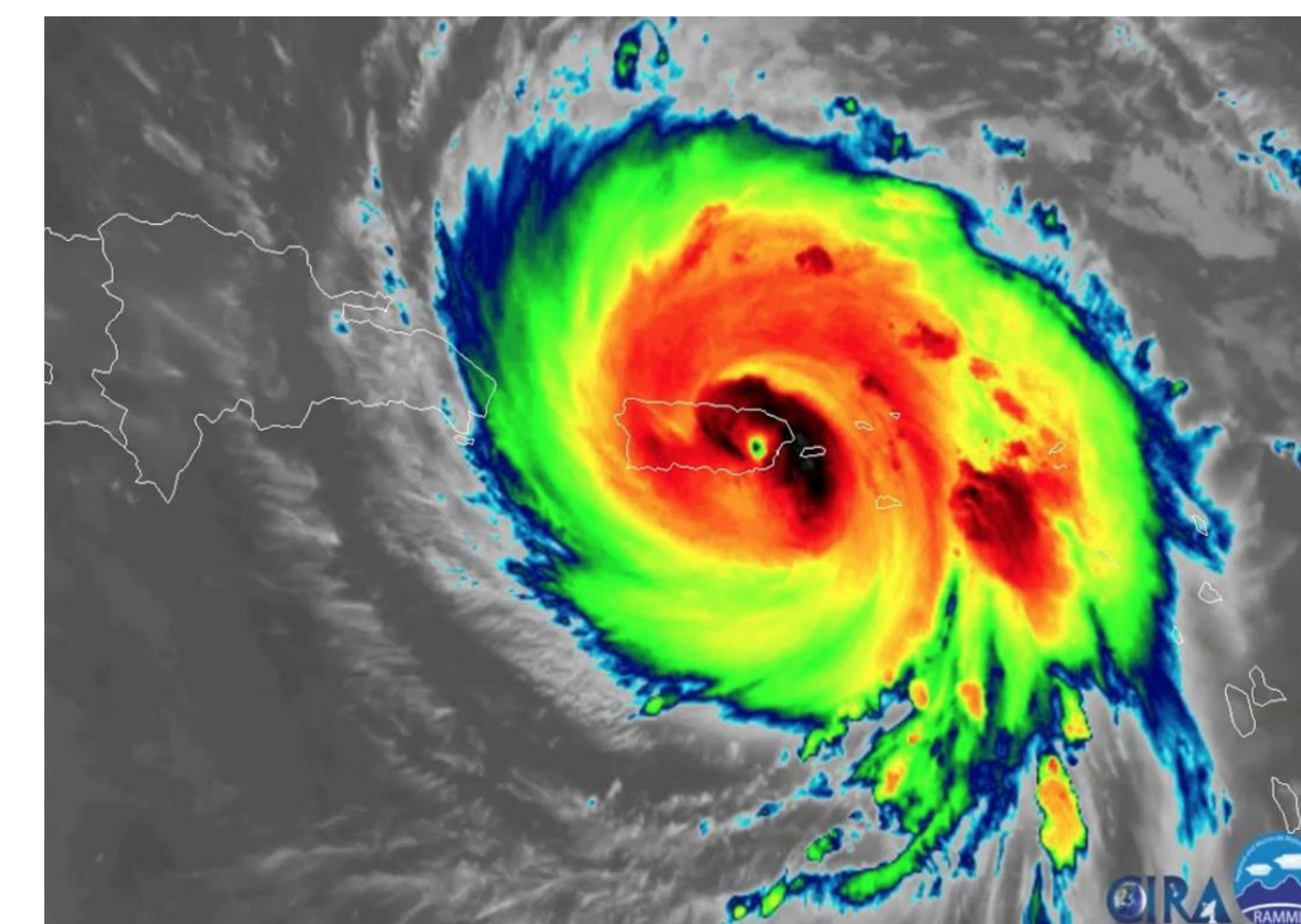
Results February 1, 2018

Results February 26, 2018



The tap water results show no bacteria except for the unfiltered sample, enterococci (2 CFU/100 ml) which is most likely due to contact contamination.

The tap water results show no bacteria except for the Sawyer filter sample, total coliform(6.5 CFU/100 ml), E. coli (1 CFU/100 ml) which is most likely due to contact contamination.



100% of power supply was cut off and access to clean water and food became limited for most.

### Conclusion

The importance of access to safe drinking water became critical in the months after Hurricane Maria hit Puerto Rico.

Our research found that water filters can drastically reduce the bacterial levels found in untreated water. All four of the filters produced similar results of zero or small of bacterial presence compared to the unfiltered water. The small presence of bacteria in the filtered water was possibly due to contact contamination which is a factor we will need to address in future testing.

As we prepare to enter hurricane season again, these findings will help the people of Puerto Rico, and around the world, to access safe drinking water.

### Acknowledgements

Mr. Steve Tamer, Rincon Surfrider Foundation

<https://rincon.surfrider.org/>

Water filters donated by:

- Water Filters for Puerto Rico <https://waterfiltersforpr.com/>
- Waves4Water <http://www.wavesforwater.org>

### Introduction:

Hurricane Maria left all systems on Puerto Rico inoperable. This led our team to assume that the water running through the taps was unchlorinated with high bacterial levels. After Hurricane Maria it took several months before our tap water was properly treated. Safe drinking water was essential and the filters were highly valuable for people on the island. Drinking contaminated water leads to a range of health issues, putting additional pressure on the already strained hospital services.

### Research question:

*How can we verify that the water being filtered was safe enough for consumption?*

### Methods:

Four different filters were tested using irrigation water and tap water on February 1 and 26, 2018.

We collected 100ml samples from the four different filters and unfiltered irrigation water and tap water were run through the Colibert and Enterolert bacterial tests . The water samples incubated overnight (24hr period) for analysis the following day.

To test for enterococci, the samples were placed under a black light and if illuminated, then the sample would be positive for the enterococcus bacteria.

To test for E.coli and total coliform, the sample would turn yellow if it was positive for coliforms and if it would iridesce, then it would be positive for E.coli.