GREEN CENTER CUBIE-BASED URINE DIVERSION STUDY

59 participants in 39 homes

Preliminary Report (1/22/24)

When Falmouth began to explore the potential of urine diversion (UD) to manage nitrogen, it could find no data from any project in the world to show how much urine could practically be diverted.

This study is the first of its kind to get data of collecting urine, measuring volume and testing nitrogen and phosphorus concentration in urine on a household level.

Waterless unisex "Cubie" urinals and "Pee-Toilets"

"Cubie"

55-gallon drums for urine storage

Participating households paid for the Cubies, drums, labor and lab costs for tests and writing of final report.
For two months participants collected urine with Cubies and stored collected urine in 55-gallon drums.
After approx. two months MASSTC (Massachusetts Alternative Septic System Technology Center):
- measured the urine volume of each barrel
- mixed the content and took urine samples
- sent samples to Barnstable Water Quality Laboratory to measure total nitrogen and total phosphorus concentrations

A Final Report on 41 households will be prepared by MASSTC [39 samples are completed, still waiting for 2 results]

For more information contact Green Center info@greencenterinc.com

Preliminary Report Results from 39 households after **2 months of urine collection**

Average number of participants/home:	1.51 pers/home
Average amount of urine collected/home:	30.80 gallons
Average amount of nitrogen diverted/home:	1.67 lbs
Average amount of nitrogen diverted/pers:	1.30 lbs
Average amount of phosphorus diverted/pers:	0.74 lbs
pH range 4.4 to 9.7 Average pH:	8.20 pH

Preliminary Report Extrapolated to **one year of urine collection**

Urine volume/home:	178.70 gallons
Nitrogen diverted/home:	9.67 lbs
Nitrogen diverted/person:	6.40 lbs
Phosphorus diverted /person:	0.43 lbs

In 2001 *the Massachusetts Estuaries Project (MEP) report was created to help determine the 2001 nitrogen loads to southeastern Massachusetts estuaries and evaluate reductions that would be necessary to support healthy ecosystems. A Total Maximum Daily Load (TMDL) of nitrogen was established for each watershed.*

- Based on this MEP report, Falmouth's "Great Pond Targeted Watershed Management Plan" will remove 2890 kg of nitrogen (N) by sewering 811 homes (properties) .
- Each home/property in Falmouth is assumed to have 2.2 residents.
- If urine was diverted at the same rate as in our study, each home would remove 2.2 x 6.4 = 14.1 lbs N or 6.4 kg and 811 homes would remove 5,185 kg of N.
- Nitrogen in wastewater from a home is reduced (attenuated) by 30% as it moves from a home to the estuary.

If urine was diverted at the same rate as in our study,
811 homes using urine diversion would prevent 3,630 kg N from reaching the estuary.
(70% of the 5,185 kg diverted).
This is 25% more than the 2890 kg N to be removed by sewering 811 homes in the Great Pond Watershed.