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IN AGRICULTURE AND NATURAL RESOURCES

Final Report

Florida Homeowners' Knowledge,
Perceptions, and Informational Needs
Regarding Septic to Sewer Conversion

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Executive Summary

Public Perceptions of Septic to Sewer Conversion
UF/IFAS
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Key Findings

Knowledge

- The average score on the objective knowledge assessment was 54.7%, indicating respondents had some knowledge of septic to sewer conversion topics.
- Analyses of responses to individual objective knowledge questions indicated respondents were slightly more knowledgeable of septic system-related topics than sewer system-related topics.
 - 64.8% of respondents correctly identified a diagram of a septic system as a septic system, whereas only 57.1% of respondents correctly identified a diagram of a sewer system as a sewer system.
 - Regarding system maintenance responsibility, 82.8% of respondents correctly identified who was primarily responsible for the maintenance of septic systems, while only 48% of respondents correctly identified who is primarily responsible for the maintenance of sewer systems.
 - However, only 33.1% of respondents correctly identified how often a household septic system typically needs to be pumped out.
- Respondents' self-perceived knowledge reflected what was observed in their answers to the objective knowledge assessment.
 - Respondents agreed they are aware of homeowners' responsibility or the maintenance of septic systems ($M = 5.09$; $SD = 1.06$), and they agreed relatively less that they are aware of homeowners' responsibility for the maintenance of sewer systems ($M = 4.54$; $SD = 1.45$).
 - Further, respondents only slightly agreed they are aware of the financial costs associated with septic to sewer conversion ($M = 4.49$; $SD = 1.50$) and the steps involved in septic to sewer conversion ($M = 4.15$; $SD = 1.66$).

Attitude

- Overall, respondents had only slightly positive attitudes toward converting from a septic system to a sewer system ($M = 1.31$; $SD = 1.32$).
 - Further analysis of individual items revealed respondents perceived the conversion as more useful than useless ($M = 1.71$; $SD = 1.52$), more beneficial than harmful ($M = 1.68$, $SD = 1.49$), and more possible than impossible ($M = 1.67$; $SD = 1.55$).
 - Respondents were more neutral in their perceptions of whether septic to sewer conversion is difficult or easy ($M = .55$; $SD = 2.13$) and had slightly negative attitudes regarding whether the conversion was affordable ($M = -.09$; $SD = 2.33$).

Benefits and Barriers

- Respondents agreed with all items as benefits of septic to sewer conversion.
 - Of the items, respondents agreed most that converting from a septic system to a sewer system reduces maintenance burdens on homeowners ($M = 4.13$; $SD = .95$) and frees up land for other purposes ($M = 3.93$; $SD = .98$)
 - They agreed relatively less that converting from a septic system to a sewer system makes them a better neighbor ($M = 3.69$; $SD = 1.07$).



- The barriers respondents agreed with to a greater extent than others were primarily external-type barriers.
 - The primary external-type barriers included lack of available hook-up ($M = 3.78$; $SD = 1.24$), upfront financial costs ($M = 3.78$, $SD = 1.22$), and the costs of paying a monthly sewer bill ($M = 3.51$; $SD = 1.23$).
 - The internal-type barrier respondents most agreed with compared to others was lack of desire to convert from a septic to sewer system ($M = 3.44$; $SD = 1.33$).
- The barriers respondents agreed with to a lesser degree than the other barrier items were fear of large-scale sewer spills ($M = 3.26$; $SD = 1.34$) and not having time to think about converting from a septic system to a sewer system ($M = 3.16$; $SD = 1.34$).

Diffusion of Innovations

- Overall, respondents agreed sewer systems were relatively more advantageous than septic systems ($M = 3.90$; $SD = .91$).
 - Of the individual items, respondents agreed most that sewer systems cause less trouble for homeowners than septic systems.
- Regarding compatibility, respondents overall agreed ($M = 3.73$; $SD = 1.08$) with septic to sewer conversion as being compatible with their needs, values, and beliefs.
 - Specifically, respondents agreed that all communities should convert from septic systems to sewer systems ($M = 3.77$; $SD = 1.17$) and that converting to a sewer system is the responsible thing to do ($M = 3.77$; $SD = 1.15$).
 - Compared to the other compatibility items, respondents agreed slightly less that converting to a sewer system is compatible with their current lifestyle ($M = 3.66$; $SD = 1.20$; see Table 7).
- Regarding complexity, respondents demonstrated overall neutral views ($M = 2.89$; $SD = .99$) about their perceived complexity of converting from a septic system to sewer system.
- Similarly, respondents held neutral views ($M = 3.16$; $SD = 1.39$) regarding the observability of septic to sewer conversion, indicating a range of experiences among respondents.

Opinion Leaders

- Overall, the sources respondents were most likely to consult when seeking advice or information about septic to sewer conversion were county government officials ($M = 3.22$; $SD = 2.03$), followed by local wastewater utility ($M = 4.12$; $SD = 2.56$), and environmental organizations ($M = 4.13$; 2.43).

Information Sources and Behaviors

- More than half of the respondents ($f = 321$; 62%) had searched for information on septic to sewer conversion to some degree in the past year; however, a little over one-third of respondents ($f = 196$; 37.9%) had never searched for such information in the past year.
- Similarly, more than half of the respondents ($f = 316$; 61.1%) had received information related to septic to sewer conversion in the past year, while a little over one-third ($f = 201$; 38.9%) had not.
- Regarding how much information they had obtained about septic to sewer conversion from various sources, respondents obtained more information from local wastewater utility ($M = 2.30$; $SD = 1.34$), environmental organizations ($M = 2.17$; $SD = 1.41$), and friends or family members ($M = 2.16$; $SD = 1.38$) than the other sources listed.
- Regarding usefulness of informational topics, respondents perceived all topics as useful.



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- The topics identified as most useful were timelines of construction for the septic to sewer conversion project ($M = 4.04$; $SD = 1.02$) and information about the costs associated with septic to sewer conversion ($M = 4.02$; $SD = 1.09$).
- If respondents were to receive such information, they identified print materials mailed to them ($M = 4.03$; $SD = 1.08$), websites ($M = 4.02$; $SD = 1.06$), and short, online videos ($M = 3.82$; $SD = 1.15$) as the most useful methods of information delivery.



Background

This research was conducted as part of a nonpoint source management grant project, *Improving Septic to Sewer Conversion Campaigns through Community-Based Social Marketing*, funded by the United States Environmental Protection Agency. The purpose of this research component of the project was to examine Florida homeowners' knowledge, perceptions, informational needs, and communication preferences regarding septic to sewer conversion to help equip local leaders with the information and tools needed to facilitate homeowners' adoption of converting to a sewer wastewater treatment system.

Methods

The population of interest was Florida homeowners age 18 or older who were utilizing a septic system as their wastewater treatment system at the time the study was conducted. An online survey was distributed via a public opinion survey research company, Qualtrics, to Florida residents. Qualtrics recruits respondents using traditional, actively managed market research panels and social media platforms. To help exclude duplication and ensure validity, Qualtrics employs digital fingerprinting technology and IP address checks, and works with panel partners who also employ such methods to obtain non-probability opt-in samples in market research (Qualtrics, 2019).

Data were collected in September 2020. An online link to the instrument was distributed to a total of 1,604 residents, with a targeted sample goal of 500 respondents to represent the state population. An initial pilot test of 50 respondents was conducted to check survey function, data quality, and reliability of scales. Attention filters (e.g. select "strongly agree" for this answer) were used to identify respondents not paying attention to the questions. Respondents who (a) did not complete all items of the instrument, (b) did not select the appropriate answer to attention filters, and (c) did not fall within the parameters of being a Florida homeowner, 18 years of age or older, and currently on a septic system were excluded from analyses. Useable responses were obtained from 517 residents for a 32% participation rate.

A researcher-developed questionnaire was used as the instrument for this study. The instrument was assessed for face and content validity by a panel of experts that consisted of a UF/IFAS Extension agent, two environmental specialists with Brevard County Natural Resources Management District, and the director of the Brevard County Natural Resources Management District. Internal consistency reliability of scales was calculated using Cronbach's alpha. Data analysis consisted of descriptive statistics (e.g. frequencies, percentages, means, and standard deviations).



Results

About Respondents

Demographic information about respondents is displayed in Table 1.

Table 1. Personal characteristics of respondents

Variable	<i>f</i>	%
Gender		
Male	294	56.9
Female	222	42.9
Other/Non-binary	1	0.2
Age		
18 to 19	1	0.2
20 to 29	31	6.0
30 to 39	130	25.1
40 to 49	162	31.3
50 to 59	67	13.0
60 to 69	73	14.1
70 to 79	49	9.5
80 or older	4	0.8
Race		
White	473	91.5
Black	11	2.1
Asian	10	1.9
American Indian	3	0.6
Multi-racial	10	1.9
Other	10	1.9
Ethnicity		
Hispanic/Latino(a)/Chicano(a)	66	12.8
Not Hispanic/Latino(a)/Chicano(a)	451	87.2
Education		
Less than 12 th grade (did not graduate high school)	1	0.2
High school graduate (includes GED)	63	12.2
Some college, no degree	51	9.9
2-year college degree (Associate, Technical, etc.)	75	14.5
4-year college degree (Bachelor's, etc.)	118	22.8
Graduate or professional degree (Master's, Ph.D., M.B.A., etc.)	209	40.4
Income		
\$24,999 or less	48	9.3
\$25,000 to \$49,999	82	15.9
\$50,000 to \$74,999	86	16.6
\$75,000 to \$149,999	173	33.5
\$150,000 to \$249,999	98	19.0
\$250,000 or more	30	5.8



Information about respondents' residential characteristics was also collected (see Table 2). Respondents were primarily full-time Florida residents who lived in a single-family home in an urban or suburban area outside of city limits. Most respondents did not own rental properties, most had previously lived in a home with a sewer system of wastewater treatment, and roughly half of respondents had neighbors who used a sewer system. Full residential characteristics of respondents are displayed in Table 2.

Table 2. Residential characteristics of respondents

Variable	<i>f</i>	%
Florida Residency		
Full-time Florida resident	500	96.7
Part-time Florida resident	17	3.3
Years Lived in Florida		
Less than 1	6	1.2
1 to 9	107	20.7
10 to 19	106	20.7
20 to 29	69	13.3
30 to 39	99	19.1
40 to 49	74	14.3
50+	56	10.8
Type of Residence		
Single family home	460	89.0
Multi-unit complex (e.g., apartment, condo, etc.)	60	9.7
Other	7	1.4
Own Rental Property		
Yes	101	19.5
No	416	80.5
Area of Residence		
A farm in a rural area	23	4.4
Rural area, not a farm	72	13.9
Urban or suburban area outside of city limits	280	54.2
Subdivision in a town or city	98	19.0
Downtown area in a town or city	44	8.5
Rural Urban Continuum (RUC)		
Metro – Counties in metro areas 1 million population or more	322	62.3
Metro – counties in metro areas of 250, 000 to 1 million population	142	27.5
Metro – Counties in metro areas of fewer than 250,000 population	18	3.5
Nonmetro – Urban population of 20,000 or more, adjacent to a metro area	19	3.7
Nonmetro – Urban population of 2,500 to 19,999, adjacent to a metro area	14	2.7
Water Management District		
Northwest Florida	29	5.6
Suwannee River	13	2.5
Southwest Florida	123	23.8
St. Johns River	160	30.9
South Florida	192	37.1



Variable	<i>f</i>	%
County Type		
Springshed	168	32.5
Coastal	274	53.0
Neither Springshed nor coastal	75	14.5
Previously Lived in Home on a Sewer System		
Yes	374	72.3
No	123	23.8
Unsure	20	3.9
Have Neighbors on Sewer System		
Yes	257	49.7
No	178	34.4
Unsure	82	15.9

Knowledge

Respondents' subjective knowledge of septic/sewer system topics was assessed using eight items measured using a 6-point Likert-type scale of agreement. Overall, respondents agreed they are aware of homeowners' responsibility for the maintenance of septic systems ($M = 5.09$; $SD = 1.06$; see Table 2). They agreed relatively less that they are aware of homeowners' responsibility for the maintenance of sewer systems ($M = 4.54$; $SD = 1.45$). Respondents only slightly agreed they are aware of the financial costs ($M = 4.49$; $SD = 1.50$) and the steps involved in septic to sewer conversion ($M = 4.15$; $SD = 1.66$). Table 3 displays the full results for each item.

Table 3. Respondents' self-perceived knowledge of septic to sewer conversion topics

Item	<i>M</i>	<i>SD</i>	Interpretation
I am aware of homeowners' responsibility for maintenance of septic systems.	5.09	1.06	Agree
I know the advantages and disadvantages of having a septic system.	4.81	1.19	Agree
I know the advantages and disadvantages of having a sewer system.	4.75	1.27	Agree
I can explain the differences between how septic systems and sewer systems work.	4.61	1.41	Agree
I am aware of homeowners' responsibility for the maintenance of sewer systems.	4.54	1.45	Agree
I am aware of the upfront financial costs associated with septic to sewer conversion.	4.51	1.49	Agree
I am aware of the recurring financial costs associated with septic to sewer conversion.	4.49	1.50	Slightly agree
I am knowledgeable of the steps involved in septic to sewer conversion.	4.15	1.66	Slightly agree

Note. Construct Mean = 5.09 ($SD = 1.06$)

Note. Real limits: 1.00 to 1.49 = *strongly disagree*; 1.50 to 2.49 = *slightly disagree*; 2.50 to 3.49 = *disagree*; 3.50 to 4.49 = *slightly agree*; 4.50 to 5.49 = *agree*; 5.50 to 6.00 = *strongly agree*.

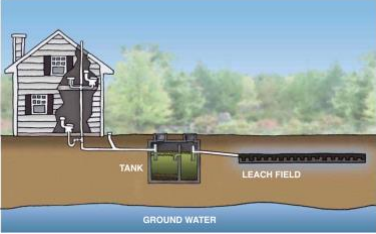
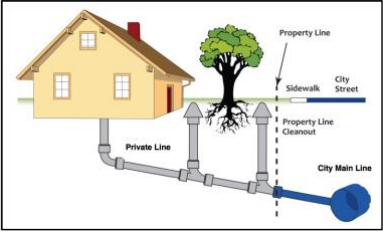
Respondents' objective knowledge of septic to sewer conversion topics was assessed using six multiple-choice questions. A test score was computed by dividing respondents' total number of correct answers by total number of possible answers multiplied by 100 (e.g., $5/6 * 100 =$ test score of 83.3%). Respondents total number of correct



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answers ranged from zero to six, with an average of 3.28 questions answered correctly for an average test score of 54.7%). Respondents' answers to each question are displayed in Table 4. Correct answer choices for each question are bolded.

Table 4. Respondents' answers per question on the objective knowledge assessment

Question	Answers	f	%
Which type of waste treatment system is depicted in this diagram?	A. Ground containment system B. Respiratory system C. Septic system D. Sewer system	127 21 335 34	24.6 4.1 64.8 6.6
			
Which type of wastewater system is depicted in this diagram?	A. Ground containment system B. Respiratory system C. Septic system D. Sewer system	110 42 70 295	21.3 8.1 13.5 57.1
			
Who is primarily responsible for the maintenance of residential septic systems?	A. Individual homeowner B. Government C. Local Wastewater Utility D. Nobody (it doesn't need to be maintained)	428 32 55 2	82.8 6.2 10.6 0.4
Who is primarily responsible for the maintenance of residential sewer systems?	A. Individual homeowner B. Government C. Local Wastewater Utility D. Nobody (it doesn't need to be maintained)	194 72 248 3	37.5 13.9 48.0 0.6
Which of the following best describes the costs typically associated with septic systems and sewer systems?	A. Both septic systems and sewer systems require homeowners to pay a monthly fee. B. Only septic systems require homeowners to pay a monthly usage fee. C. Only sewer systems require homeowners to pay a monthly usage fee. D. Neither septic nor sewer require homeowners to pay a monthly usage fee.	220 37 220 37	42.6 7.2 42.6 7.2
How often does a household septic system typically need to be pumped out?	A. Every 6 months B. Every 1-2 years C. Every 3-5 years D. Every 10 years	127 163 171 56	24.6 31.5 33.1 10.8

Note. Correct answers to each question are bolded.



Attitude Toward Septic to Sewer Conversion

Attitude toward converting from a septic system to a sewer system was measured using a 7-point semantic differential scale between 10 sets of bipolar descriptors (e.g., good/bad, harmful/beneficial). Responses were coded from -3 to +3, and a construct mean was computed to represent overall attitudes. The internal consistency reliability estimate for this scale was $\alpha = .92$.

Overall, respondents had only slightly positive attitudes toward converting from a septic system to a sewer system ($M = 1.31$; $SD = 1.32$). Further analysis of individual items revealed respondents perceived the conversion as more useful than useless ($M = 1.71$; $SD = 1.52$), more beneficial than harmful ($M = 1.68$; $SD = 1.49$), and more possible than impossible ($M = 1.67$; $SD = 1.55$). Respondents were more neutral in their perceptions of whether septic to sewer conversion is difficult or easy ($M = .55$; $SD = 2.13$) and had slightly negative attitudes regarding whether the conversion was affordable ($M = -.09$; $SD = 2.33$).

Perceived Benefits

Respondents' perceived benefits of converting from a septic system to a sewer system were assessed using eight items measured on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). A construct mean was computed to represent respondents' overall degree of benefit perceived for sewer system conversion. The internal consistency reliability estimate for this scale was $\alpha = .92$. Respondents agreed with all items as benefits of septic to sewer conversion (see Table 5). Of the items, respondents agreed most that converting from a septic system to a sewer system reduces maintenance burdens on homeowners ($M = 4.13$; $SD = .95$) and frees up land for other purposes ($M = 3.93$; $SD = .98$); they agreed relatively less that converting from a septic system to a sewer system makes them a better neighbor ($M = 3.69$; $SD = 1.07$).

Table 5. Respondents' agreement with benefits of converting from a septic system to a sewer system.

Item	<i>M</i>	<i>SD</i>	Interpretation
<i>"Converting from a septic system to a sewer system..."</i>			
Reduces maintenance burdens on homeowners	4.13	.95	Agree
Frees up land for other purposes	3.93	.98	Agree
Increases property values	3.89	1.03	Agree
Is better for human health	3.88	1.03	Agree
Improves environmental health	3.84	1.02	Agree
Reduces water pollution	3.78	1.07	Agree
Reduces storm-associated flooding on private properties	3.75	1.05	Agree
Makes me a better neighbor	3.69	1.07	Agree

Construct Mean = 3.86 ($SD = .82$)

Note. Real limits: 1.00 to 1.49 = *strongly disagree*; 1.50 to 2.49 = *disagree*; 2.50 to 3.49 = *neither agree nor disagree*; 3.50 to 4.49 = *agree*; 4.50 to 5.00 = *strongly agree*

Perceived Barriers

Respondents' perceived barriers to converting from a septic system to a sewer system were assessed using five items reflective of external-type barriers and seven items reflective of internal-type barriers. External-type barriers refer to those relatively more outside of respondents' personal control, whereas internal or intrinsic-type barriers pertain to those experienced at the personal level (e.g., lack of knowledge, concerns, desires). Responses were collected using a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). A construct mean was computed to represent respondents' overall degree of perceived barriers with converting from a septic to sewer system. The internal consistency reliability estimate for this scale was $\alpha = .94$.



The barriers respondents agreed with to a greater extent than others were primarily external-type barriers, such as “lack of available hook-up prevents me from converting to a sewer system” ($M = 3.78; SD = 1.24$), “upfront financial costs hinder me from converting to a sewer system” ($M = 3.78; SD = 1.22$), and “the costs of paying a monthly sewer bill hinder me from converting to a sewer system” ($M = 3.51; SD = 1.23$; see Table 6). The internal-type barrier respondents most agreed with compared to others was “lack of desire to convert from a septic to sewer system hinders me from doing so” ($M = 3.44; SD = 1.33$). The barriers respondents agreed with to lesser degree than the other barrier items were “fear of large-scale sewer spills hinders me from converting from a septic system to a sewer system” ($M = 3.26; SD = 1.34$) and “not having time to think about converting from a septic system to a sewer system hinders me from doing so” ($M = 3.16; SD = 1.34$). Table 6 depicts the full results of barrier items.

Table 6. Respondents' agreement with barriers hindering them from converting from a septic system to a sewer system

Item	M	SD	Barrier Type
Lack of available hook-up prevents me from converting to a sewer system.	3.78	1.24	External
Upfront financial costs hinder me from converting to a sewer system.	3.78	1.22	External
The costs of paying a monthly sewer bill hinder me from converting to a sewer system.	3.51	1.23	External
Inconvenience of construction in my community hinders me from converting to a sewer system.	3.44	1.29	External
Lack of desire to convert from a septic to sewer system hinders me from doing so.	3.44	1.33	Internal
Disruptions on my property associated with construction hinder me from converting to a sewer system.	3.39	1.28	External
Lack of clear benefits of converting from a septic system to a sewer system hinders me from doing so.	3.31	1.33	Internal
Unwanted changes in my community hinders me from converting from a septic system to a sewer system.	3.31	1.27	External
Not having enough information about homeowner responsibilities in the process in the process hinders me from converting to a sewer system	3.30	1.27	Internal
Not knowing how to begin the process of converting to a sewer system hinders me from doing so.	3.29	1.34	Internal
Fear of large-scale sewer spills hinders me from converting from a septic system to a sewer system.	3.26	1.34	Internal
Not having time to think about converting from a septic system to a sewer system hinders me from doing so.	3.16	1.34	Internal
Construct Mean = 3.41 ($SD = 1.00$)			

Note. Real limits: 1.00 to 1.49 = *strongly disagree*; 1.50 to 2.49 = *disagree*; 2.50 to 3.49 = *neither agree nor disagree*; 3.50 to 4.49 = *agree*; 4.50 to 5.00 = *strongly agree*

Diffusion of Innovations

To better understand respondents' likeliness of converting from a septic system to a sewer system, four attributes of Rogers' (2003) Diffusion of Innovations were examined, including relative advantage, compatibility, observability, and complexity.



Relative Advantage

Relative advantage of a sewer system over a septic system was assessed using six items measured on a 5-point Likert scale. A construct mean was computed to represent respondents' overall perceived relative advantage. The internal consistency reliability estimate for this scale was $\alpha = .93$. Overall, respondents agreed sewer systems were relatively more advantageous than septic systems ($M = 3.90$; $SD = .91$). Of the individual items, respondents agreed most that sewer systems cause less trouble for homeowners than septic systems ($M = 4.01$; $SD = .96$; see Table 7).

Table 7. Respondents' perceived relative advantage of sewer systems compared to septic systems

Item	M	SD	Interpretation
Sewer systems cause less trouble for homeowners than septic systems	4.01	.96	Agree
Sewer systems are overall better for me as a homeowner than septic systems.	3.95	1.10	Agree
Sewer systems are better for human health than septic systems.	3.91	1.02	Agree
Sewer systems offer more benefits than septic systems.	3.91	1.01	Agree
Sewer systems are better for the environment than septic systems.	3.91	1.05	Agree
Sewer systems are financially more advantageous for homeowners than septic systems.	3.72	1.22	Agree

Construct Mean = 3.90 ($SD = .91$)

Note. Real limits: 1.00 to 1.49 = *strongly disagree*; 1.50 to 2.49 = *disagree*; 2.50 to 3.49 = *neither agree nor disagree*; 3.50 to 4.49 = *agree*; 4.50 to 5.00 = *strongly agree*

Compatibility

Perceived compatibility of converting from a septic system to a sewer system was assessed using six items representative of respondents' perceived compatibility of such conversion with their individual needs/lifestyle, sociocultural needs, and existing values and beliefs (Rogers, 2003). A construct mean was computed to represent respondents' overall perceived compatibility. The internal consistency reliability estimate for this scale was $\alpha = .96$. Overall, respondents agreed ($M = 3.73$; $SD = 1.08$) with septic to sewer conversion as compatible with their needs, values, and beliefs (see Table 8). Specifically, respondents agreed that all communities should convert from septic systems to sewer systems ($M = 3.77$; $SD = 1.17$) and that converting to a sewer system is the responsible thing to do ($M = 3.77$; $SD = 1.15$). Compared to the other compatibility items, respondents agreed slightly less that converting to a sewer system is compatible with their current lifestyle ($M = 3.66$; $SD = 1.20$; see Table 8).

Table 8. Respondents' perceived compatibility of converting from a septic system to a sewer system

Item	M	SD	Interpretation
I think all communities should convert from septic systems to sewer systems if possible.	3.77	1.17	Agree
I think converting to a sewer system is the responsible thing to do.	3.77	1.15	Agree
Converting to a sewer system is compatible with the needs of my community.	3.75	1.20	Agree
Converting to a sewer system is something I think is the right thing to do.	3.74	1.14	Agree
Converting to a sewer system fits my needs as a homeowner.	3.70	1.26	Agree
Converting to a sewer system is compatible with my current lifestyle.	3.66	1.20	Agree

Construct Mean = 3.73 ($SD = 1.08$)

Note. Real limits: 1.00 to 1.49 = *strongly disagree*; 1.50 to 2.49 = *disagree*; 2.50 to 3.49 = *neither agree nor disagree*; 3.50 to 4.49 = *agree*; 4.50 to 5.00 = *strongly agree*



Complexity

Complexity was assessed using four items designed to measure the degree to which respondents' perceive septic to sewer conversion as complex. Responses were collected using a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree), and a construct mean was computed to represent respondents' overall perceived complexity. Positively worded items were reverse coded for inclusion in the construct mean (i.e., a higher construct mean indicates greater perceived complexity). The internal consistency reliability estimate for this scale was $\alpha = .73$. Overall, respondents demonstrated neutral views ($M = 2.89$; $SD = .99$) regarding the complexity of converting from a septic to sewer system (see Table 9).

Table 9. Respondents' perceived complexity of converting from a septic system to a sewer system

Item	M	SD	Interpretation
Converting from a septic to sewer system is too much work.	3.70	1.48	Neither agree nor disagree
Converting from a septic to sewer system is an easy thing for me to do.*	3.23	1.48	Neither agree nor disagree
Converting from a septic to sewer system is affordable for me.*	3.30	1.42	Neither agree nor disagree
I could convert from a septic to sewer system if I wanted to.*	3.35	1.41	Neither agree nor disagree
I would know how to start the process of converting from a septic to sewer system if I wanted to do so.*	3.36	1.46	Neither agree nor disagree

Construct Mean = 2.89, $SD = .99$; * Indicates item reverse coded for construct mean

Note. Real limits: 1.00 to 1.49 = *strongly disagree*; 1.50 to 2.49 = *disagree*; 2.50 to 3.49 = *neither agree nor disagree*; 3.50 to 4.49 = *agree*; 4.50 to 5.00 = *strongly agree*.

Observability

Observability was assessed using four items measured on a 5-point Likert scale. A construct mean was computed to represent respondents' overall perceived observability of septic to sewer conversion. The internal consistency reliability estimate for this scale was $\alpha = .95$. Overall, respondents neither agreed nor disagreed ($M = 3.16$; $SD = 1.39$) with the observability of septic to sewer conversion (see Table 10).

Table 10. Respondents' perceived observability of septic to sewer conversion

Item	M	SD	Interpretation
I know of other homeowners who have converted from a septic system to sewer system.	3.27	1.52	Neither agree nor disagree
I have observed the process of septic system to sewer system conversion.	3.17	1.53	Neither agree nor disagree
I have close friends/family who have converted from a septic system to a sewer system.	3.12	1.46	Neither agree nor disagree
I have observed the process of septic system to sewer system conversion in my community.	3.08	1.49	Neither agree nor disagree

Construct Mean = 3.16 ($SD = 1.39$)

Note. Real limits: 1.00 to 1.49 = *strongly disagree*; 1.50 to 2.49 = *disagree*; 2.50 to 3.49 = *neither agree nor disagree*; 3.50 to 4.49 = *agree*; 4.50 to 5.00 = *strongly agree*

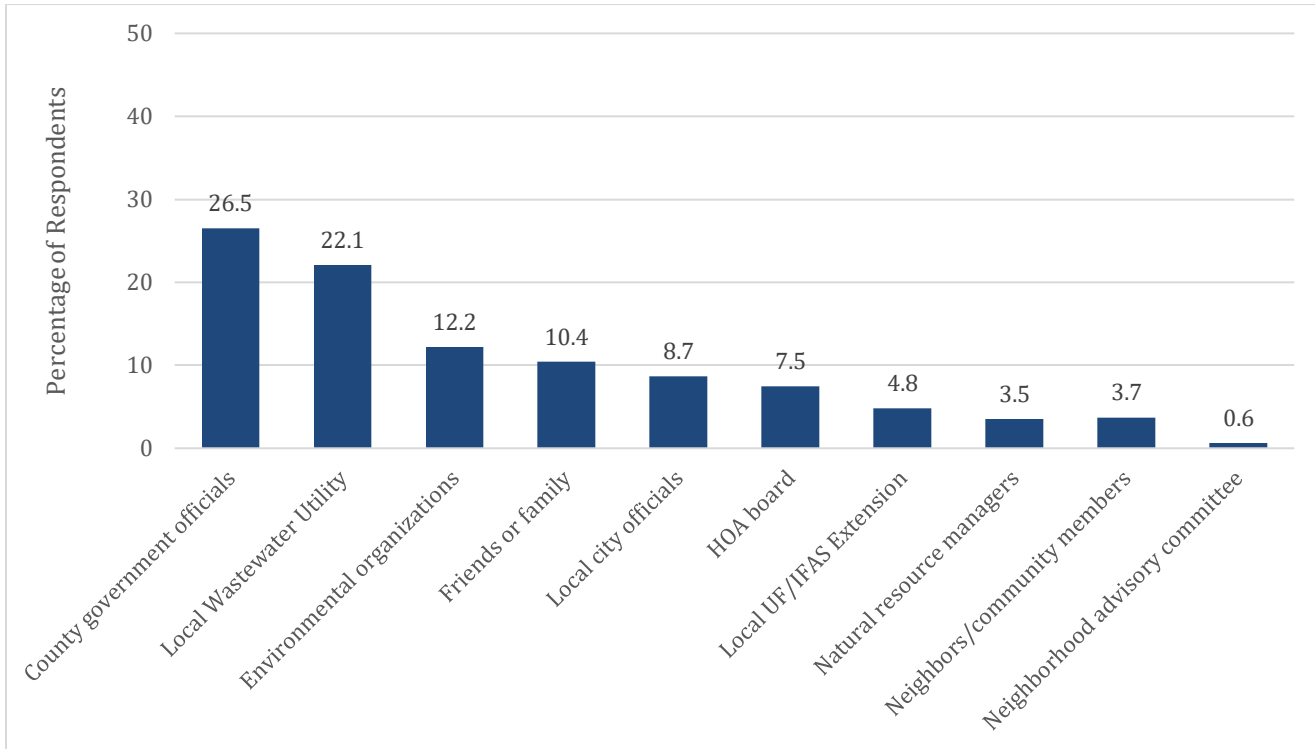


Opinion Leaders

Respondents were provided a list of 10 potential opinion leaders and asked to rate who they would be most likely to consult when seeking advice or information about septic to sewer conversion (1 = most likely to consult with; 10 = least likely to consult with).

Overall, the sources respondents were most likely to consult when seeking advice or information about septic to sewer conversion were county government officials ($M = 3.22$; $SD = 2.03$), followed by local wastewater utility ($M = 4.12$; $SD = 2.56$) and environmental organizations ($M = 4.13$; 2.43). Figure 1 depicts the number of respondents who ranked each opinion leader/source as their top-ranked choice.

Figure 1. Percentage of respondents who ranked each item as number one most likely to consult



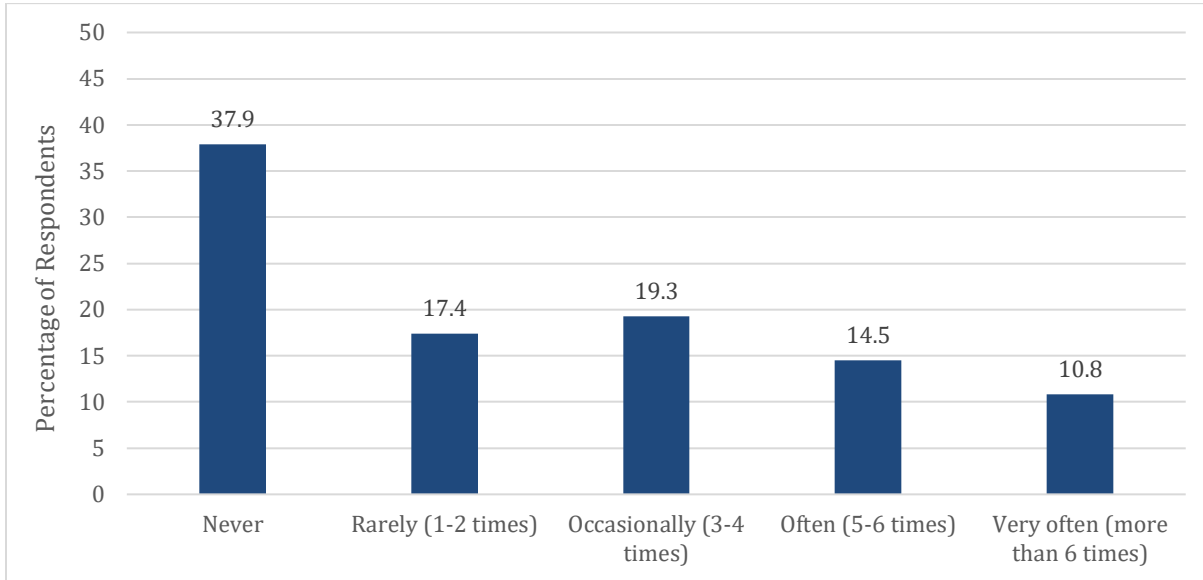
Communication Strategies

Information Search Frequency

To assess respondents' active information search behaviors, they were first asked to indicate how often they had actively sought information about topics related to septic system to sewer system conversion in the past year. More than half of the respondents ($f = 321$; 62%) had searched for information about septic to sewer to some degree in the past year; however, a little over one-third of respondents ($f = 196$; 37.9%) had never searched for information in the past year (see Figure 2).

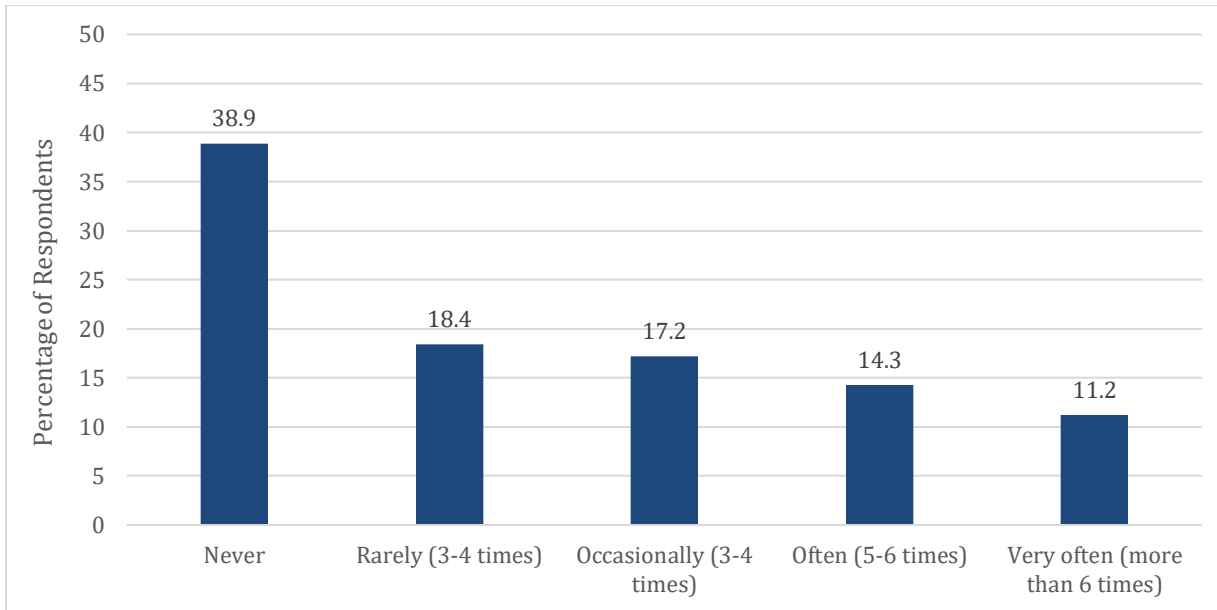


Figure 2. How often respondents had searched for information about septic to sewer conversion in the past year



Respondents were then asked how often they had received information about septic to sewer conversion in the past year. Similar to their active information search behaviors, more than half of the respondents ($f = 316$; 61.1%) had received information in the past year, while a little over one-third ($f = 201$; 38.9%) had not (see Figure 3).

Figure 3. How often respondents had received information about septic to sewer conversion in the past year



Information Sources Used

Respondents who reported having sought for or received information about septic to sewer conversion ($n = 343$) were then asked to identify how much of that information they had obtained from a list of sources. Responses were collected using a 5-point ordinal scale (0 = none at all; 5 = a great deal). On average, respondents received more information about septic to sewer conversion from local wastewater utility ($M = 2.30$; $SD = 1.34$), environmental organizations ($M = 2.17$; $SD = 1.41$), and friends or family members ($M = 2.16$; $SD = 1.38$) than any of the other sources. Figure 4 displays a further breakdown of the distribution of respondents' answers to this section.



Figure 4. Degree of information respondents' had obtained from select sources (N = 343)

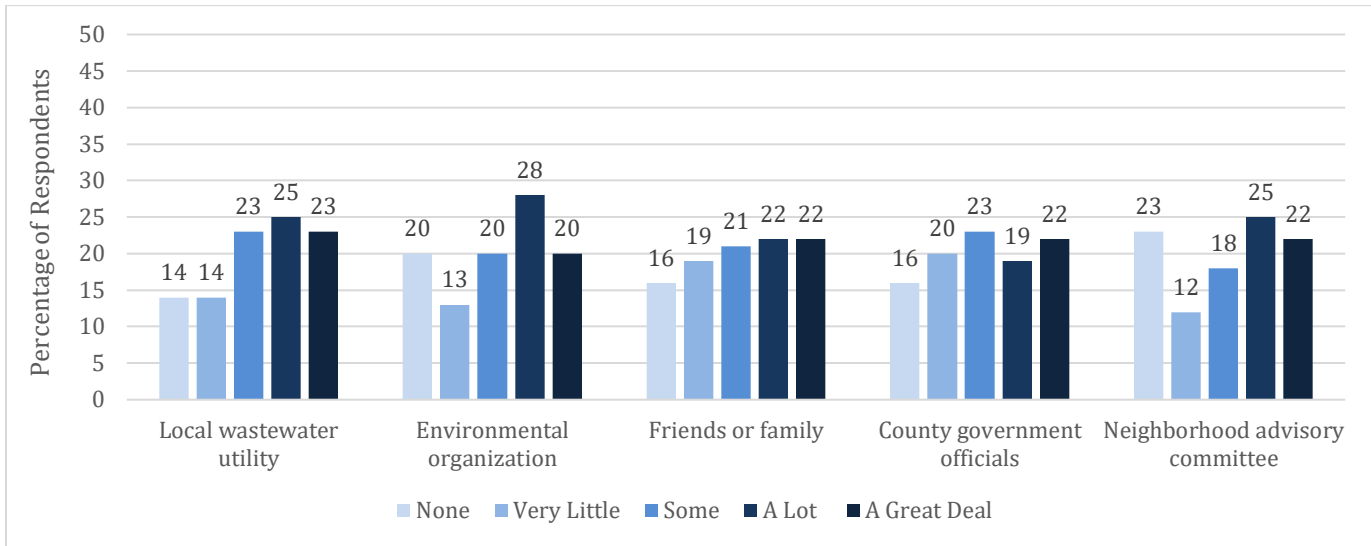
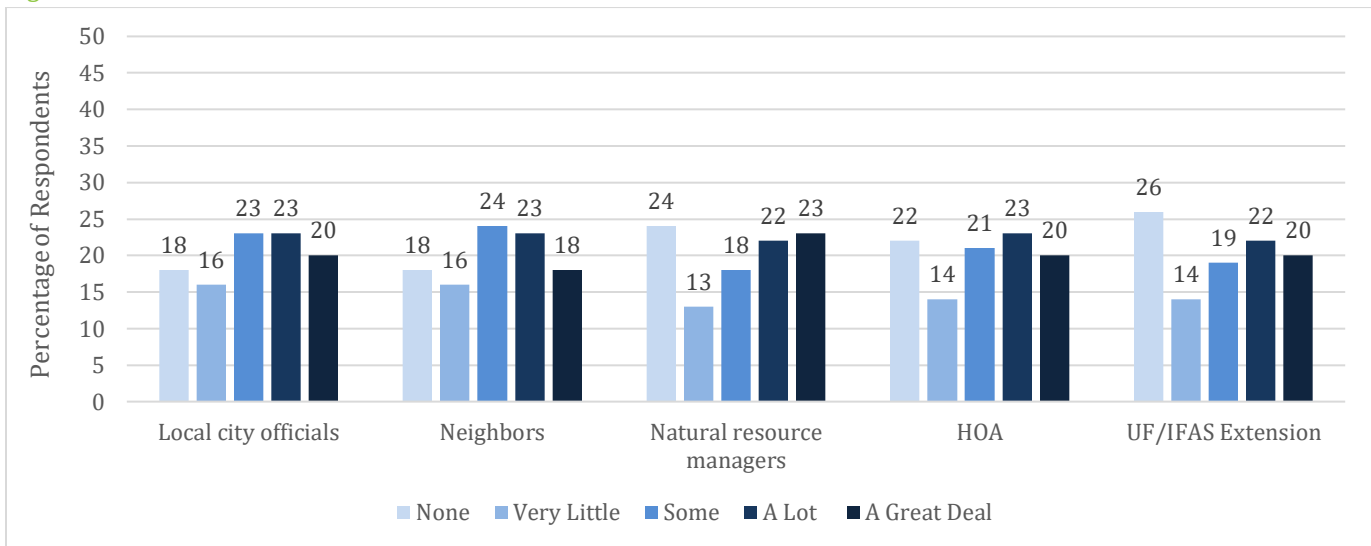


Figure 4 continued.



Usefulness of Information

To assess usefulness of information, respondents were asked to indicate how useful they perceived select informational topics associated with septic system to sewer system conversion (1 = very useless; 5 = very useful). Overall, respondents perceived all topics as useful, with the most useful being timelines of construction for the septic to sewer conversion project ($M = 4.04$; $SD = 1.02$) and information about the costs associated with septic to sewer conversion ($M = 4.02$; $SD = 1.09$; see Table 11).

Table 11. Respondents' perceived usefulness of information topics about septic to sewer conversion

Item	M	SD	Interpretation
Timelines of construction for the septic to sewer conversion project	4.04	1.02	Useful
Information about the costs associated with septic to sewer conversion (e.g., upfront costs, maintenance costs, fees, etc.)	4.02	1.09	Useful



Item	<i>M</i>	<i>SD</i>	Interpretation
Information on programs or regulations being developed about septic to sewer conversion in my community	4.02	.99	Useful
Information about the responsibility of homeowners in septic to sewer conversion	4.00	1.10	Useful
Information on evidence-based benefits of septic to sewer conversion for the environment	3.99	1.10	Useful
Information on evidence-based benefits of septic to sewer conversion for Florida communities	3.99	1.09	Useful
Information on evidence-based benefits of septic to sewer conversion for homeowners	3.98	1.11	Useful
Contact information for someone associated with the project (POC)	3.95	1.06	Useful
List of contractors involved in the conversion project	3.90	1.07	Useful

Note. Real limits: 1.00 to 1.49 = *very useless*; 1.50 to 2.49 = *useless*; 2.50 to 3.49 = *neither useful nor useless*; 3.50 to 4.49 = *useful*; 4.50 to 5.00 = *very useful*

Preferred Methods of Receiving Information

Regarding how they would like to receive information, respondents were asked to indicate how useful select methods of informational delivery would be to them (1 = very useless; 5 = very useful). On average, respondents identified as print materials mailed to them (*M* = 4.03; *SD* = 1.08), websites (*M* = 4.02; *SD* = 1.06), and short online videos (*M* = 3.82; *SD* = 1.15) as the most useful of the informational delivery method options presented. Table 12 depicts a further breakdown of respondents' answers.

Table 12. Respondents' perceived usefulness of methods of informational delivery

Item	<i>M</i>	<i>SD</i>	Interpretation
Print materials mailed to me	4.03	1.08	Useful
Websites	4.02	1.06	Useful
Short, online videos	3.82	1.15	Useful
Community meetings	3.51	1.27	Useful
Phone call or text message announcements	3.48	1.31	Useful
Social media platforms	3.48	1.38	Useful
Newsletters from Homeowners' Associations	3.48	1.35	Useful

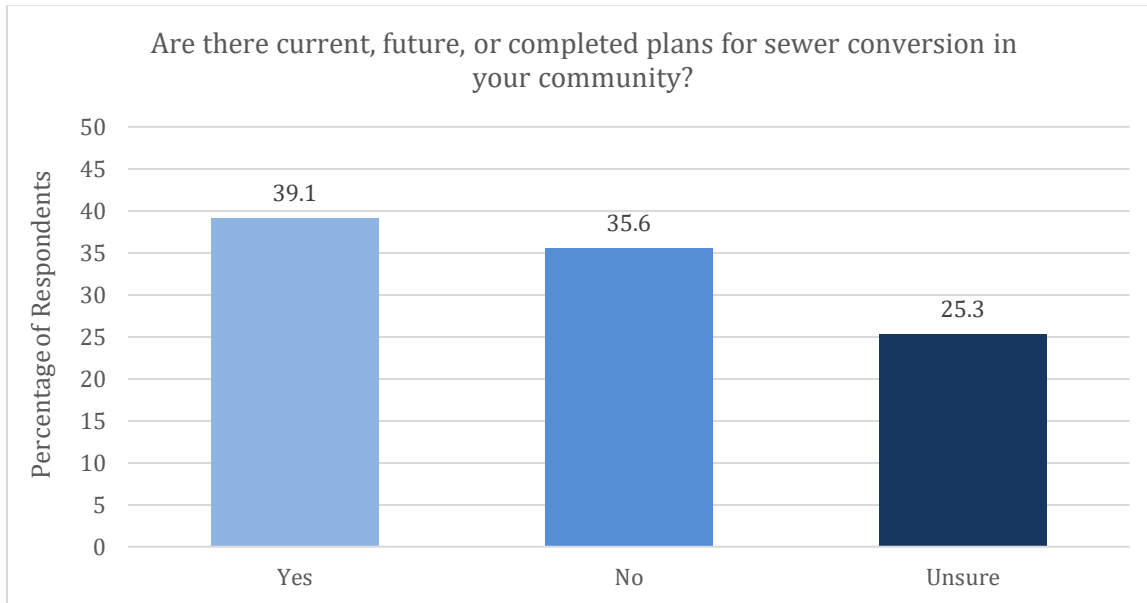
Note. Real limits: 1.00 to 1.49 = *very useless*; 1.50 to 2.49 = *useless*; 2.50 to 3.49 = *neither useful nor useless*; 3.50 to 4.49 = *useful*; 4.50 to 5.00 = *very useful*



Community Conversion Status

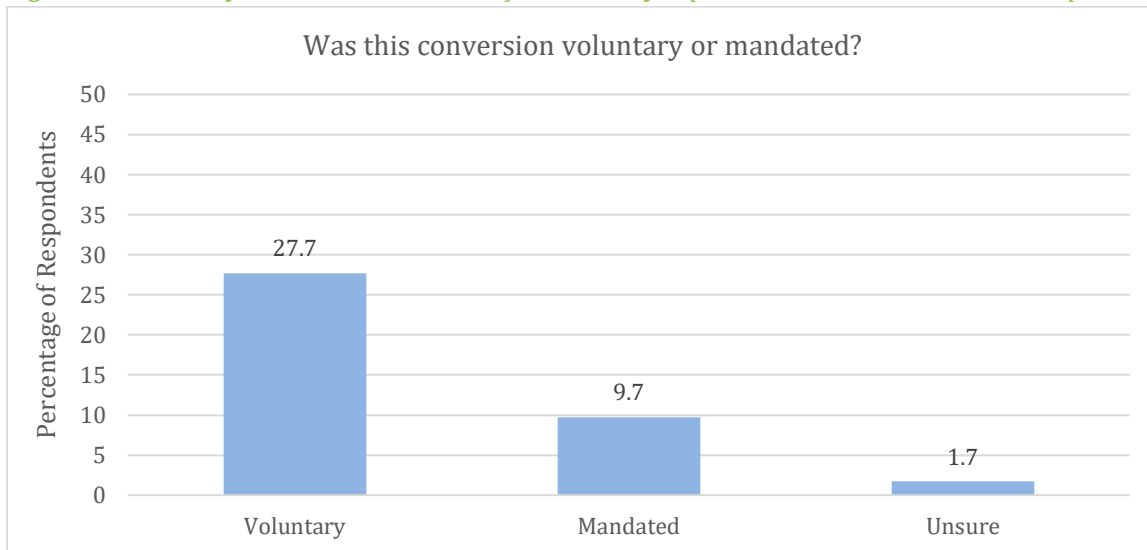
Lastly, respondents were asked questions pertaining to septic to sewer conversion activities in their communities, as well as their perceptions of/support for such conversion. When asked if there were plans for septic system to sewer system conversion in their community 202 (39.1%) respondents reported yes, 184 (35.6%) said no, and 131 (25.3%) were unsure (see Figure 5).

Figure 5. Septic to sewer conversion status in respondents' communities



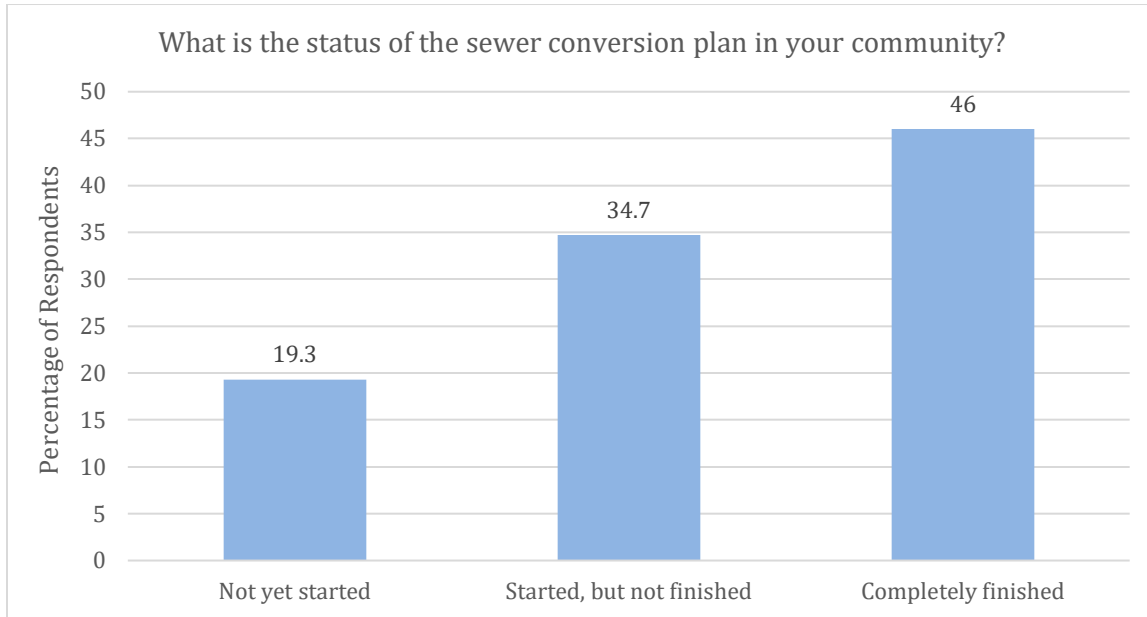
Those who reported that there were current, future, or completed septic to sewer conversion plans in their community ($n = 202$) were then asked if that conversion was voluntary or mandated. Of these respondents, 143 (27.7%) reported it was voluntary, 50 (9.7%) reported it was mandated, and 9 (1.7%) were unsure (see Figure 6.)

Figure 6. Voluntary or mandated status of community septic to sewer conversions in respondents' communities



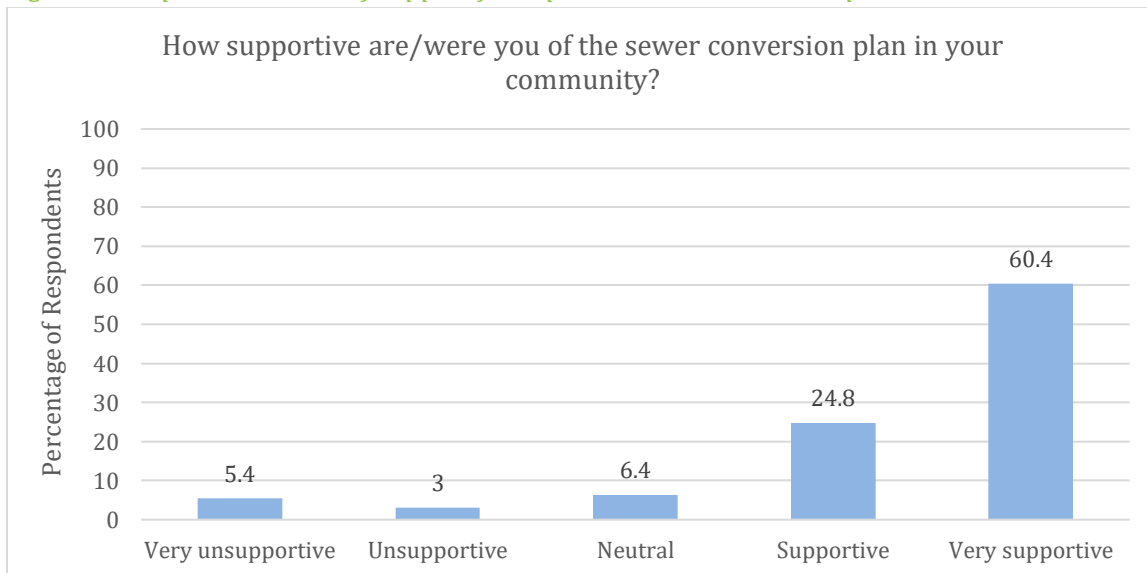
Respondents who reported some degree of septic to sewer conversion plans in their community ($n = 202$), were also asked to indicate the current progress of such plans. Nearly one-half of respondents ($f = 93$; 46%) reported the community conversions plans were completely finished, 70 (34.7%) reported it was started but not finished, and 39 (19.3%) reported it was not yet started (see Figure 7).

Figure 7. Progress of septic to sewer conversion plans in respondents' communities



Lastly, respondents who reported current, future, or completed septic to sewer conversions in their communities ($n = 202$) were asked to indicate how supportive they are/were of the plans to do so (1 = very unsupportive; 5 = very supportive). The majority of respondents ($f = 23.6$; 60.4%) indicated they were very supportive (see Figure 8).

Figure 8. Respondents' level of support for septic to sewer conversion plans in their communities

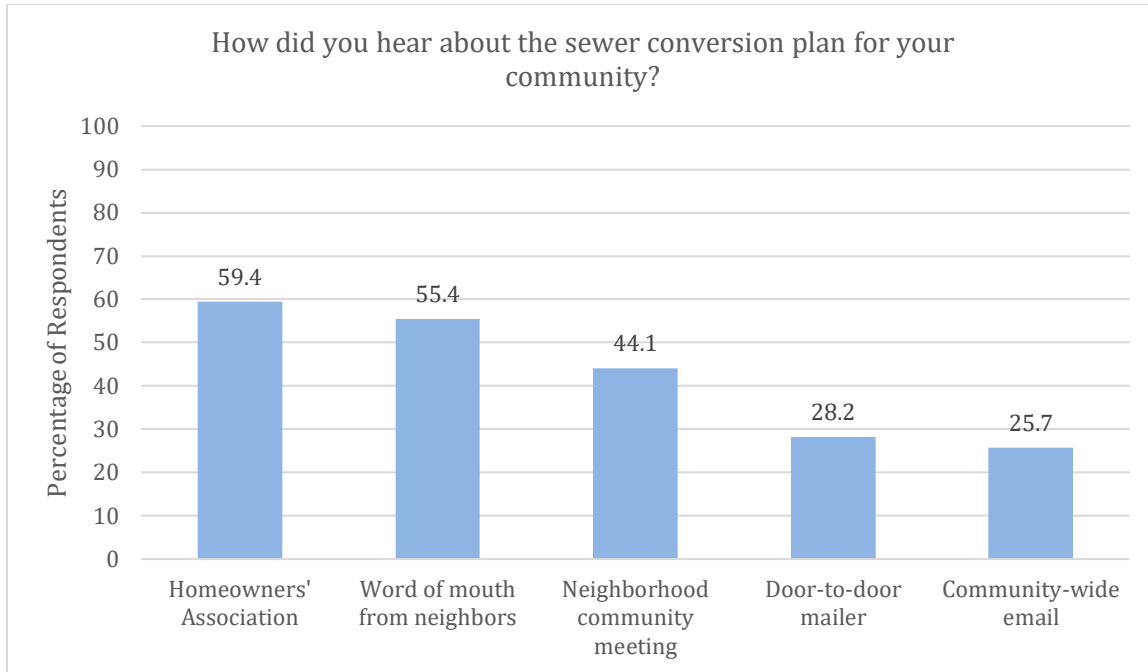


Lastly, respondents who reported current, future, or completed septic to sewer conversions in their communities ($n = 202$) were also asked how they hear about the conversion plan. Respondents were provided a list of potential



sources and asked to indicate by checking all that apply where they heard word of the plans. The sources most frequently identified by respondents were their homeowners' association ($f = 120$; 59.4%) and word of mouth from neighbors ($f = 112$; 55.4%; see Figure 9). The sources identified by the fewest number of respondents were door-to-door mailer announcements ($f = 57$; 28.2%) and community-wide emails ($f = 52$; 25.7%; see Figure 9).

Figure 9. How respondents heard about septic to sewer conversion plans for their community



References

Qualtrics. (2019, April). *ESOMAR 28 questions to help research buyers of online samples*. <https://www.iup.edu/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=274179&libID=274203>

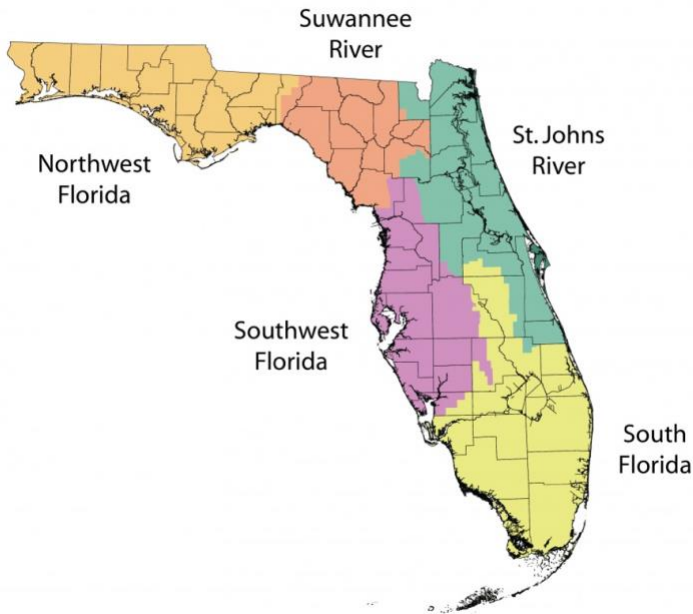
Rogers, E. M. (2003). *Diffusion of innovations*. Free Press.



Appendix A: Results by Water Management District

Appendix A includes results organized by the water management district of respondents (see water district map in Figure A-1). The number of respondents in each of Florida's five water management districts are as follows: Northwest Florida ($n = 29$; 5.6%); Suwannee River ($n = 12$; 2.5%); Southwest Florida ($n = 123$; 23.8%); St. John's River ($n = 160$; 30.9%); and South Florida ($n = 192$; 37.1%).

Figure A-1. Map of Florida's water management districts

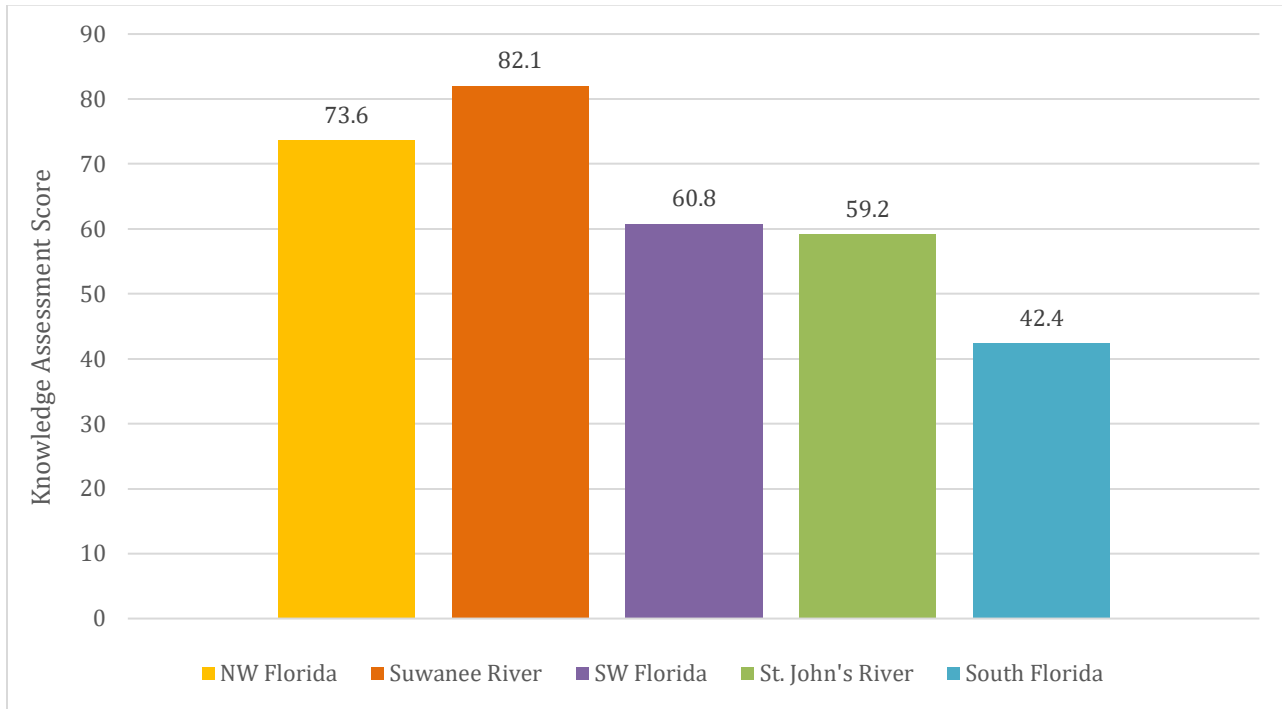


Knowledge by Water District

Respondents' objective knowledge of septic to sewer conversion topics assessed using six multiple-choice questions. A test score was computed by dividing respondents' total number of correct answers by total number of possible answers multiplied by 100 (e.g., $5/6 * 100 =$ test score of 83.3%). The average assessment scores of respondents by water management district is displayed in Figure A-2.



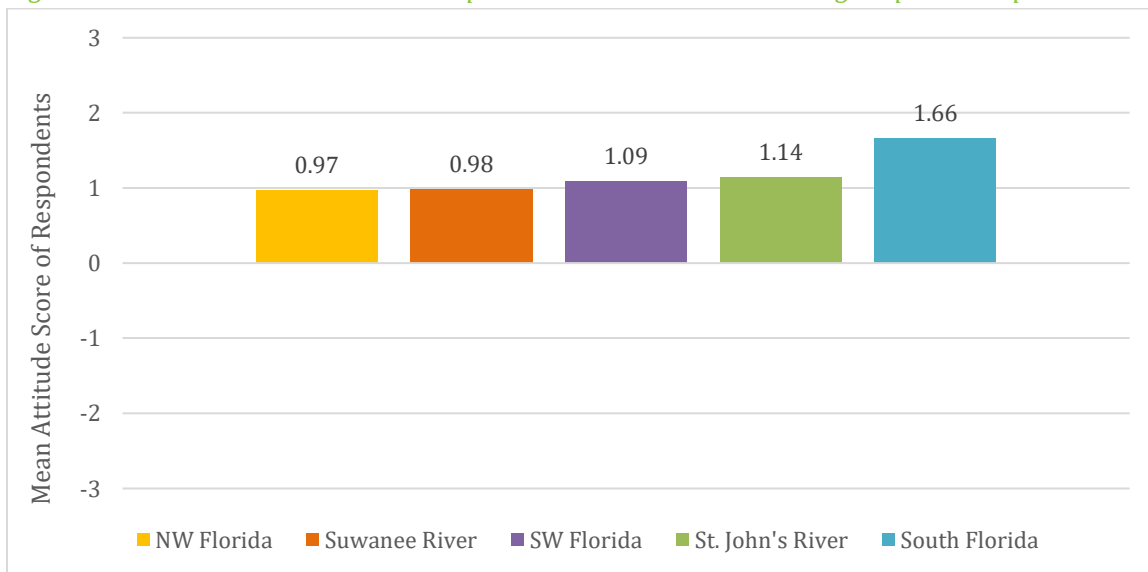
Figure A-2. Objective knowledge of septic to sewer conversion among respondents per water management district



Attitude by Water District

Respondents' overall attitude toward septic to sewer conversion was assessed per water management district and is reported in Figure A-3. Compared to the other water districts, residents in South Florida had overall more positive attitudes toward septic to sewer conversion.

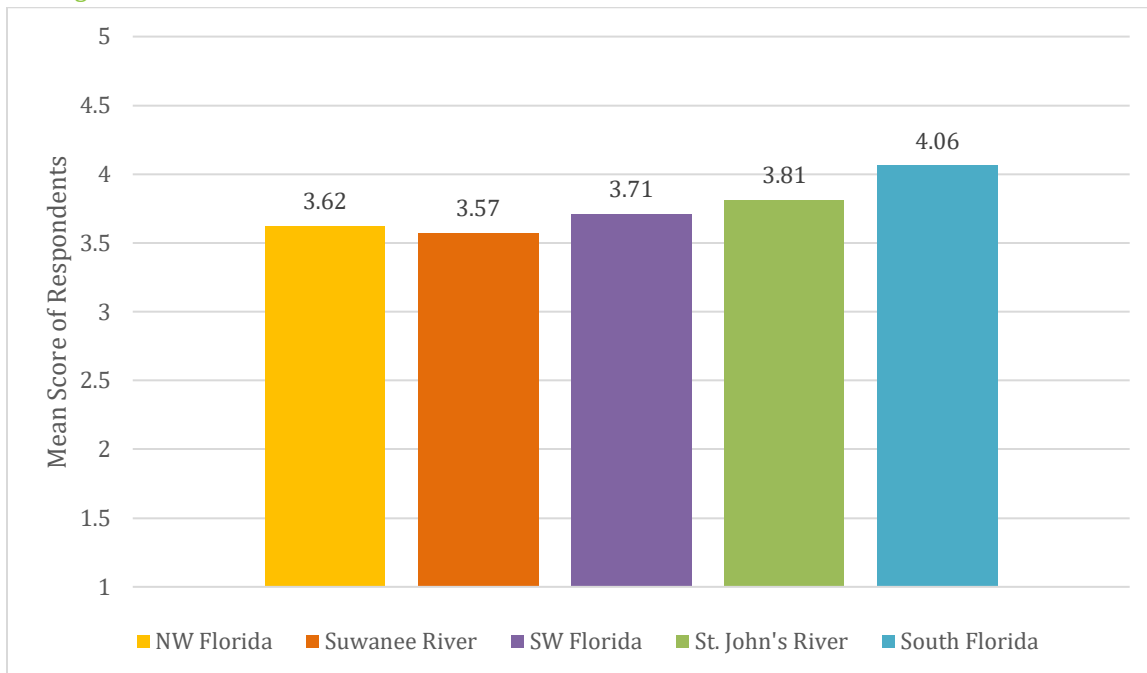
Figure A-3. Overall attitude toward septic to sewer conversion among respondents per water management district



Perceived Benefits by Water District

The overall perceived degree of benefit in converting from a septic system to a sewer system held by respondents in each water management district is displayed in Figure A-4.

Figure A-4. Overall degree of perceived benefit of septic to sewer conversion among respondents per water management district



Respondents agreement with individual items as benefits of converting from a septic system to a sewer system was also assessed, and the top perceived benefits among respondents in each water management district is reported in Table A-1. Across all water management districts, the factor respondents agreed with most as being a benefit of septic to sewer conversion was reduced maintenance burdens on homeowners (see Table A-1).

Table A-1. Top perceived benefits of septic to sewer conversion among respondents per water management district

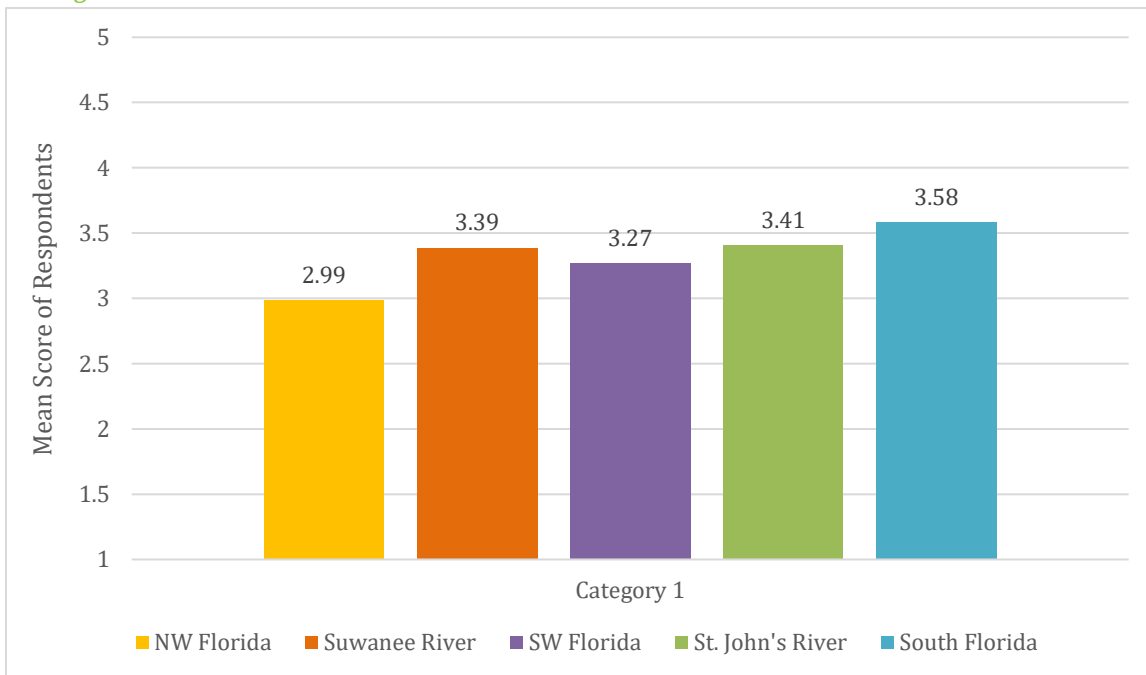
Top Benefits	<i>M</i>	<i>SD</i>
“Converting from a septic to sewer system...”		
NW Florida		
Reduces maintenance burdens on homeowners	3.97	.94
Improves environmental health	3.79	.90
Increases property values	3.76	.83
Frees up land for other purposes	3.76	.99
Suwanee River		
Reduces maintenance burdens on homeowners	4.08	.86
Increases property value	3.77	1.24
Is better for human health	3.62	1.04
Improves environmental health	3.62	1.04
SW Florida		
Reduces maintenance burdens on homeowners	3.99	.92
Increases property value	3.80	1.00
Frees up land for other purposes	3.73	.95
St. John’s River		
Reduces maintenance burdens on homeowners	4.13	1.00
Frees us land for other purposes	3.94	.92
Increases property values	3.82	1.02

Top Benefits	<i>M</i>	<i>SD</i>
"Converting from a septic to sewer system..."		
South Florida		
Reduces maintenance burdens on homeowners	4.26	.92
Is better for human health	4.12	.99
Frees up land for other purposes	4.11	.98

Perceived Barriers by Water District

Respondents' overall perceived degree of barriers to septic to sewer conversion was similar across all water management districts, with the exception of the NW Florida Districts. Compared to other districts, respondents indicated slightly less agreement with the presence of barriers hindering them from converting from a septic system to a sewer system (see Figure A-5).

Figure A-5. Overall degree of perceived barriers to septic to sewer conversion among respondents per water management district



Regarding the top barriers perceived by respondents as hindering them from converting to a sewer system, both lack of availability of a sewer hook-up and upfront financial costs of converting were identified as top barriers across all five water management districts. Full results are displayed in Table A-2.

Table A-2. Top perceived barriers to septic to sewer conversion among respondents per water management district

Top Barriers	<i>M</i>	<i>SD</i>
NW Florida		
Lack of availability of a sewer hook-up hinders me from converting to a septic to sewer system.	4.24	1.12
Lack of desire to convert from a septic system to a sewer system hinders me from doing so.	3.31	1.34
Upfront financial costs hinder me from converting to a sewer system.	3.31	1.29
Suwanee River		
Lack of availability of a sewer hook-up hinders me from converting to a septic to sewer system.	4.23	.83



Top Barriers	<i>M</i>	<i>SD</i>
Upfront financial costs hinder me from converting to a sewer system.	4.00	1.08
Inconvenience of construction in my community hinders me from converting to a sewer system.	3.69	1.12
SW Florida		
Upfront financial costs hinder me from converting to a sewer system.	3.82	1.17
Lack of availability of a sewer hook-up hinders me from converting to a septic to sewer system.	3.67	1.23
The costs of paying a monthly sewer bill hinder me from converting to a sewer system.	3.44	1.30
St. John's River		
Lack of availability of a sewer hook-up hinders me from converting to a septic to sewer system.	3.87	1.19
Upfront financial costs hinder me from converting to a sewer system.	3.84	1.23
The costs of paying a monthly sewer bill hinder me from converting to a sewer system.	3.51	1.33
South Florida		
Upfront financial costs hinder me from converting to a sewer system.	3.75	1.22
Lack of availability of a sewer hook-up hinders me from converting to a septic to sewer system.	3.68	1.29
The costs of paying a monthly sewer bill hinder me from converting to a sewer system.	3.64	1.25

Key Opinion Leaders per Water District

To identify key opinion leaders, respondents were asked to rate (on a scale of 1 to 10) who they would most likely go to when seeking advice or information about septic to sewer conversion. The top opinion leaders in each water management district is as follow:

NW Florida District:

- Neighborhood advisory committee
- Natural resource managers
- Homeowners' Association (HOA) board

Suwanee River District:

- Neighborhood advisory committee
- Homeowners' Association (HOA) board
- Neighbors/members in their community

Southwest Florida District:

- Neighborhood advisory committee
- Neighbors/members in their community
- Natural resource managers

St. John's River District:

- Natural resource managers
- Neighbors/members in their community
- Natural resource managers

South Florida District:



- Neighborhood advisory committee
- Neighbors/members in their community
- Local UF/IFAS Extension offices/specialists

Informational Needs by Water District

Across all water management districts, residents identified timelines of construction for septic to sewer conversion projects among the most useful informational topics. Unique to South Florida Water Management District residents, was the high degree of perceived usefulness of information about the responsibility of homeowners in septic to sewer conversion. Further, South Florida residents indicated it would be most useful to receive information about the multi-faceted benefits of septic to sewer conversion, including benefits for Florida communities, for homeowners, and for the environment. Full results are displayed in Table A-3.

Table A-3. Most useful informational topics needed by respondents per water management district

Informational Topic	M	SD
NW Florida		
Information about the costs associated with septic to sewer system conversion (e.g., upfront costs, maintenance costs, fees)	3.59	1.24
Timelines of construction for the septic to sewer conversion project	3.55	1.30
Information on evidence-based benefits of septic to sewer conversion for homeowners	3.48	1.27
Suwanee River		
Information on evidence-based benefits of septic to sewer conversion for homeowners	4.08	1.12
Timelines of construction for the septic to sewer conversion project	4.00	1.16
Information on programs or regulations being developed about septic to sewer conversion in my community	4.00	1.16
Contact information for someone associated with the project (POC)	3.92	1.04
SW Florida		
Timelines of construction for the septic to sewer conversion project	4.04	.98
Information about the costs associated with septic to sewer system conversion (e.g., upfront costs, maintenance costs, fees)	3.98	1.09
Information on programs or regulations being developed about septic to sewer conversion in my community	3.98	.97
St. John's River		
Timelines of construction for the septic to sewer conversion project	4.00	1.11
Information on programs or regulations being developed about septic to sewer conversion in my community	3.99	.97
Information about the costs associated with septic to sewer system conversion (e.g., upfront costs, maintenance costs, fees)	3.94	1.14
Information on evidence-based benefits of septic to sewer conversion for Florida communities	3.93	1.13
South Florida		
Information about the responsibility of homeowners in septic to sewer conversion	4.24	.93
Information on evidence-based benefits of septic to sewer conversion for Florida communities	4.22	.91
Information on evidence-based benefits of septic to sewer conversion for homeowners	4.21	.96
Information on evidence-based benefits of septic to sewer conversion for the environment.	4.20	.96



Informational Delivery Method Preferences by Water District

Lastly, respondents were asked to indicate how useful various methods of delivery would be if they were to receive information about septic to sewer conversion. Across all water management districts, respondents identified either websites or print materials mailed to them as the most useful of the delivery method options. Full results are displayed in Figure A-6.

Figure A-6. Usefulness of methods of delivering information to respondents per water management district

