Syracuse University
Maxwell School of
Citizenship & Public Affairs

Maxwell X Lab

Coastal Risk Message and Septic Tank Replacement Survey Results

Survey Design

This survey aimed to understand how homeowners who are 18 years of age or older, who live near a body of water, and who own a septic tank assess flood risk. All four of these conditions had to be met to remain in the study. Each survey respondent was randomly assigned to one of three groups:

1. Control (n=160)
2. Treatment group 1 - given information on the likelihood of a 100-year flood over the life of a 30-year mortgage (n=158)
3. Treatment group 2 - given information on the depth of water inundation conditions for property with a 100-year flood (n=159).

The survey was administered virtually using Syracuse University's Qualtrics software. The survey was distributed starting June 14th, 2022. The last day data were collected was June 23rd, 2022.

Survey Questions

The survey consists of thirteen items across three different categories: screener questions, demographic information, and experimental outcomes. See the Appendix for the complete survey. Screening questions ensured all participants were homeowners, had a septic system, lived in a coastal area, and were 18 years of age or older. We then asked demographic questions, including age, sex, race, income, education, and property type.

For the experiment, all respondents were given information about the consequences of floods for those with septic systems and provided pictures of homes damaged by flooding (see the Appendix for the information and the pictures). Each treatment group was then asked to consider their property when reading a vignette and to answer questions afterward. See the box below for the actual content of the vignette. The control group was not given a vignette.

Treatment 1	*Treatment 2*
A commonly misunderstood term is the one-hundred-year flood plain because people in these areas can experience severe flooding more often than once every 100 years. A local government agency recently completed an analysis of flood risk for your home. They assessed the likelihood that your property will be flooded at least once over the next 30 years is 85%.	A local government agency recently completed an analysis of flood risk for your home. They estimate that a one-hundred-year flood will create a water level about 10 inches higher than the lowest point on your property.

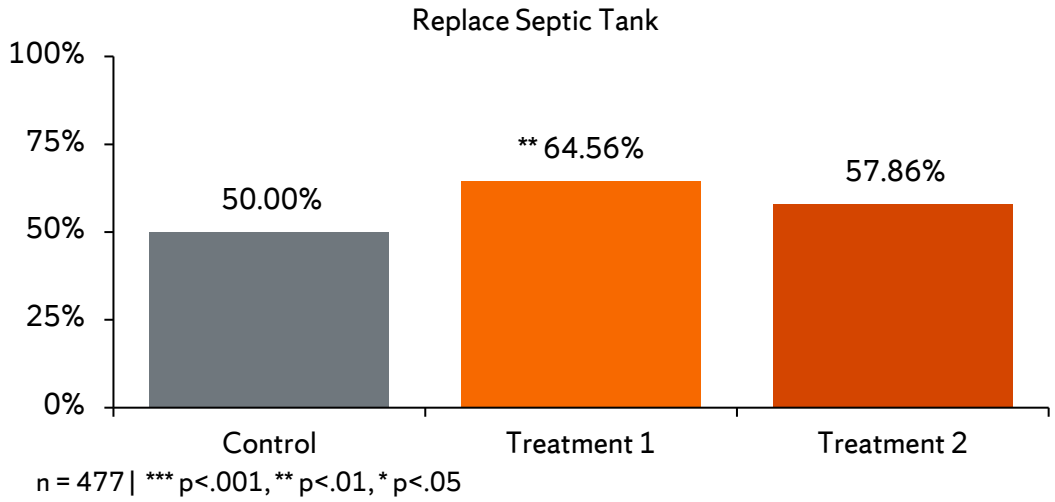
All respondents were then asked to answer (yes or no) the following two questions:

1. A new septic system, which can withstand severe flooding, costs approximately $16,000. Are you considering replacing your septic system in the next year?
2. Imagine the local government offers to subsidize septic tank replacement in your community. If this program would increase your annual property taxes by $75-100, would you support it?

Results

The survey experiment suggests that respondents in both treatment groups were more likely to report that they are considering replacing their septic tank relative to the control group. Figure 1 shows that those in treatment 1 group were almost 15 percentage points more likely to respond that they are considering replacing their septic system in the next year compared to the control group.

Figure 1.

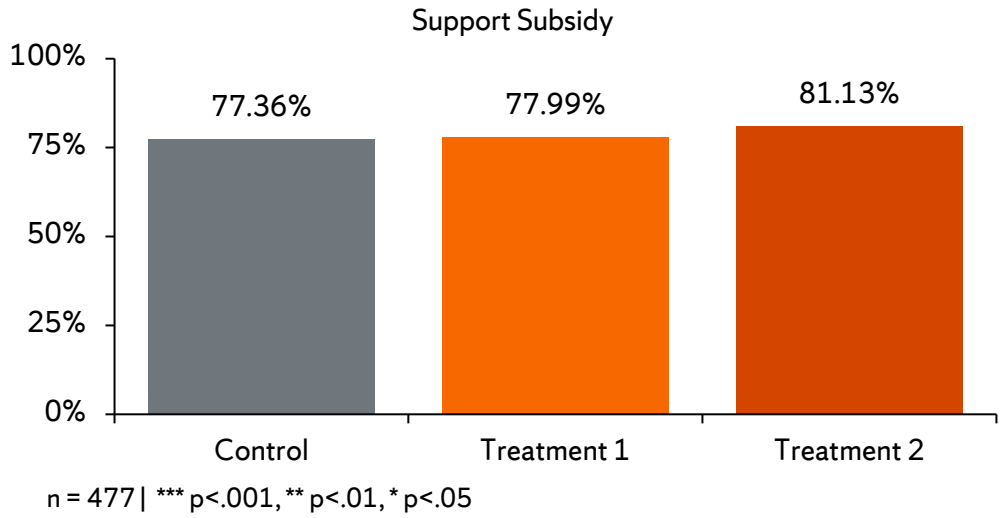


Treatment group 2 also reported a higher likelihood of replacing their septic system, about eight percentage points, but that difference was not statistically different from the control group.[1]

Figure 2 shows responses for the experimental groups to the question asking about subsidy support. Importantly, over three-quarters of all respondents supported such a program. Further, there is little variation in the response among the control and treatment groups. Treatment group 1 had a nearly identical proportion supporting the proposal. Treatment group 2 respondents were about four percentage points more likely to support the subsidy, but this difference is not statistically significant.

[1] We also ran tests to compare the coefficients on the two treatment groups, and none were statistically significant.

Figure 2.



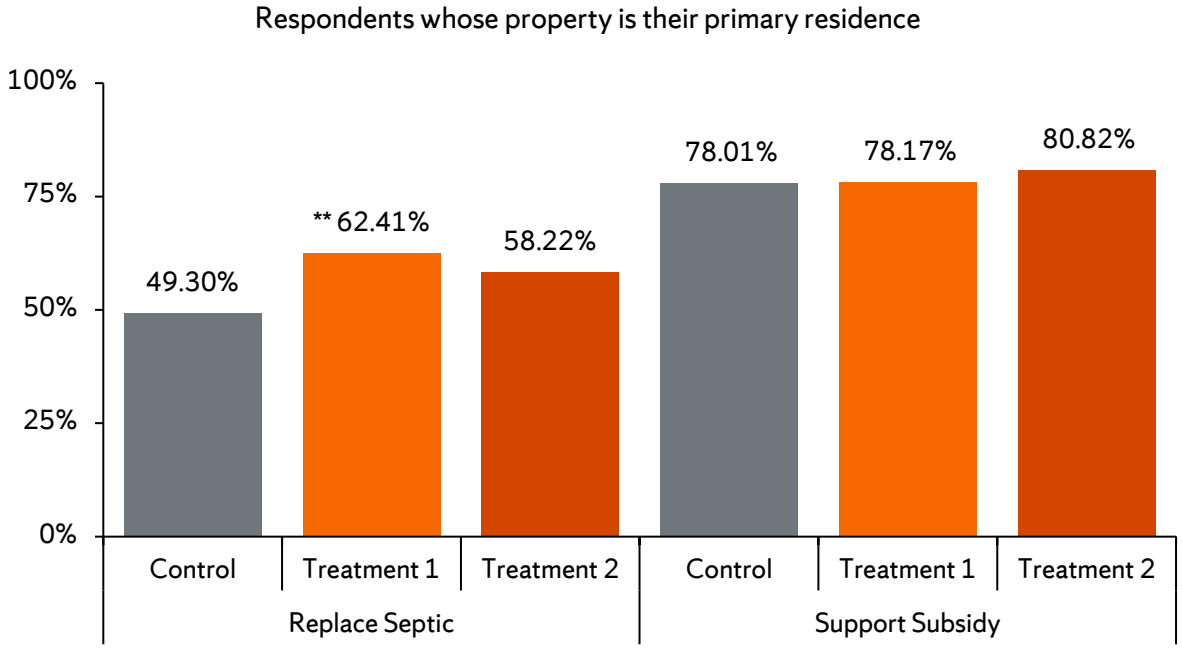
In addition to the models run for the pooled sample reported above, we also partitioned the results by property type and income level.

Property Type

Figure 3 shows the variation in the experimental outcomes for respondents who reported their property was their primary residence (90 percent of the sample).[2] Similar to the full sample, treatment group 1 was more likely to say they would replace their septic tank relative to control by around 13 percentage points. Those in treatment group 2 were also more supportive, but that difference was not statistically significant. Again, there is broad support for the subsidy program and little variation across the control and treatment groups.

[2] We do not report the results by property types for vacation homes (eight percent of the sample) and investment properties (two percent of the sample) because the sample sizes were too small.

Figure 3.



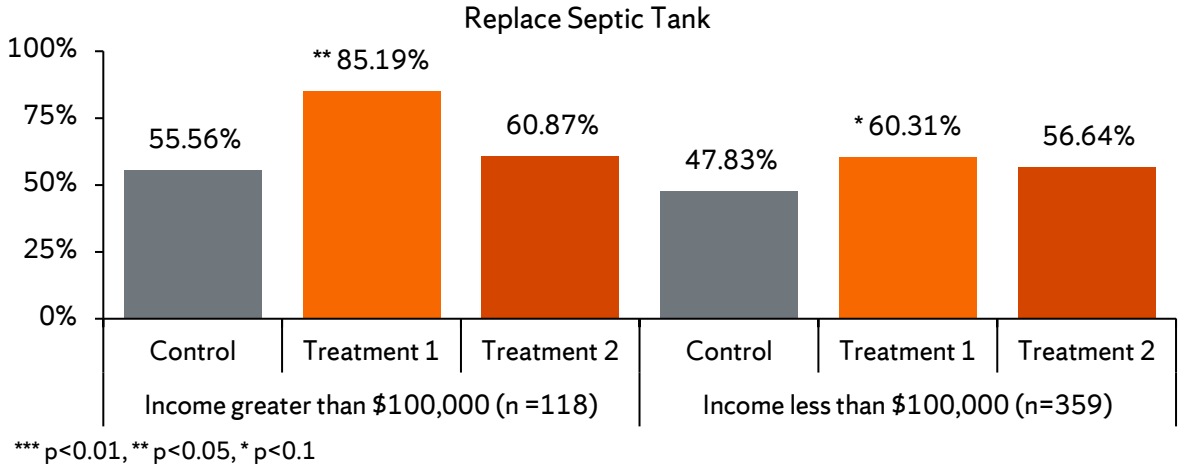
n = 429 | *** p<0.001, ** p<0.01, * p<0.05.

Income

Outcomes varied somewhat across respondents in different income groups. Figure 4 shows responses regarding the likelihood of replacing their septic tank in the next year for two groups: those with incomes over $100,000 (the highest income category) and the rest of the sample. Perhaps unsurprisingly, the more affluent homeowners were more likely to report that they intended to replace their septic tank in the next year relative to the less affluent group. Based on groups means, 56 percent of those with incomes over $100,000 reported that they were likely to replace their septic systems compared to 48 percent of those with incomes below $100,000. Further among the affluent group, those in treatment group 1 were nearly 30 percentage points more likely to say yes to replacing their septic tank than the control group. For those with income less than $100,000, treatment group 1 was about 12.5 percentage points higher than the control group. For respondents in treatment 2, there was a five percentage point increase relative to control for the more affluent homeowners and a nine percentage point increase for the less affluent homeowners relative to control. Neither result for treatment 2 was statistically significant, however.

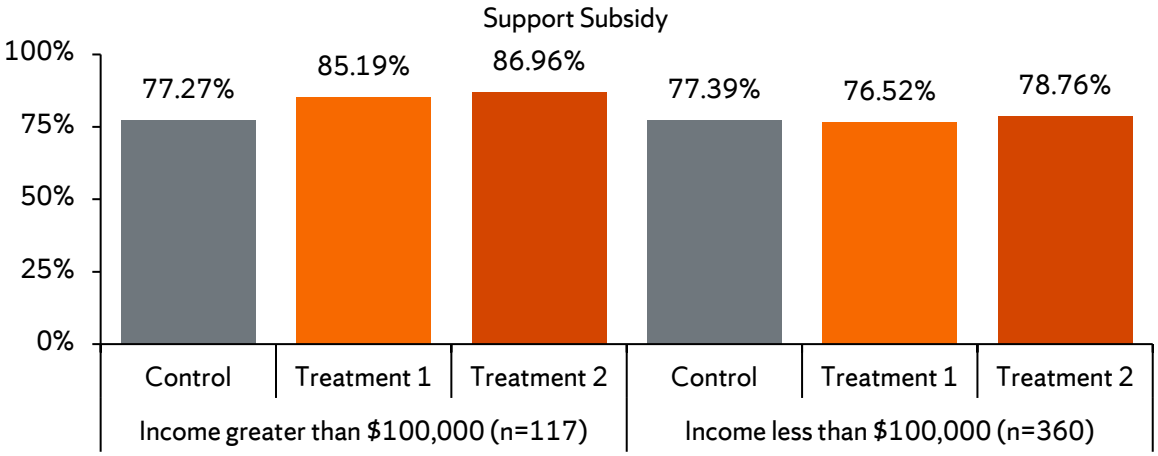
Figure 5 shows responses for the septic tank replacement subsidy by income group. Again, there is strong support for this type of program across the experimental groups. Relative to the control group, however, there is little difference in support for the treatment groups.

Figure 4.



*** p<0.01, ** p<0.05, * p<0.1

Figure 5.



*** p<.001, ** p<.01, * p<.05

Findings

This study was designed to estimate the importance of flooding messages to homeowners who had residential property near a body of water. It is unclear how much the priming that was done in the introduction to the survey - the information on the consequences of flooding for those with septic tanks and the photographs - affected the baseline levels reported (i.e., the control group's responses). Because all experimental groups were given this information, the baseline levels reported may have been higher than would have been the case without the priming information. Future studies might investigate this issue. With respect to the messaging, a couple of findings surfaced.

1. Around half of the control group reported being likely to replace their septic systems in the next year. Messages (treatment 1) that provided information on the probability of flooding at least once over the next year 30 years appear to be particularly effective at increasing the likelihood of septic system replacement. Reporting the height of the flood also seems to increase the reported likelihood of septic system replacement, but the differences relative to the control for this outcome were never statistically significant.
2. There seems to be high support for the tax and subsidy program among all respondents. Messaging did not appear to affect their level of support.

Appendix.

Coastal Flooding: Risk Assessment Testing

Start of Block: Intro

My name is Leonard Lopoo, and I am the Director of the Maxwell X Lab at Syracuse University. My team and I are conducting a short survey to improve our understanding of concerns about flooding in residential communities near lakes, rivers, creeks, and oceans. The survey should last around 5 minutes and will ask you several basic demographic questions. In addition, we provide some information on flooding and ask your opinion about it as it relates to your property. Your individual responses will remain completely anonymous. Thank you again; we really appreciate your help!

End of Block: Intro

Start of Block: Screener

Q1. Are you a homeowner?

- Yes (1)
- No (2) [If no, drop]

Q2. Do you live near a body of water (a lake, river, or ocean)?

- Yes (1)
- No (2) [If no, drop]

Q3. Do you have a septic system?

- Yes (1)
- No (2) [If no, drop]

Q4. Are you 18 years of age or older?

- Yes (1)
- No (2) [If no, drop]

Q5. For this research project, careful attention to survey questions is critical! To show that you are paying attention, please select "I have a question."

- I understand (1)
- I do not understand (2)
- I have a question. (3)

[If incorrect]

Q6.You didn't select the correct answer to our last question. Your attention to the survey questions is very important to our research, so we'd like to give you another chance to respond. To show that you are paying attention, please select "I have a question."

- I understand (1)
- I do not understand (2)
- I have a question. (3)

[If incorrect]
Q7. You have answered our questions incorrectly. We can only accept surveys from people who are paying attention so we are ending this survey.

[If correct]

End of Block: Screener

Start of Block: Demographic Questions

Q8. What is your age?

- Under 18 (1)
- 18 - 24 (2)
- 25 - 34 (3)
- 35 - 44 (4)
- 45 - 54 (5)
- 55 - 64 (6)
- 65 - 74 (7)
- 75 - 84 (8)
- 85 or older (9)

Q9. What is your race? You can select multiple.

- Hispanic or Latino (1)
- White (2)
- Black or African American (3)
- Native Hawaiian or Other Pacific Islander (4)
- Asian (5)
- Native American or Alaska Native (6)
- Other (7) _____

Q10. What is your sex?

- Male (1)
- Female (2)
- Intersex (3)
- Prefer not to say (4)

Q11. Please check your highest level of education completed.

- No high school (1)
- High school diploma (2)
- Associate degree (3)
- Bachelor's degree (4)
- Master's degree (5)
- Professional degree (6)
- Doctorate degree (7)

Q12. Please check the most appropriate category for your coastal property.

- Primary residence (1)
- Vacation home (secondary home) (2)
- Investment property (property you rent for additional income) (3)

Q13. What was your total household income last year?

- Less than $25,000 (1)
- $25,000-$50,000 (2)
- $50,001-$75,000 (3)
- $75,001-$100,000 (4)
- Greater than $100,000

End of Block: Demographic Questions

Start of Block: Survey Experiment Introduction

Properly maintained septic systems have little to no effect on nearby waterbodies and groundwater. However, a significant flood can affect the nutrients in wastewater leading to algae blooms and aquatic plant growth. Further, these pollutants can affect drinking water supplies making them unsafe. In addition, residential plumbing systems can become overwhelmed making lavatories inoperable for extended periods of time and potentially leading to raw sewage backflows into the home.

End of Block: Survey Experiment Introduction

Start of Block: Survey Experiment

[Control group]

Q14. A new septic system, which can withstand severe flooding, costs approximately $16,000. Are you considering replacing your septic system in the next year?

- Yes (1)
- No (2)

Q15. Imagine the local government offers to subsidize septic tank replacement in your community. If this program would increase your annual property taxes by $75-100, would you support it?

- Yes (1)
- No (2)

[Treatment group 1]

Imagine you were given the following information about your property. Please read it and answer the following two questions:

> A commonly misunderstood term is the one-hundred-year flood plain because people in these areas can experience severe flooding more often than once every 100 years. A local government agency recently completed an analysis of flood risk for your home. They assessed the likelihood that your property will be flooded at least once over the next 30 years is 85%.

Q16. A new septic system, which can withstand severe flooding, costs approximately $16,000. Would you consider replacing your septic system in the next year?

- Yes (1)
- No (2)

Q17. Imagine the local government offers to subsidize septic tank replacement in your community. If this program would increase your annual property taxes by $75-100, would you support it?

- Yes (1)
- No (2)

[Treatment group 2]

Imagine you were given the following information about your property. Please read it and answer the following two questions:

> A local government agency recently completed an analysis of flood risk for your home. They estimate that a one-hundred-year flood will create a water level about 10 inches higher than the lowest point on your property.

Q18. A new septic system, which can withstand severe flooding, costs approximately $16,000. Would you consider replacing your septic system in the next year?

- Yes (1)
- No (2)

Q19. Imagine the local government offers to subsidize septic tank replacement in your community. If this program would increase your annual property taxes by $75-100, would you support it?

- Yes (1)
- No (2)

End of Block: Survey Experiment