WATER CHAMPIONS CASE STUDY

Lower Cape May Regional High School

Business Partner: Little Danny's Ice Cream

Lower Cape May Regional (LCMR) High School participated in the Water Champions Program between 2018 and 2019. The engaged high school students conducted water audits at the high school and five local businesses to determine where water saving practices could best be implemented. Retrofits were conducted at LCMR High School, LCMR Intermediate School, and one business, Little Danny's Ice Cream. After a successful presentation by the students, the school board elected to update all of the restroom fixtures at both schools, resulting in the installation of 118 new water saving bathroom devices. One fixture was updated at the local business. These retrofits are estimated to result in an *annual* reduction of three million gallons of water used, $15,500 saved, and a greenhouse gas reduction of 7.86 MTCO2e across the three locations. Throughout the duration of the case study project period (2018-2023), this has amounted to a *total* estimate of nearly 15 million gallons of water reduced, $77,500 saved, and a greenhouse gas reduction of 39.3 MTCO2e across the three participating sites.

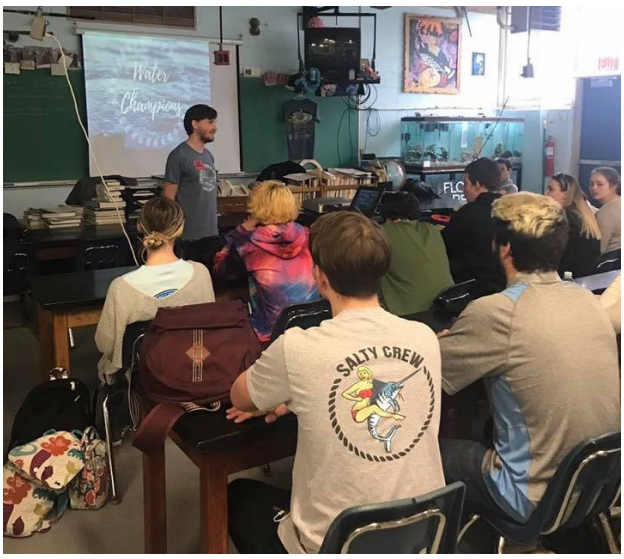
Background

Lower Cape May Regional High School in Cape May, NJ was the third school in the Cape May region to be recruited under the 2016-2023 Water Champions grant. The program was implemented in Jeff Martin's Environmental Science class in 2018. The students received 10 sessions of water conservation education presented by the American Littoral Society (ALS) in which they learned about Cape May's saltwater intrusion issues, responsible water management, and were trained to conduct water audits. The students were tasked with researching technological and behavioral water usage habits in their homes, school, and local businesses before conducting audits at each of these locations.

The goal of the audits was to identify old and wasteful fixtures such as faucets or toilets that could be replaced with high efficiency WaterSense or WaterSense equivalent models in order to conserve water across their community. These products are certified to use at least 20 percent less water than regular models, which results in cost and energy savings once installed. By conserving water, these devices reduce the amount of energy used to pump, treat, deliver, and heat water, which reduces greenhouse gas (GHG) emissions. The reduced water use also results in a lower water and electric bill. Thus, the upgrades to fixtures identified through the audits save water, reduce costs, and indirectly save energy.

Case Study Highlights

- **Location**: Cape May, NJ
- **Retrofitted Sites**: LCMR High School, LCMR Intermediate School, and Little Danny's Ice Cream
- **Case Study Project Period**: 2018-2023
- **Devices Replaced**: 119 devices (50 toilets, 52 bathroom sinks, and 17 urinals) across three locations
- **Project Period Water Savings:** An estimated 15 million gallons across three locations
- **Project Period Cost Savings:** An estimated $77,500 across three locations
- **Project Period GHG Emission Reduction:** An estimated 39.3 $MTCO_2e$ across three locations



ALS instructor Zach Nickerson conducting a Water Champions lesson for Mr. Martin's Environmental Science class at Lower Cape May Regional High School.

Water Audits

After completing their home audits as homework, the students conducted a water audit of the high school with the help of ALS. Based on the findings of the audits, the students identified facilities that could be prioritized to be retrofitted using Water Champions grant funding.

In addition to the school audits, the students conducted water audits of five local businesses. Rather than conducting the audits with the direct help of ALS as had been done with other participating schools, the students were assigned to do them as homework. Without ALS staff to guide them, the students struggled with the audits, which resulted in lower quality business audit data. This indicated to ALS that students need more direct assistance and oversight from staff or teachers to ensure that they understand how the audits are conducted and that collected data is reliable. Business audits done with subsequent participating schools kept this lesson in mind. Two of the five audited businesses were initially chosen to receive funding for retrofits, Aloha Smoothie Company and Little Danny's Ice Cream. Retrofits were ultimately only implemented at Little Danny's Ice Cream due to coordination issues with Aloha Smoothie Company.

As part of the program, the students presented the school audit results to their school board, the Lower Cape May Regional Board of Education. During the presentation, they gave an overview of the Water Champions program and described their reasoning for what restrooms should be prioritized for replacement.

Thanks to the hard work of the students, the presentation was a success; the school board was so impressed that they decided to independently fund school-wide retrofits at both the high school and intermediate school, going far beyond the students' hopes for what could be done under the grant.

Due to the successful program work resulting in the replacement of all bathroom fixtures at both schools, Lower Cape May Regional High School was awarded a Sustainable Jersey Grant to install two cisterns for their greenhouse with educational signage. Part of that grant money was also allocated to repeating the Water Champions program with another class, as well as funding additional business audits that may be upgraded through Water Champions in the future. This program was delayed due to COVID-19.

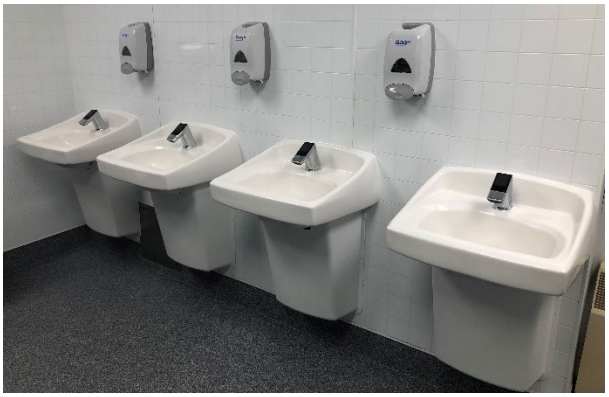
Installations & Measurable Results

After receiving Water Champions grant funding and the school's decision to replace the remaining restrooms across the high school and intermediate school, 118 new devices were installed across the two schools – 49 toilets, 52 bathroom sinks, and 17 urinals. The students calculated that these retrofits would result in nearly three million gallons of water saved per year. Using the EPA's 2022 Pollution Prevention (P2) Cost and Greenhouse Gas Calculators, it is estimated that the water use reduction could save the schools around $15,500 per year and reduce their greenhouse gas footprint by 7.86 metric tons of carbon dioxide equivalent (MTCO2e) annually. Since the installation of the devices in 2019, the schools are estimated to have saved 15 million gallons of water, $77,500, and has had a GHG reduction of 39.3 MTCO2e.

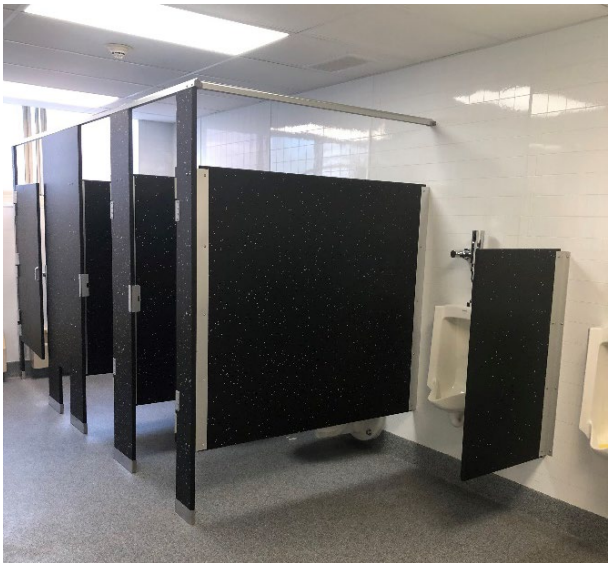
In order to better understand the true water savings achieved by the program, LCMR High School and Intermediate School water usage reports were collected from before and after the retrofits were installed. Comparing submitted water usage data from 2017 to 2022, the DEP found that there was an estimated annual one million gallon reduction, which is less than the student's annual audit estimate of three million gallons. However, this calculation is based on limited data that does not fully account for confounding variables such as seasonal or multi-year variability and may include data from additional locations that are beyond the scope of the project. Therefore, these values should still be considered estimates. The collection of additional water usage data would result in a more accurate and robust measure of the program's impact on water savings.

Little Danny's Ice Cream installed one new device, a water efficient toilet, which is estimated to save at least 1,000 gallons of water annually. Using the P2 Calculators, this could save the business approximately $5 a year and result in an annual greenhouse gas reduction of 0.003 MTCO2e. Since the installation of the device in 2019, the ice cream shop is estimated to have saved 5,000 gallons of water, $25, and has had a GHG reduction of 0.015 MTCO2e.

In summary, it is estimated that throughout the duration of the Lower Cape May Regional High School Water Champions grant project period, from the 2019 retrofit installations to the project period end in 2023, there has been a cumulative total of around 15 million gallons of water reduced, $77,500 saved, and a GHG reduction of 39.3 MTCO2e across the participating sites. Due to the commitment of the students, the support of local leadership, and the scale of retrofits completed during this project, the Lower Cape May Regional High School Water Champions Program was the most successful implementation of the 2016-2023 grant with the EPA, despite setbacks with local business participants. The DEP hopes that LCMR High School will serve as a model for decisive water conservation action to other schools across New Jersey.



Lower Cape May Regional High School restroom with newly installed high efficiency WaterSense sinks.



Lower Cape May Regional High School restroom with newly installed high efficiency WaterSense toilets and urinals.

Acknowledgements

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NJ Department of Environmental Protection
Division of Water Supply & Geoscience

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