

# Summary Report:

## Educational Materials Evaluation - Huron River Watershed Detection and Rectification of Failing Septics Project

**Submitted to:**

Huron River Watershed Council

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August 2013

## **Educational Materials Evaluation - Huron River Watershed Detection and Rectification of Failing Septics Project**

### **Overview of Purpose**

The Huron River Watershed Detection and Rectification of Failing Septics project set out to identify signatures of failing septic systems using digital image analysis in conjunction with spatial analysis. In September 2012 the project team produced a report of their results from the assessment. Concluding remarks indicate that the methods studied are reasonable at picking up failures, but that the occurrence of false positives (i.e. where a positive signature is identified, but there is no problem) is high. This suggested that an educational approach with target homeowners at this point should focus on general septic system best management practices with some discussion of the study approach where warranted. This approach may reduce the perception that signs of a failing septic system always indicate septic failure and immediate action is warranted and instead help homeowners focus on maintenance and monitoring to prevent septic system failure.

HRWC's evaluation goal of the educational portion of this project is to determine whether homeowners implemented corrective measures or suggested best practices as a result of receiving educational campaign materials related to septic systems. Some homeowners would receive information on the relative risk of failure of their specific system as observed during the first part of the study. Their responses will be compared with a control group who will only get educational information and not an indication on the relative risk of failure of their specific system. Secondarily HRWC will measure if homeowners receiving the materials report a better understanding of the signs of septic system failure in general as a result of the information provided.

### **Project Background**

The goals of the Huron River Watershed Detection and Rectification of Failing Septics project overall are to (1) reduce the quantity of phosphorus and bacteria entering the middle Huron River and (2) to develop a cost-effective approach for monitoring and rectifying problems with septic systems for county health departments in Michigan. The project set out to identify signatures of failing septic systems using digital image analysis in conjunction with spatial analysis. These signatures vary depending on soil and weather conditions, but relate to the impact on vegetation due to saturation of soil with nutrients and water. Imagery from a camera that collects 16 bands in the thermal and optical wavelengths, in combination with elevation and GIS dataset, was analyzed to determine the probability of failing septic systems within Mill and Honey Creeks tributaries to the middle Huron. This assessment was calibrated and verified with field observations by the Washtenaw County Environmental Health Department.

To validate the digital and spatial data analysis, two pools of owner-occupied single family homes were selected for site visits. The first site visits (wave one) were conducted in the fall of 2011. A pool of 121 homeowners were identified and contacted by mail for permission with a follow up postcard and phone call. They were informed of the study's purpose and the risks that if their system were to be found failing that there would necessarily be follow up enforcement by the County Health Department. 31 of these homeowners granted permission for a site visit. The second round of site visits (wave two) occurred in the spring/summer of 2012 using the same contact method from a new pool of 300 homeowners, whose systems were internally categorized by the project team as high, medium, or low probability of failure. 47 of these homeowners granted permission for a site visit. In both instances participating homeowners were thanked for their cooperation and provided with information and materials on septic system care and maintenance.

## **Overview of Methods**

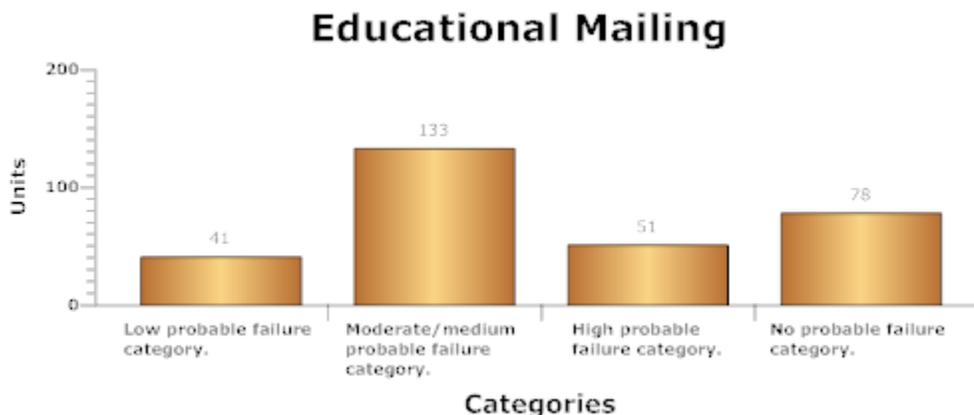
### **Educational Campaign**

Educational materials were distributed to homeowners within the study region who were contacted but who declined to participate (343) in the study during waves one and two of the field visits. On June 14, 2013, they were mailed an information packet with the following components:

1. Letter from HRWC introducing the project and enclosed education materials. Homeowners in wave two of the study were given a probable failure category (high, medium or low). Those in wave one received no probable category information. For high and medium probability categories immediate inspection was encouraged. The letter also indicated that the information is being kept private and is for homeowner use only. Copies of the outreach materials are in the appendix labeled Septic Outreach Materials.zip.

After further research into ownership records, the number of packets in the mailing totaled 303. All homeowners were asked to complete an online or hardcopy survey to indicate if their receipt of the information and materials was helpful.

2. A brochure produced by HRWC about drain fields as indicators of system failure, factors that make a system high-risk with general tips on maximizing life of system, a call to action to have their system (including the drain field) inspected and/or pumped. Frequency of and type of inspection suggested was based on EPA guidelines.
3. An EPA SepticsSmart program brochure.



### Evaluation Methods

Based on the size and spatial scale of the sample group, a survey was decided to be the most effective means of gaining the information needed. The data collected for this project is intended to provide evaluative information for a specific method for homeowner education on septic system best practices as part of a research study on the use of infrared and aerial photography to identify and rectify failing septic systems. Evaluating whether providing site specific information regarding the potential risk of failure results in a higher rate of corrective action by homeowners will help the project team identify potential best practices for future education and outreach that relies upon analysis of aerial photography.

The survey was designed to elicit the following information:

1. To determine homeowner response to specific educational materials on septic systems in the form of:
  - actions taken to verify or correct their septic health,
  - changes made incorporating corrective measures or recommended best practices.
2. To measure target audience self-reported improvement in understanding of signs of septic system failure as a result of information provided.
3. To determine if providing individual relative risk of probable failure increases likelihood of response in the form of
  - actions taken to verify or correct their septic health,
  - changes made incorporating corrective measures or recommended best practices.

4. To determine if providing individual relative risk of probable failure increases likelihood of self-reported improvement in understanding of signs of septic system failure as a result of information provided.
  5. Time since the last certified inspection or pump out. This information was elicited to see if there was any correlation in responses to this factor.
- Optional - Respondents could provide the control number from the top of the printed survey to opt out of follow up reminder calls, although no data was linked to individuals.

The evaluation component began on June 25, 2013 approximately 2 weeks after mailing the educational materials and comprised:

1. A hard copy survey instrument with return postage prepaid. The survey was one page and had 5 multiple choice questions. The target audience was given the option of responding through an online survey instrument at a dedicated web-address (page on HRWC's website).
2. Outer envelope that promoted survey and website.
3. An introductory letter

Phone call reminders and offers to complete surveys by phone were made to non-responders July 8-13, 2013, approximately 2 weeks after survey packet was mailed. Phone numbers were individually researched and available for 80% of the non-responding homeowners. Each number was called twice (different days/times were selected for each call). A reminder was left by voicemail on the second call if the homeowner was not available to speak.

Survey data was collected in Survey Monkey either by respondents online or by staff entering data from hard copy or phone survey. 31 surveys were completed and returned by mail (an additional 7 surveys were returned by mail and excluded from the survey data for the following reasons: 4 with control numbers provided, no answers and no comments; 1 without control number, no answers and 1 comment; 2 completed after the close date). 18 surveys were conducted over the phone with staff (with 7 declining to participate with comments captured). 10 surveys were completed online by respondents themselves.

A copy of the survey document is in the appendix labeled Survey Document.

### **Summary of findings and observations**

The response rate to the survey was 59 - too low to make any findings with certainty. (161 responses were needed to provide 95% certainty.) Seven of the 59 respondents

either declined to participate when contacted by phone or stated that they did not review the material - nonetheless their comments and information about the time of last inspection was captured.

Participation in site visits in wave one and two of the study was also low: 47/300 (15.6%) and 31/121 (17%) respectively. A similar approach in was used to recruit participants: a mailed request by letter with a reply postcard, followed by a reminder postcard and then a follow up phone call.

Responses were primarily from those who reported following best practice guidelines:

- 41 (78%) of the respondents reported that their last inspection or pump out by a licensed contractor was either 2 years or less or 3-5 years ago. These ranges are within the recommended guidelines for septic tank maintenance.
- 96% of the respondents reported regularly following best practice guidelines for septic tank maintenance and/or care of the system.
- All 52 respondents reported either regular care and/or maintenance of their septic systems or some type of prompted action/change.
- Some noted lack of care by others. In the open comments, four people noted that their neighbors do not take appropriate care of their systems.

It is possible that those who are most conscientious about caring for their systems were more inclined to respond to the survey vs. others who either don't want to report a lack of care, or who are not interested in septic system care. At any rate, we clearly don't know whether those with systems more at risk took any prompted action.

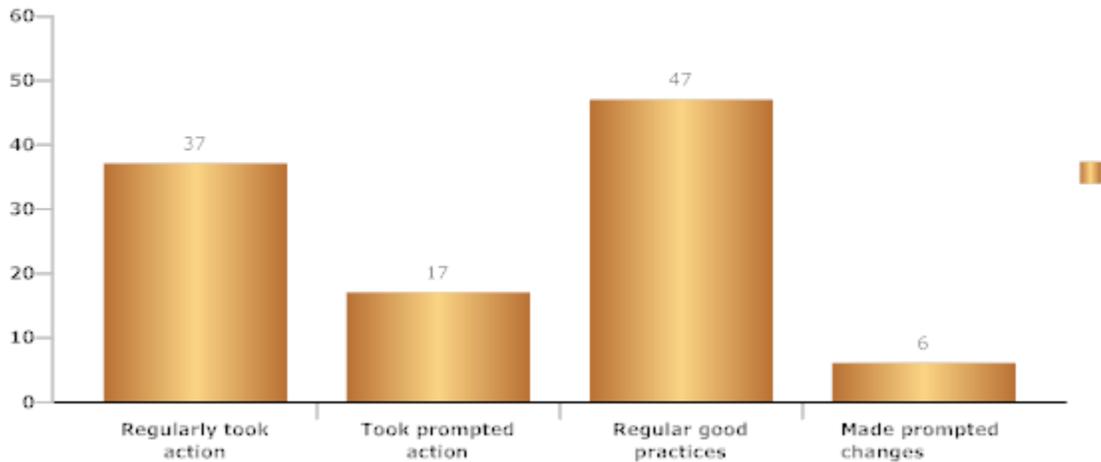
Although no certain conclusions can be drawn due to the low number of responses, there are some observations that can be made in regard to the four key areas of inquiry that could prove helpful in developing other educational campaigns.

**1. To determine homeowner response to specific educational materials on septic systems in the form of:**

- **Actions taken to verify or correct their septic health,**
- **Changes made incorporating corrective measures or recommended best practices.**

In survey questions 4 and 5, 50 respondents reported regular care and/or maintenance of their septic systems, so it appears the self-reported behavior of most did not need the prompting of the educational materials. All 52 respondents reported one or more: regular care of their system, regular maintenance of their septic systems or some type of prompted action or change.

## Action/Changes or Regular Maintenance (SQ4 & 5) 52 Respondents



Whether the educational materials prompted actions was explored in two questions in the survey.

- *Actions taken to verify or correct their septic health* (survey question 4)

37 respondents reported that they regularly took actions to verify or correct their septic health. Additionally 17 reported taking a specific action(s) prompted by the materials (4 of these also noted taking regular action to maintain their system). 15 reported doing a visual inspection and 8 either contacted an inspector and/or arranged for a pump out. Three respondents discussed their prompted action in comments.

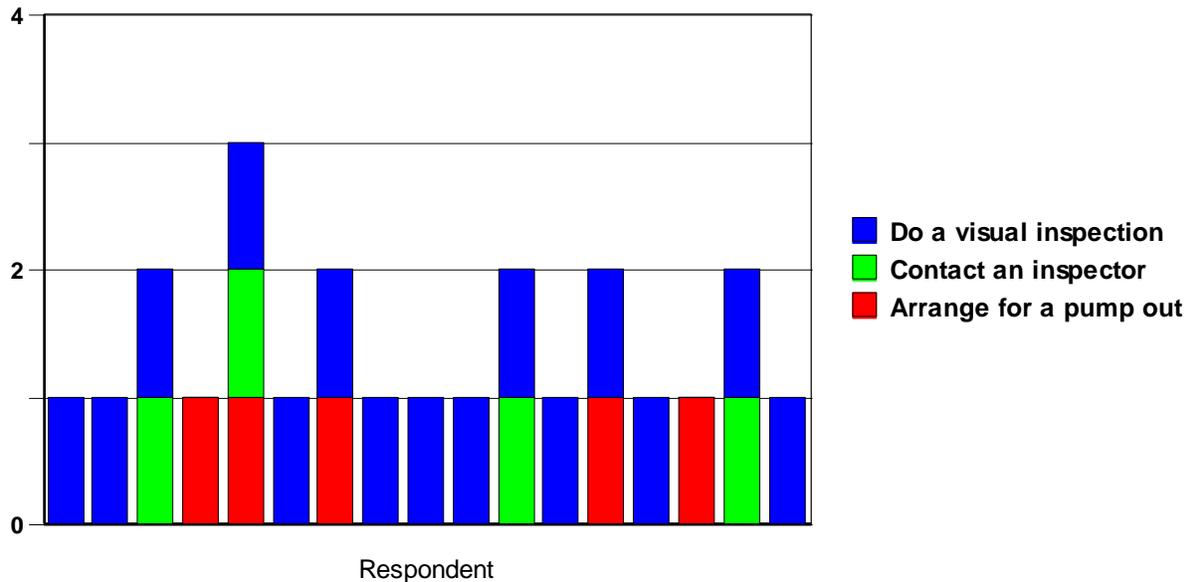
“We were scheduled for a pump out next summer (2014) but, due to your letter, we had our tank pumped a year early. The company, upon inspection, said we didn't need to. We did anyway.” (high probability)

“Motivated to schedule an inspection” (moderate probability)

“It was time anyway -- last pump was 2007”. (low probability)

The chart below shows the detail of prompted specific action(s) by each of the 17 respondents.

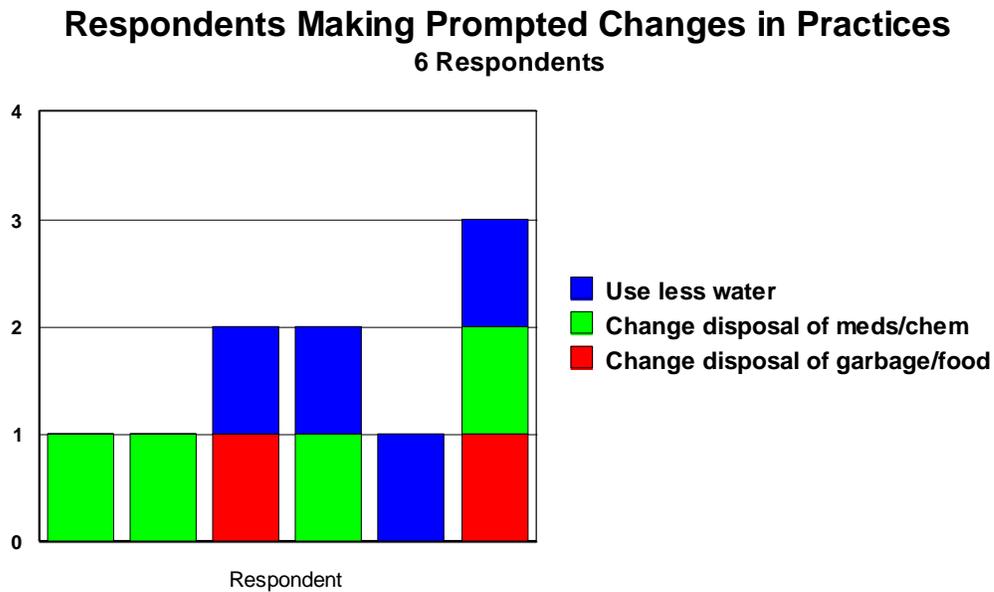
### Respondents Taking Prompted Action (SQ4) 17 respondents



- ***Changes made incorporating corrective measures or recommended best practices*** (survey question 5)

47 respondents reported that they regularly followed best practices for septic tank care. Additionally 6 reported making specific changes to their practices prompted by the materials (3 of these also reported regular compliance.) 4 used less water, 4 changed how they dispose of medicine and toxic materials, and 2 changed how they dispose of garbage or food waste.

The chart below shows the detail of prompted changes(s) by each of the 6 respondents.

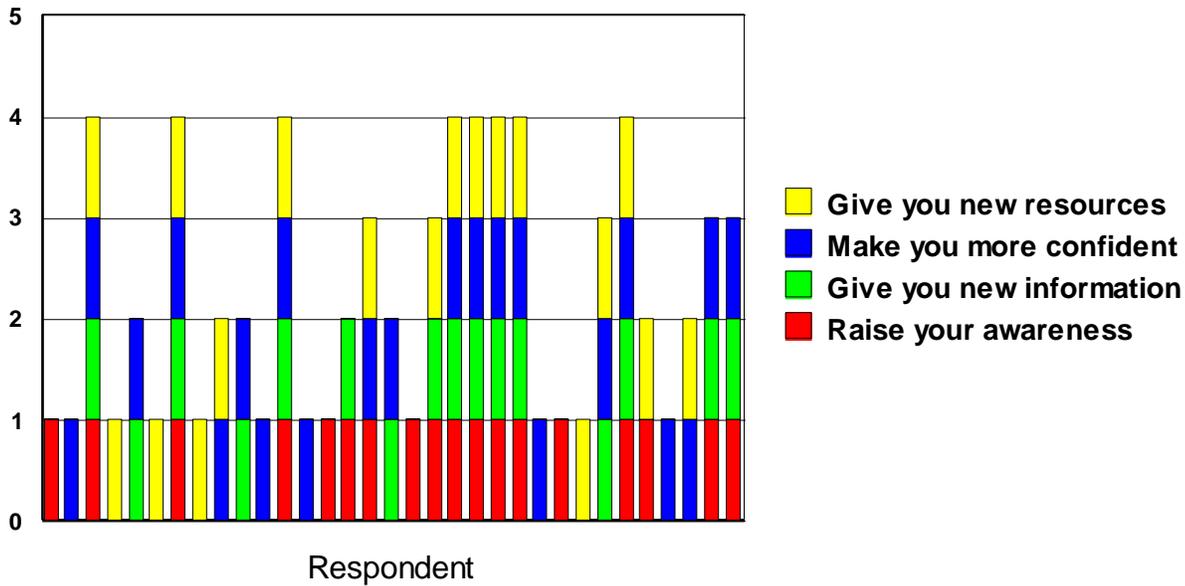


***2. To measure target audience self-reported improvement in understanding of signs of septic system failure as a result of information provided.***

63% (33 respondents) selected one or more of the options in survey question 3 that identified their having found the educational materials useful at some level. 22 reported that it helped them feel more confident they could recognize signs of septic failure, 18 that it increased their awareness of risks. 18 also reported that the materials gave them new information and 16 reported having new resources for further information.

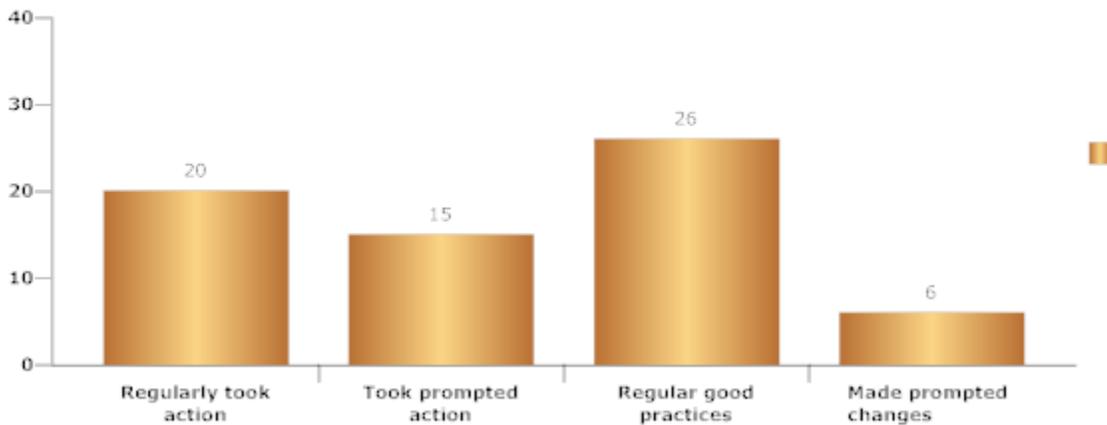
The chart below breaks down the types of usefulness reported per respondent.

### Educational Materials Were of Use 33 Respondents



The following chart examines the 33 respondents who reported finding the materials of some use (SQ3) and any actions (SQ4) or changes (SQ5) they reported. Prompted actions or changes are grouped together.

### Educational Materials of Use (SQ3) 33 Respondents

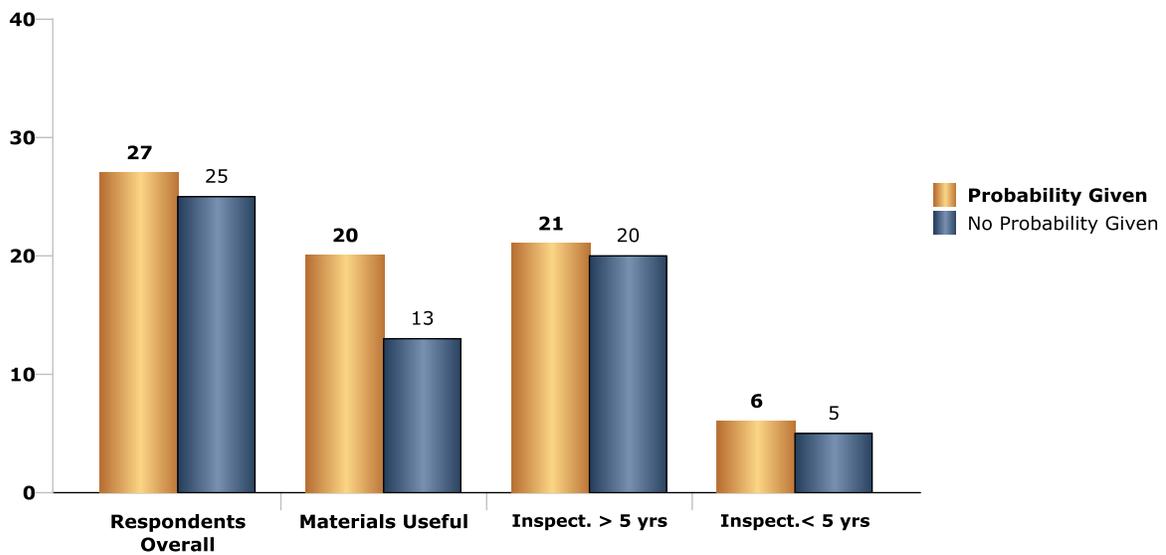


**3. To determine if providing individual relative risk of probable failure increases likelihood of response in the form of**

- **Actions taken to verify or correct their septic health**
- **Changes made incorporating corrective measures or recommended best practices.**

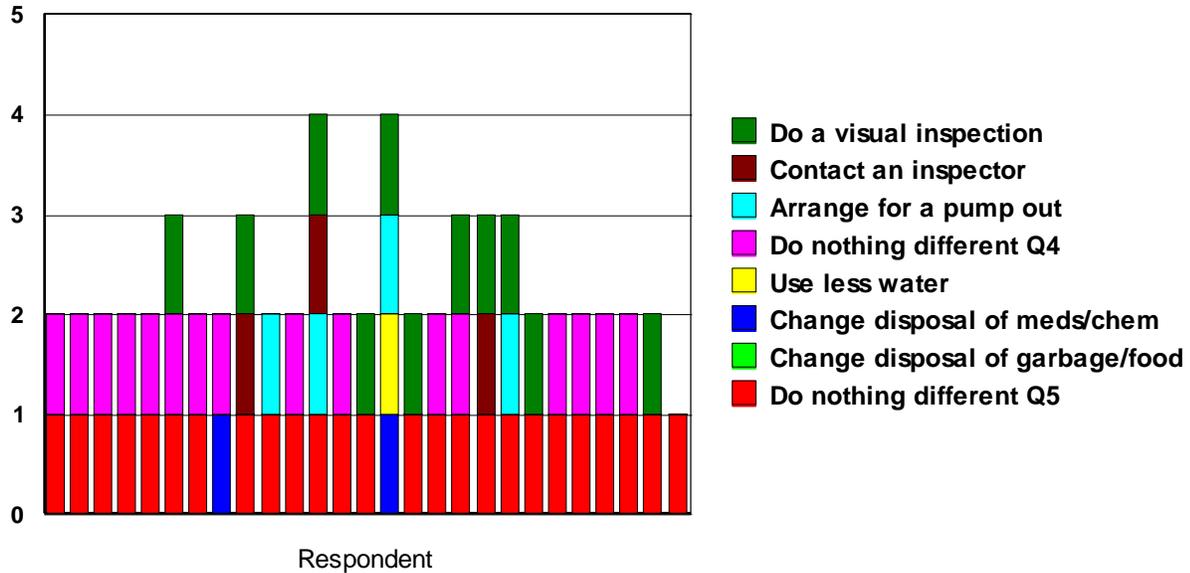
The following chart is an examination of whether there is any correlation in being given a failure probability to the type of action or maintenance that was reported. It also includes data on whether the time since a last certified inspection was 5 years or less (within guidelines) or longer (survey question 6).

**Action/Changes or Regular Maintenance  
(SQ4 & 5)  
52 Respondents**

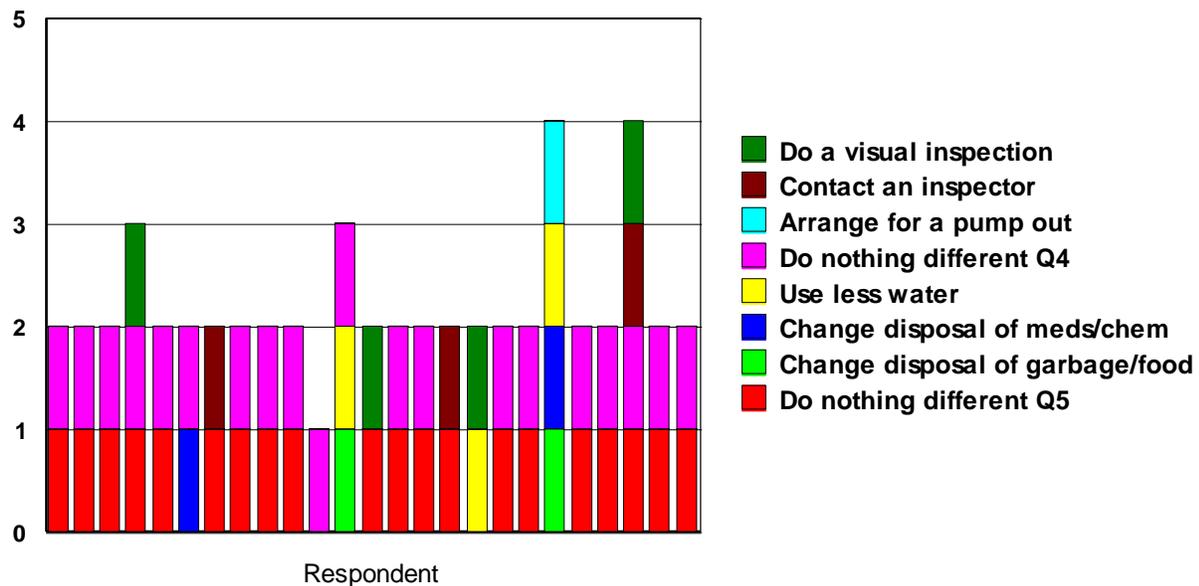


All respondents reported some form of regular care or maintenance or prompted action or change. The following two charts take a more detailed look the type of actions/maintenance taken by those who were given a failure probability and those who were not.

### Took Action or Made Changes (27) 27 Respondents Noting a Probability

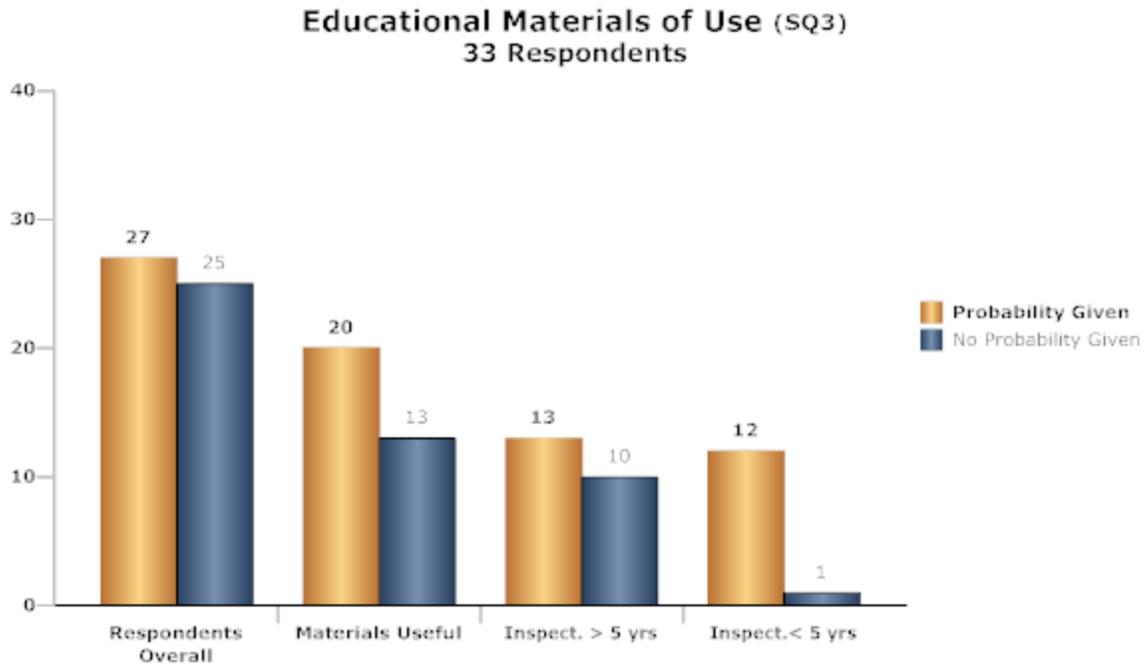


### Took Action or Made Changes (25) 25 Respondents NOT Noting a Probability



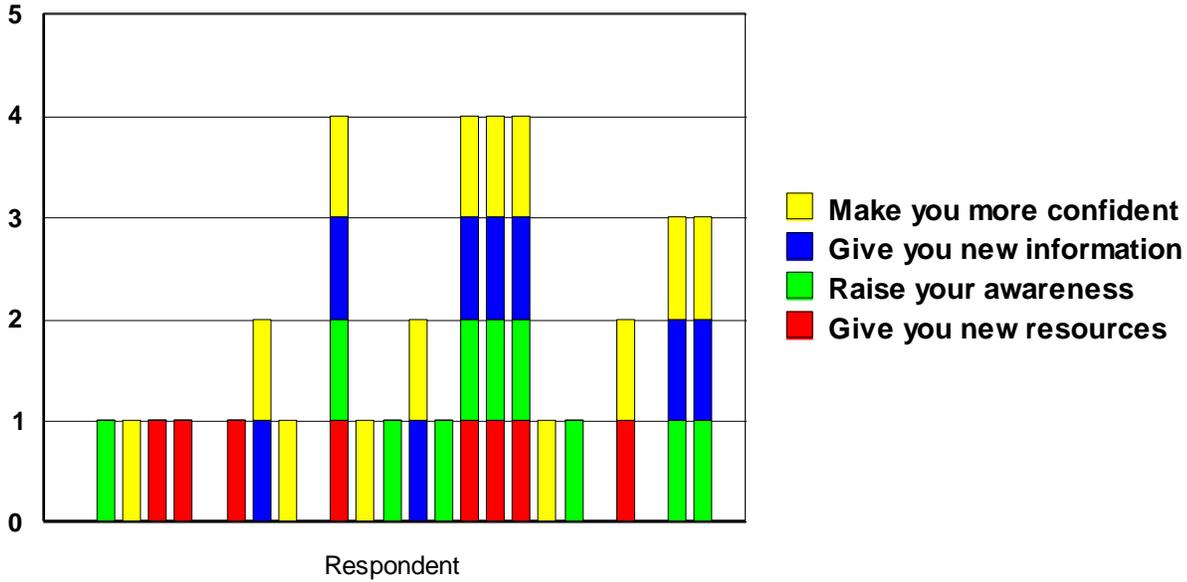
**4. To determine if providing individual relative risk of probable failure increases likelihood of self-reported improvement in understanding of signs of septic system failure as a result of information provided.**

The following chart is an examination of any correlation in being given a probability or the time of last certified inspection on the 33 respondents who reported that the materials were of some use.

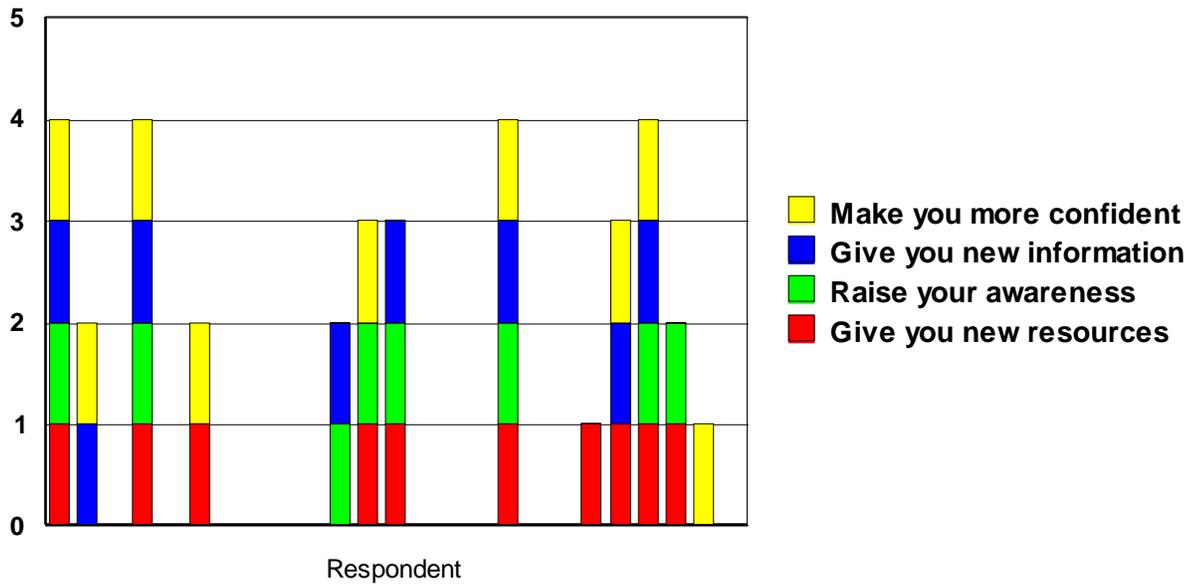


The following two charts take a more detailed look at options selected regarding the usefulness of the materials and any probability given.

### Found Materials of Use (20) Respondents Noting a Probability (27)



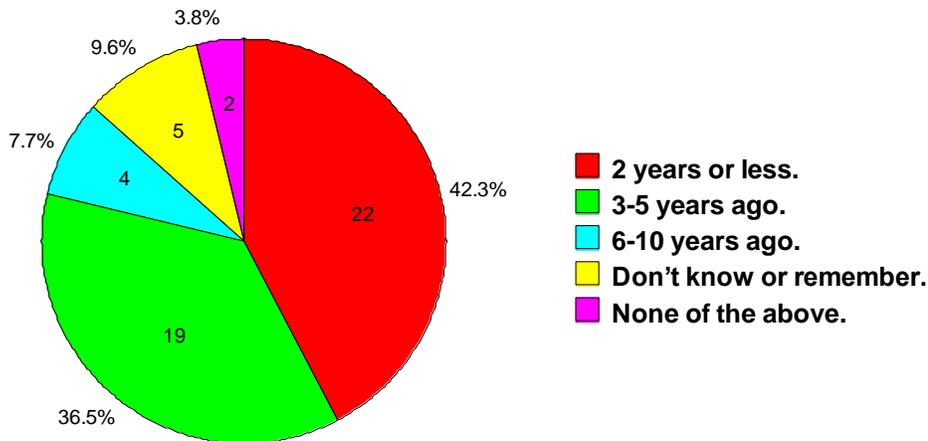
### Found Materials of Use (13) Respondents NOT Noting a Probability (25)



5. Time since the last certified inspection or pump out. This information was elicited to see if there was any correlation in responses to this factor.

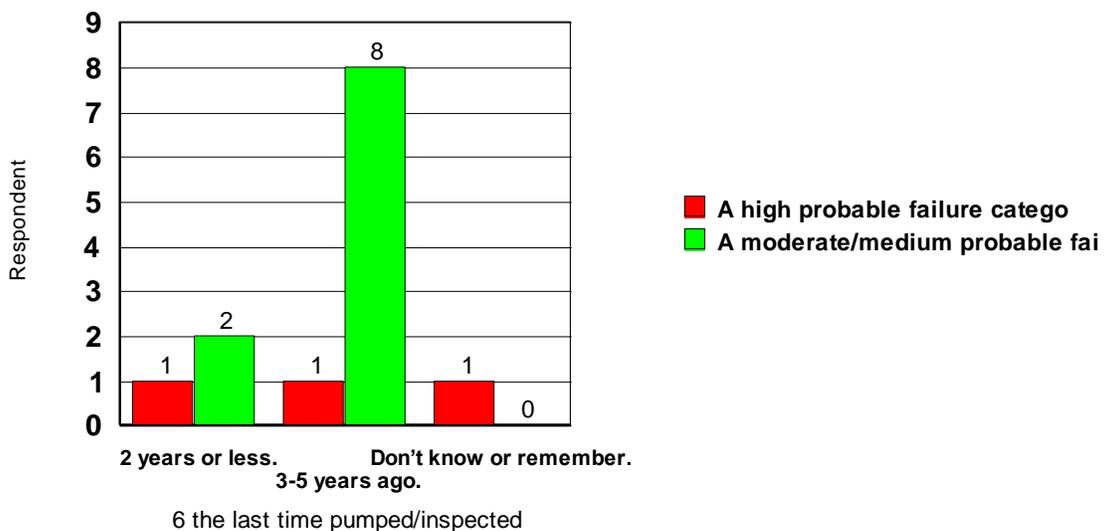
The chart below shows the options selected in survey question 6, asking when their system was last formally inspected. 41 (78%) of the respondents reported that their last inspection or pump out by a licensed contractor was either 2 years or less or 3-5 years ago. These ranges are within the recommended guidelines for septic tank maintenance.

### SQ6 Septic system inspection All Respondents



The numbers are too low to draw conclusions, however all but one respondent with high or medium system failure probabilities reported being within recommended guidelines for inspection.

### SQ6 Septic System Inspection All Respondents Given High or Medium Probabilities



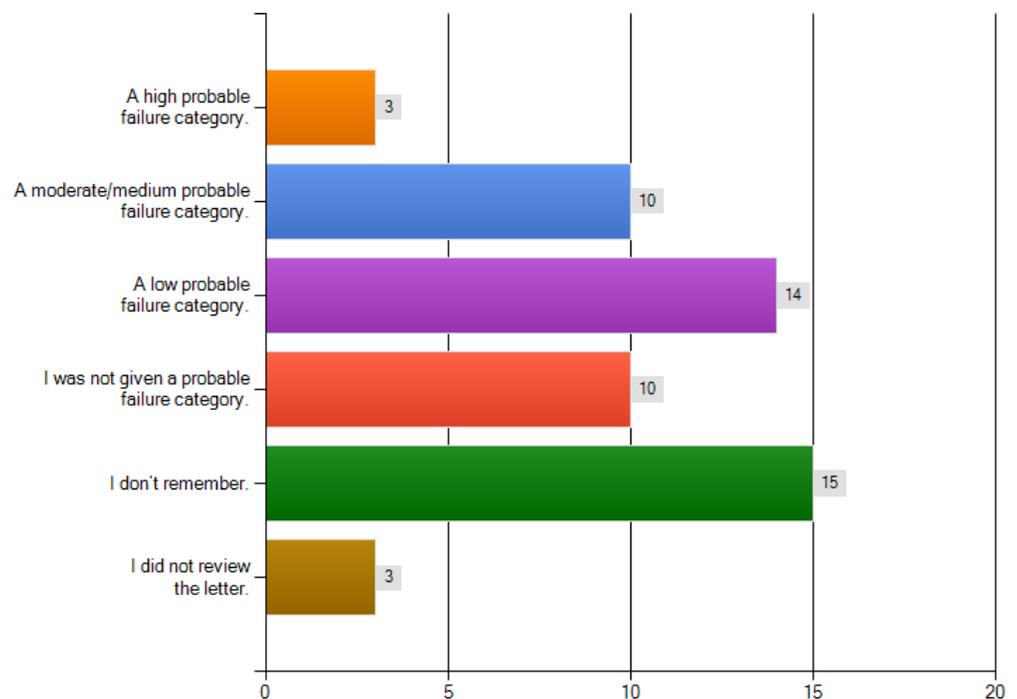
## Detailed survey responses

The first survey question gave respondents the option of adding a control number from their mailing to opt out of reminder calls. 46 submitted their numbers.

1. Please note: HRWC will be making phone calls to ensure the highest participation in this survey. To remove yourself from the call list, please fill in the control number from the top of the cover letter that accompanied this survey.

Question 2 addressed probability categories. 52% of respondents reported being given one of the three probability categories.

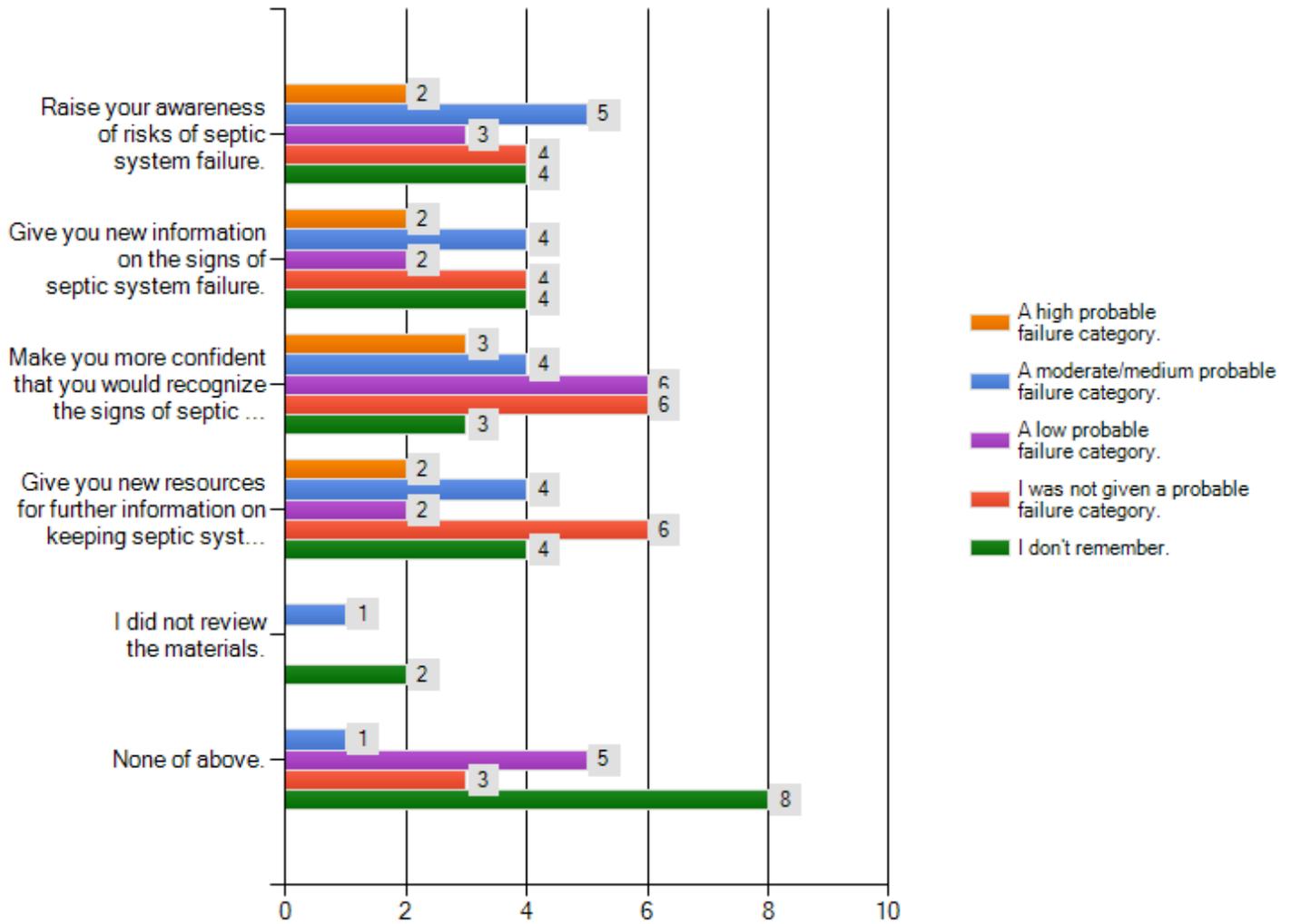
Did the letter you received earlier with the information packet tell you we saw signs indicating that your septic system may fall into: (check one)



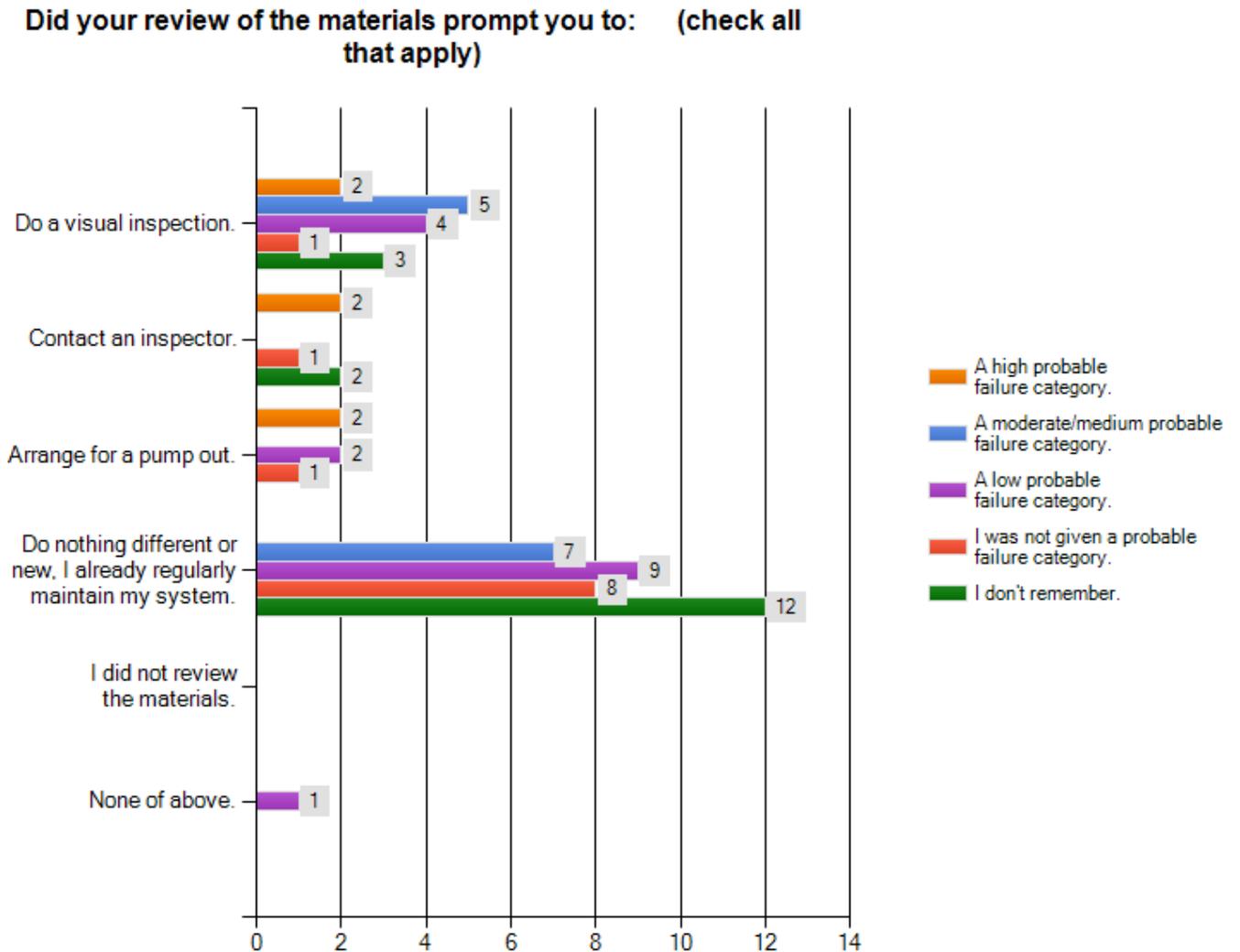
Because a goal of the survey was to explore whether failure probability information might influence responses, the remaining survey questions are shown cross tabbed with probability information.

Question 3 asked respondents to categorize what sort of use they found from the provided educational materials. 33 reported the materials of use. This chart explores the responses in relation to the type of probability categories.

**Did your review of the materials: (check all that apply)**

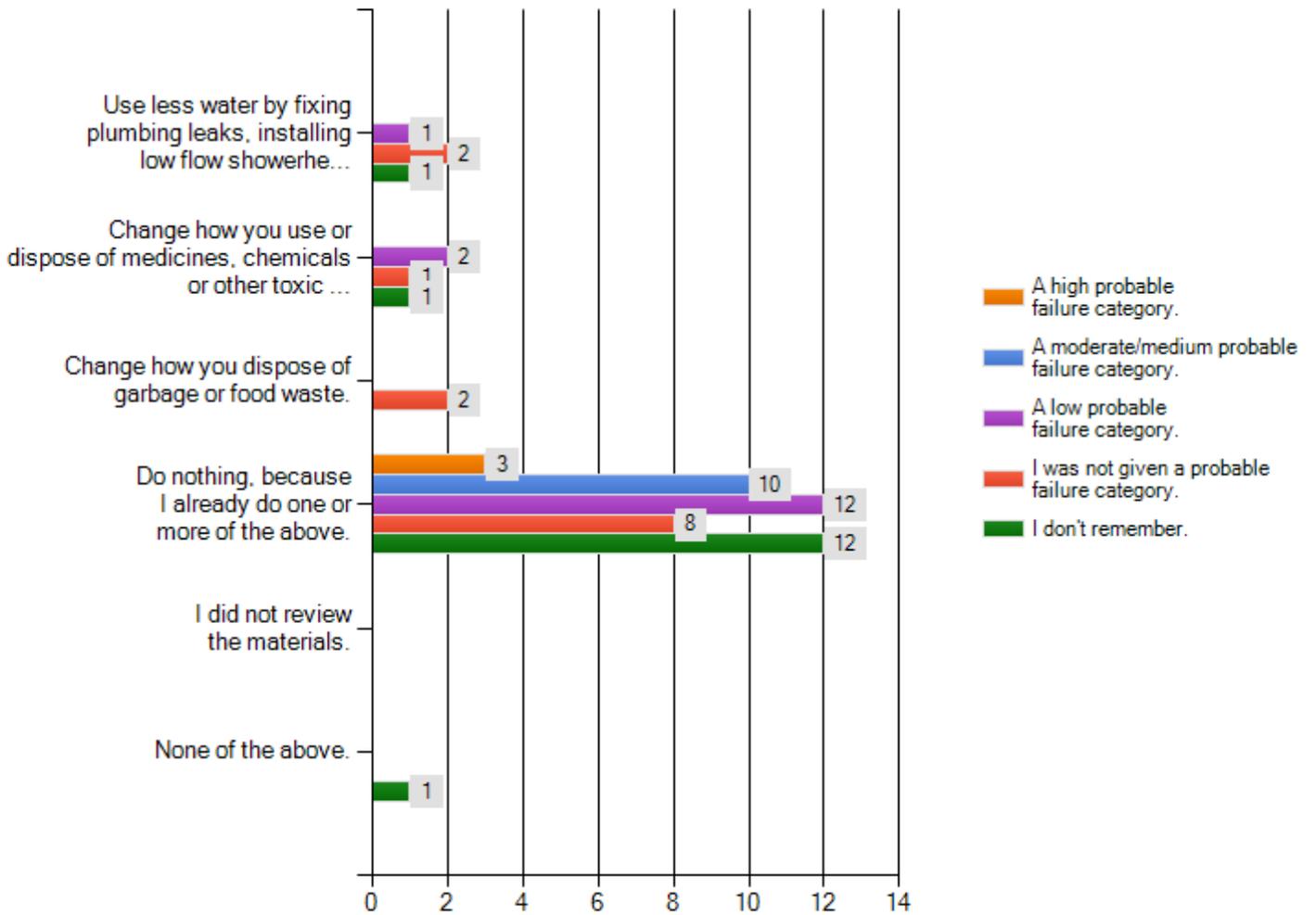


Survey question 4 asked participants to report whether they took any actions for maintenance of their septic system. This chart explores the responses in relation to the type of probability categories.



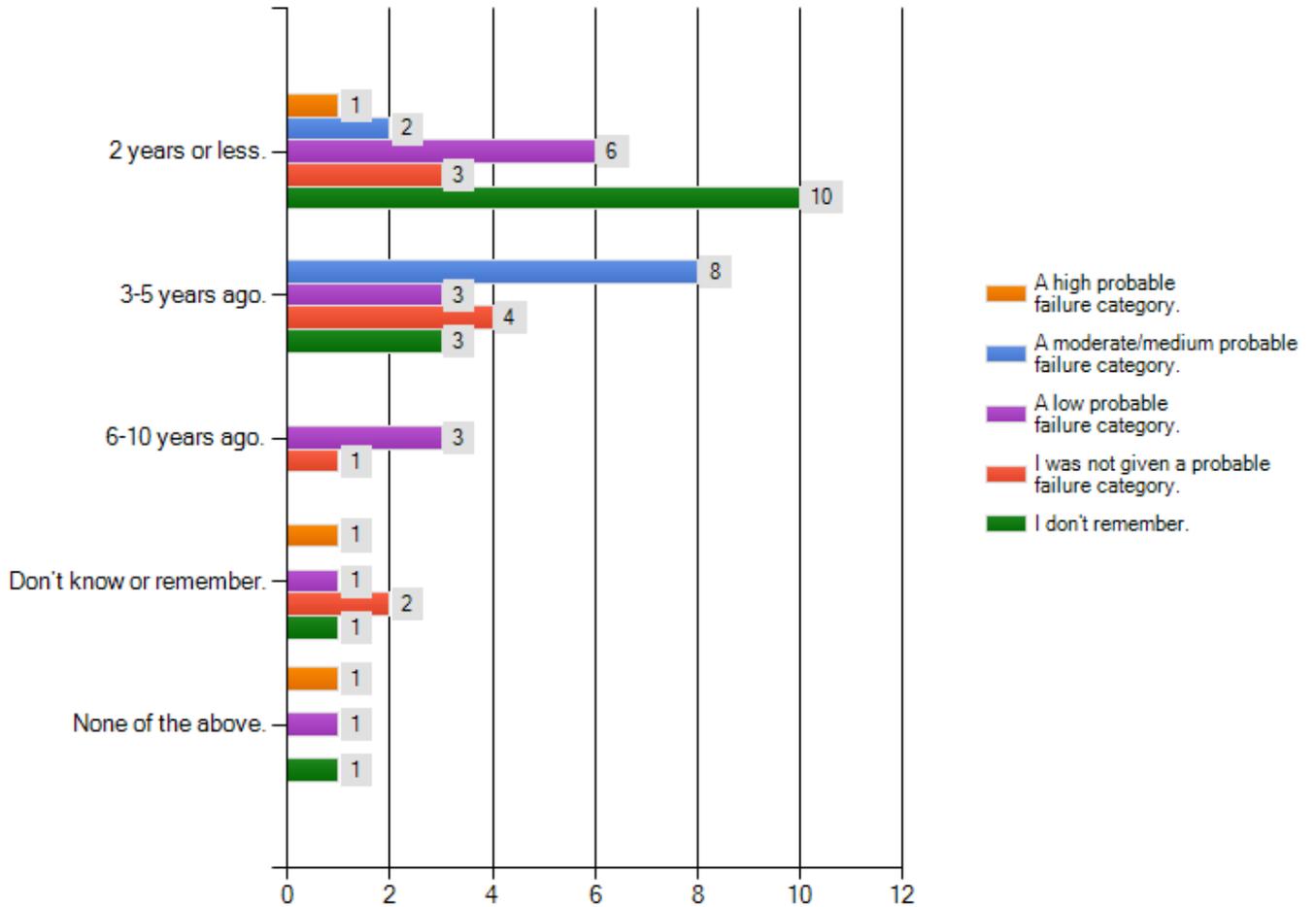
Survey question 5 asked about the use of best practices for the care of their septic system. This chart explores the responses in relation to the type of probability categories.

**Did your review of the materials prompt you to: (check all that apply)**



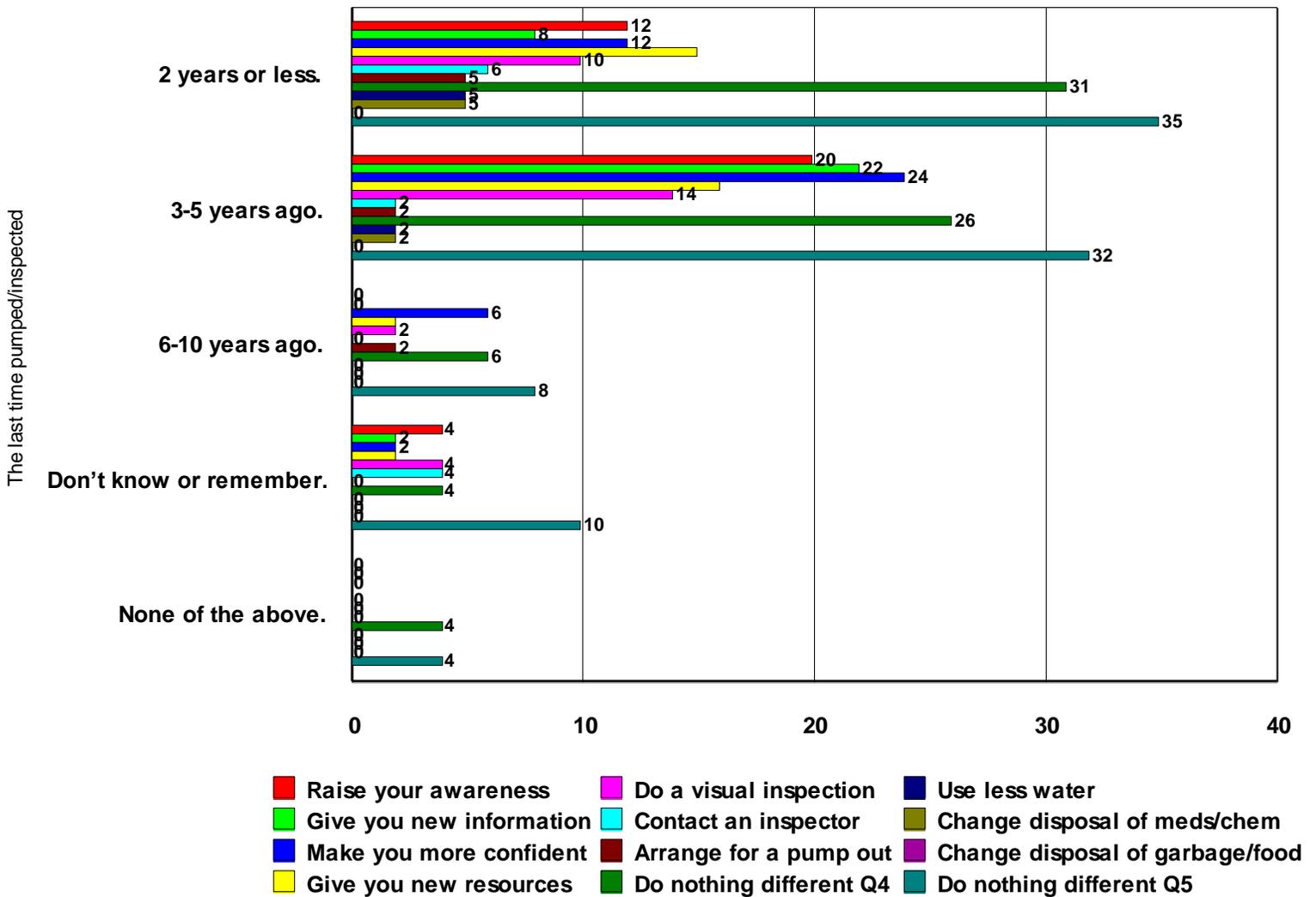
Survey question 6 asked participants to report when their system was last formally inspected. This chart explores the responses in relation to the type of probability categories.

**The last time you had your septic system inspected or pumped by a licensed contractor was:**



The final chart gives a detailed look at all responses from the time of last inspection or pump out.

### Responses by time of last inspection



That's it! Thank you for your participation. Please use the space below for any additional comments about this survey or water resources in your area. Did the letter you received earlier with the information packet tell you we saw signs indicating that your septic system may

*answered question* 17  
*skipped question* 35

Categories	Open Response Text	4. Did your review of the materials prompt you to: (check all that apply) Other	5. Did your review of the materials prompt you to: (check all that apply) Other
A high probable failure category.	The man who pumped our tank opined tha you had our property listed as "high possible failure" because a thermal image may have been taken on a day I did a lot of laundry. He saw no signs of septic failure upon our property or when he opened the tank lid.	4. We were scheduled for a pump out next summer (2014) but, due to your letter, we had our tank pumped a year early. The company, upon inspection, said we didn't need to. We did anyway.	
A high probable failure category.	Thanks for supporting and protecting our local water resources!		
A high probable failure category.	New tank and field installed 6-13-10, tank #1 to be pumped this year.		
A moderate/medium probable failure category.	This made me panic and feel paranoid about my system (which we have maintained conscientiously with regular inspections). I think it's unhelpful to be told that my system has a "medium" risk of failure without any explanation of what that means or how that was determined. Did your GIS study gather specific data on my property or just my neighborhood? We don't have any signs of septic failure (e.g. abnormal vegetation).		
A moderate/medium probable failure category.	They told us to do it again in 4 years. It was done in 2010.		
A moderate/medium probable failure category.		Motivated to schedule an inspection	
A low probable failure category.	I am very aware of all concerns about our septic system. Many neighbors have failing systems -- I hope they will become more aware of their systems and implications.		
A low probable failure category.	I am educated about our system - its condition - and its implications on others. I hope this educates people about their poor systems, I know of several.		
A low probable failure category.	If you use RIDEX monthly three stool into septic tanks they will never fail -- 20 or 30 or more years and still good per our experience! Next door neighbor to the West has, or had, a "Dry Well" with open grate spilling "water" that runs over onto 5215 Pratt Road and kills the grass -- probably washer water and or sump pump. Check it out! Thanks.	4. Nothing -- had to have it inspected to sell 6/30/12 -- passed fine!	5. It was sold 6/30/12
A low probable failure category.	I do not understand how this possible failure could be indicated. The septic field was replaced not too long ago and is properly maintained. The septic tank is pumped every 5 years. Perhaps your imagery was picking up the old field?		

A low probable failure category.		It was time anyway -- last pump was 2007.	
I was not given a probable failure category.	Please do not bother anymore. I grew up with septic tanks all my life I am 79 years old.		
I was not given a probable failure category.	Your information was helpful. Thank you.		
I was not given a probable failure category.	Asked about the expected life of septic tanks in general.		
I was not given a probable failure category.	Has 2 tanks for 1 person, thinks that she will be fine for a while.		
I was not given a probable failure category.	I don't see any indications of problems with our septic. Our neighbors on the other hand did have issues and had their system redone last year. I'm curious if you were picking up indications from their system rather than ours.		
I don't remember a category.	The image that prompted all this was from a leaking pool solar heater near the drain field. Have since stopped most leakage and will monitor it. My septic system is in good working order. Thanks for your concern. P.S. Say goodbye to Leon.		
I don't remember a category.	I have my septic tank changed every 3 to 5 years by K & D Kittey (11489 Waterloo Munith Road Munith, MI 49257) They always tell me everything is good. Last time it was pumped was 4 or 5 years ago.		
I don't remember a category.	Home was foreclosed, bought from bank 3 years ago, system had failed and is now inspected 4 times a year.		