

Survey Report

Usability Analysis of the Florida Fish and Wildlife Conservation Commission's Florida Wildlife Research Institute Red Tide Website

Lisa S. Krinsky

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For More Information

Contact Lisa Krimsky at lkrimsky@ufl.edu

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About the Author

Lisa Krimsky, Ph.D. – Water Resources Regional Specialized Agent, University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) Extension and Florida Sea Grant

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Background

The Florida Fish and Wildlife Conservation Commission's Florida Wildlife Research Institute's (FWC-FWRI) mission is "through effective research and technical knowledge, to provide timely information and guidance to protect, conserve and manage Florida's fish and wildlife resources".¹ The red tide website, <https://myfwc.com/research/redtide/>, is the agency's mechanism for disseminating information about red tides (*Karenia brevis*) in Florida, including monitoring information, advisories, and technical support. FWC-FWRI uses the website to communicate to a diverse array of stakeholders including federal, state and local governments, recreational and commercial fishing interests, universities, nongovernmental organizations and the public.

Users of websites are primarily concerned with finding desired information with ease and in a timely fashion. Usability testing measures the extent to which a website is easy to use, effective, efficient, and satisfactory.^{2,3,4} Website usability testing relies on the execution of real tasks to uncover problems and improvements with the goal of making the website a more enjoyable experience for the user.⁵

This report is an assessment of the FWC-FWRI red tide website. The report presents the findings of a usability survey and offers recommendations based on the survey results.

Methods

An online survey instrument was developed and distributed using the Qualtrics survey software company. The survey instrument was developed to include the following sections:

- Screening questions and participant consent
- Demographics
- Homepage heat mapping
- Website tasks
- Attitudes about the website aesthetics, content, functionality, and user experience
- Prior website experience

¹ Florida Fish and Wildlife Conservation Commission (2020, December 14) Fish and Wildlife Research Institute. <https://myfwc.com/about/inside-fwc/fwri/>

² International Organization for Standardization, Technical Committee of Ergonomics. (1998). *Ergonomic requirements for office work with visual display terminals (VDTs): Part 11: Guidance on usability*. (ISO No. 9241-11)

³ Joo, S., Lin, S., & Lu, K. (2011). A usability evaluation model for academic library websites: Efficiency, effectiveness and learnability. *Journal of Library and Information Studies*, 9(2), 11-26.

⁴ Roy, S., Pattnaik, P. K., & Mall, R. (2014). A quantitative approach to evaluate usability of academic websites based on human perception. *Egyptian Informatics Journal* 15, 159-167.

⁵ Dumas, S. C. & Redish, J. C. (1999). *A practical guide to usability testing*. Portland: Intellect Books.

Prior to dissemination, the survey was reviewed, piloted, and submitted for approval by the University of Florida Institutional Review Board (refer to Appendix IV for the full survey instrument). The survey was open March 15 – April 15, 2021 and distributed to Florida residents age 18 and older. Participants were recruited through press releases, the project website, newsletters, and email lists from members of the Florida Harmful Algal Bloom Communication Work Group.

Data analyses consisted of descriptive statistics (e.g., frequencies, percentages, means, and standard deviations) and are presented in tables or figures by question.

Results

Demographics

A total of 40 individuals completed the survey. Demographic information of the respondents is displayed in Table 1.

Table 1. Respondent demographics

Variable	Frequency	Percentage
Gender		
Male	12	43.0
Female	12	43.0
Prefer not to answer	4	14.0
Age		
18 to 24	1	2.5
25 to 34	4	10.0
35 to 44	3	7.5
45 to 54	8	20.0
55 to 64	8	20.0
65 to 74	10	25.0
75 to 84	6	15.0
85 and above	--	--
Race		
White	23	82.0
Other	1	3.5
Prefer not to answer	4	14.5
Education		
Some college	1	3.5
Associate's or technical degree	2	7.0
Bachelor's degree	8	28.5
Graduate or Professional degree	15	53.5
Prefer not to answer	2	7.0
County of residence		
Alachua	1	2.5
Brevard	1	2.5
Broward	1	2.5

Variable	Frequency	Percentage
Charlotte	3	7.5
Collier	10	25.0
Hillsborough	2	5.0
Indian River	1	2.5
Lee	3	7.5
Manatee	5	12.5
Miami-Dade	2	5.0
Monroe	1	2.5
Okaloosa	1	2.5
Pinellas	2	5.0
Sarasota	7	17.5

Respondents (n = 40) were asked to report what type of device they were using to complete the survey. The majority of respondents completed the surveys on computers, either a laptop or desktop (60%). The other respondents completed the survey on mobile phones (27.5%) and tablets (12.5%).

Respondents' subjective, or self-perceived, knowledge of red tide algal blooms was assessed using a 3-point Likert-type scale of agreement (1 = *not at all knowledgeable*; 3 = *very knowledgeable*). A construct mean was computed to represent respondents' overall perceived level of knowledge. Overall, respondents considered themselves to be knowledgeable about red tides in Florida ($M = 2.54$; $SD = 0.51$) (Figure 1).

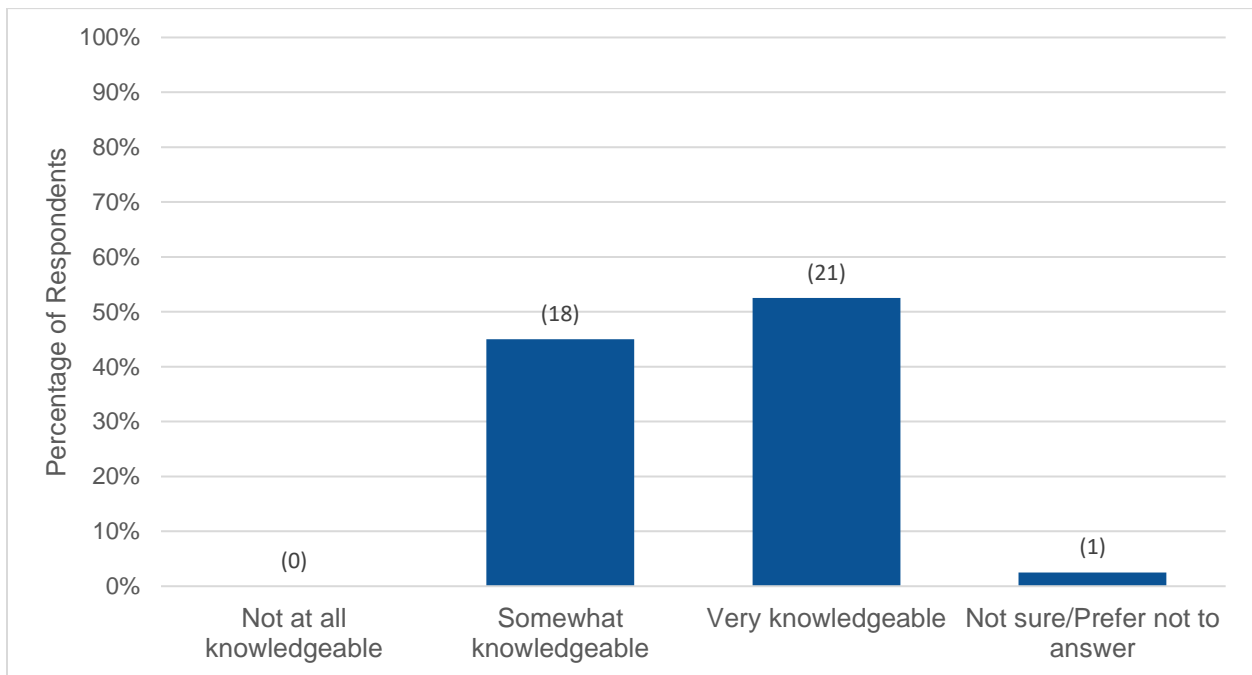


Figure 1. How knowledgeable are you about the coastal condition known as red tide?

Website Visibility

Visibility of the website homepage was assessed across five top U.S. search engines (Google, Bing, Yahoo!, DuckDuckGo, and AOL). The term “Florida red tide” was entered into the search bar and recorded if the FWC-FWRI red tide website appeared in the top ten results. The website received a visibility score of 100% appearing across all search engines.

Mapping the Homepage

Participants were shown a screenshot of a desktop version of the red tide homepage. Participants were asked to click on the area where their eye first went when they looked at the homepage image (Figure 2). According to the heat map image, the majority of respondents (71%) clicked on the red tide image. The remaining participants clicked on the FWC logo (10.5%), the Red Tide heading (7%), the Search Bar (3.5%), and Red Tide Current Status region (3.5%).

Participants were then asked to click on the area of the homepage image where they would go for more information (Figure 3). The majority of respondents clicked on the Red Tide Current Status (34%) and Daily Sample Map (18%). These and other regions selected are presented in Table 2.

Table 2. Homepage Heat Map: Area where individuals will go for more information

Homepage Region	Frequency	Percentage
Red Tide Current Status	14	38
Daily Sample Map	7	18.5
Red Tide image	3	8
Red Tide heading	2	5
Red Tide FAQ	2	5
About Us	2	5
FWC logo	1	2.5
Tools for Tracking Red Tides	1	2.5
Harmful Algal Bloom/Red Tide Task Force	1	2.5
HAB Monitoring Database	1	2.5
Facebook	1	2.5
Ambiguous/Undefined Regions	3	8

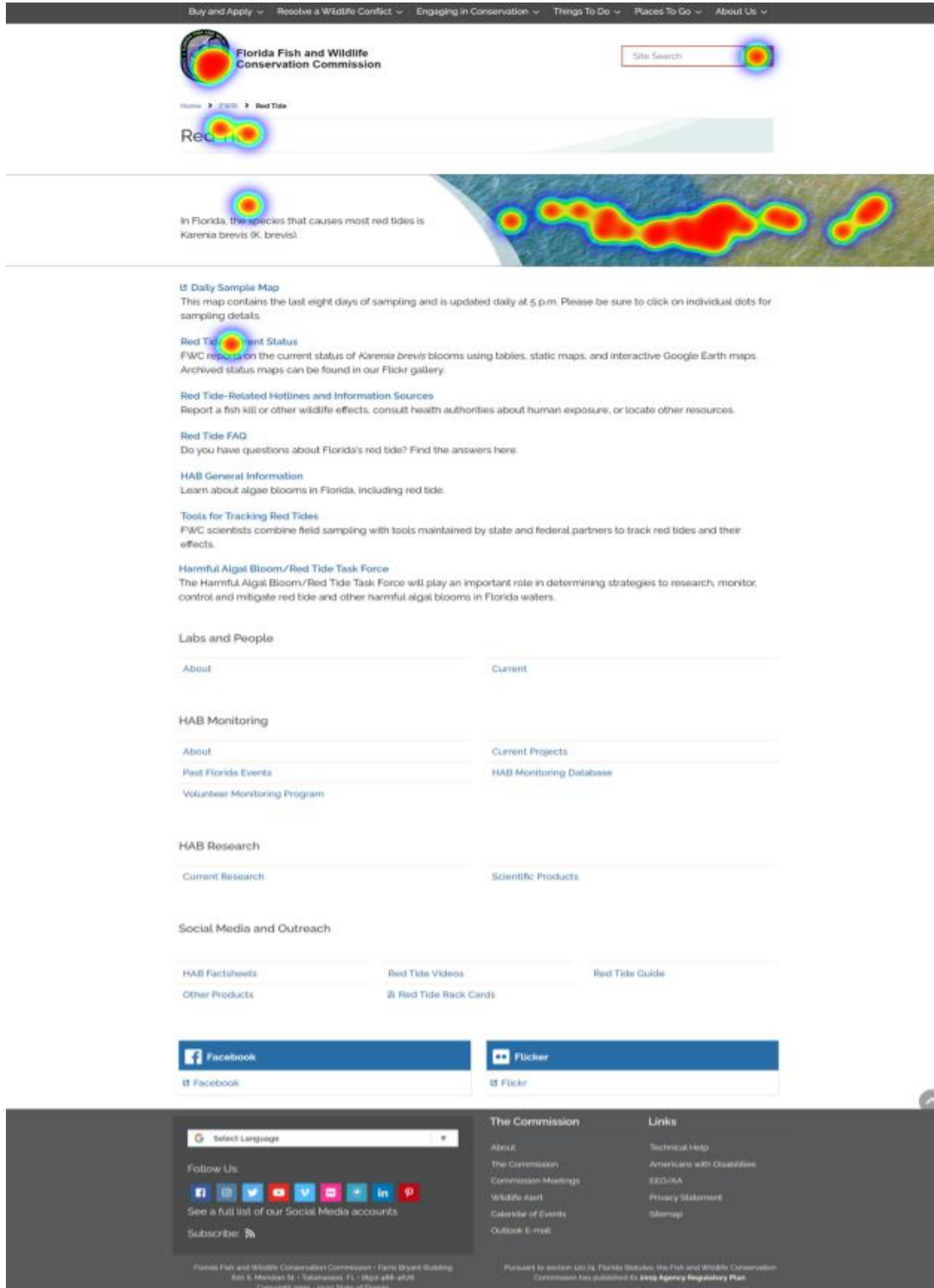


Figure 2. Homepage Screenshot Heat Map: Area where eyes first went (scale: 1 to 2 clicks)

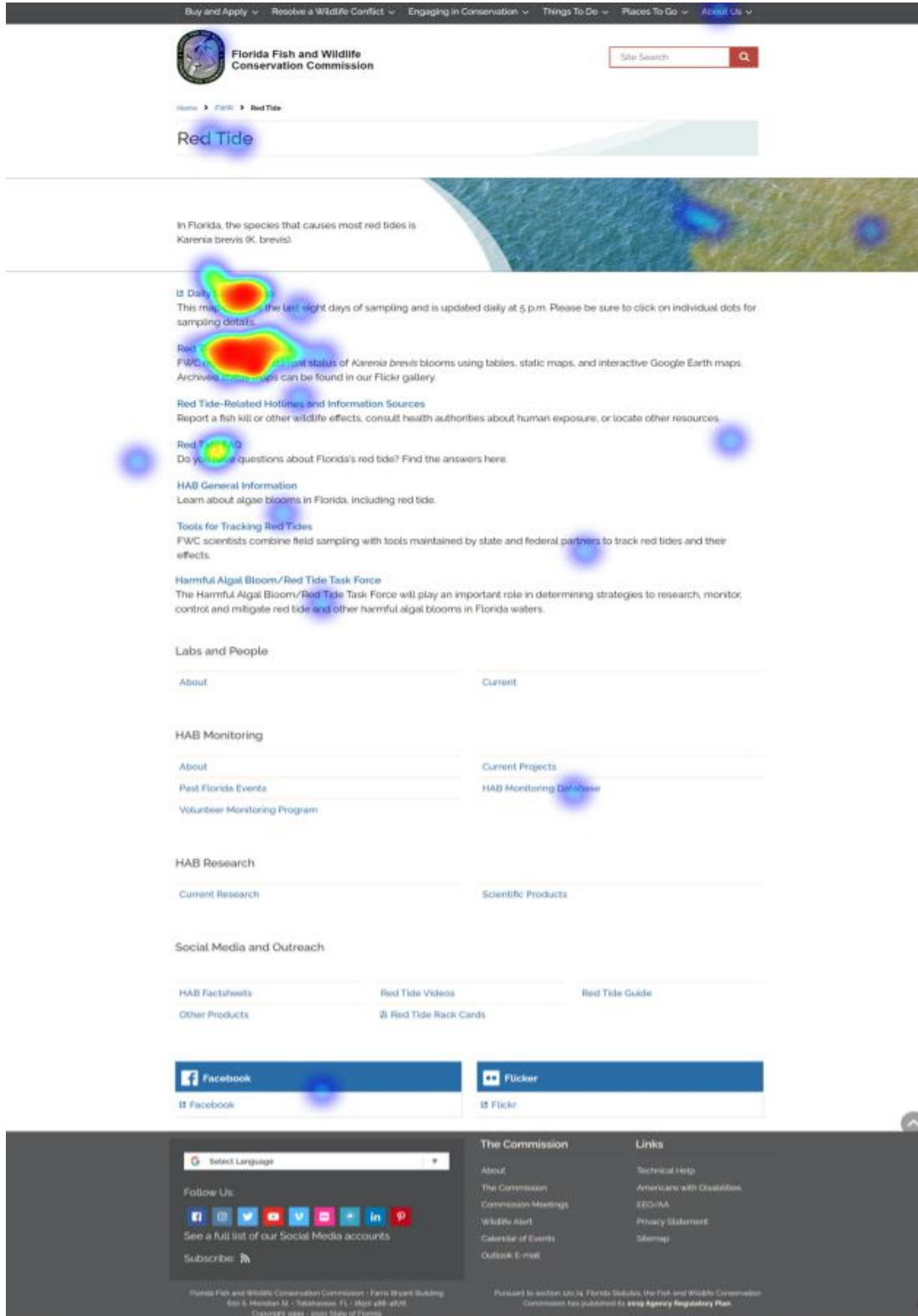


Figure 3. Homepage Screenshot Heat Map: More information (scale: 1 to 3 clicks)

Website Tasks

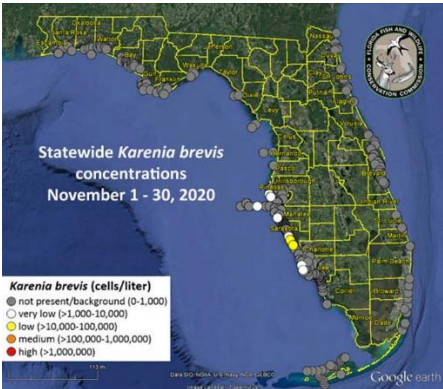
Participants were presented with four questions representative of those one might try to answer when they visit the page. The questions were designed to assess different elements within the website and varied in their level of difficulty. To complete the tasks, participants were advised to open and navigate the website in a new browser by clicking on the provided URL. For each task, the number of correct responses was assessed. The time it took a respondent to make their first click, second click, and the length of time it took a respondent to submit their response was recorded in seconds. The total number of clicks each respondent made was also recorded. Respondents were asked questions about their experience after completing the task.

Task 1: Possible effects associated with red tide cell count abundance Correct Responses

Forty individuals completed Task 1. Less than half of respondents (47.5%) were able to correctly answer the question about the possible effects during a red tide with low cell abundance. A further 27.5% of participants were unable to navigate the website to find the answer (Table 3).

Table 3. Number of respondents who correctly answered Task 1

Question	Answer Choices	f	%
<i>What are the possible effects during a red tide with low (yellow) cell abundance?</i>	No effects anticipated	4	10.0
	Respiratory irritation; shellfish harvesting closures; possible fish kills; probable detection of chlorophyll by satellites at upper range of cell abundance	19	47.5
	Respiratory irritation; shellfish harvesting closures; beach closures	3	7.5
	Respiratory irritation; shellfish harvesting closures; probably fish kills; probable detection of chlorophyll by satellites	3	7.5
	I was unable to find this information	11	27.5



Note. Correct answer is bolded.

Time of Task

The amount of time it took the respondents to submit their answer (page submit) was recorded in seconds. The mean time to submit the page was 162.96 seconds. Participants clicked an average of 7 times within the website to try and find the information. Table 4 displays the full results.

Table 4. Task 1: Number and timing of clicks in seconds

(n = 40)	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Time of First Click	1.52	212.75	36.11	46.02
Time of Last Click	23.39	418.39	158.29	110.98
Time of Page Submit	40.24	420.28	162.96	109.74
Click Count	1	41	7.13	7.90

Respondent Perceptions

Respondents who provided an answer to Task 1 were asked to report a subjective account of their experience including ease of navigation and perception of time spent completing the task. Respondents' perception of ease in navigating the website to complete Task 1 was measured on a 5-point Likert scale (*strongly disagree* to *strongly agree*). 32.4% of respondents had a positive attitude to the ease of navigation, 45.9% of respondents had a negative attitude, and 21.6% were neutral in their perceptions (Figure 4). These respondents believed equally that the amount of time to complete the task was *very little time* (48.2%) and *moderate amount of time* (48.2%). Less than 4% of respondents believed the task took *a lot of time* to complete (Figure 5).

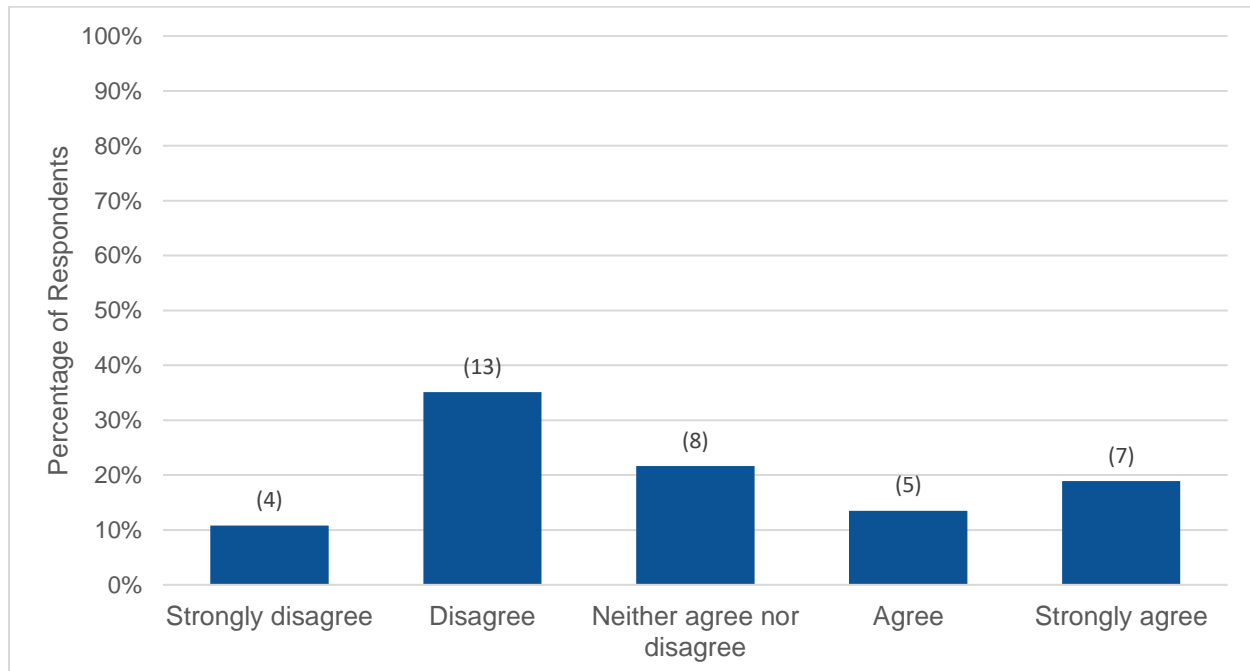


Figure 4. Percent agreement with the statement "I was able to easily find my way around the website to complete Task 1". Answer frequency shown in parentheses.

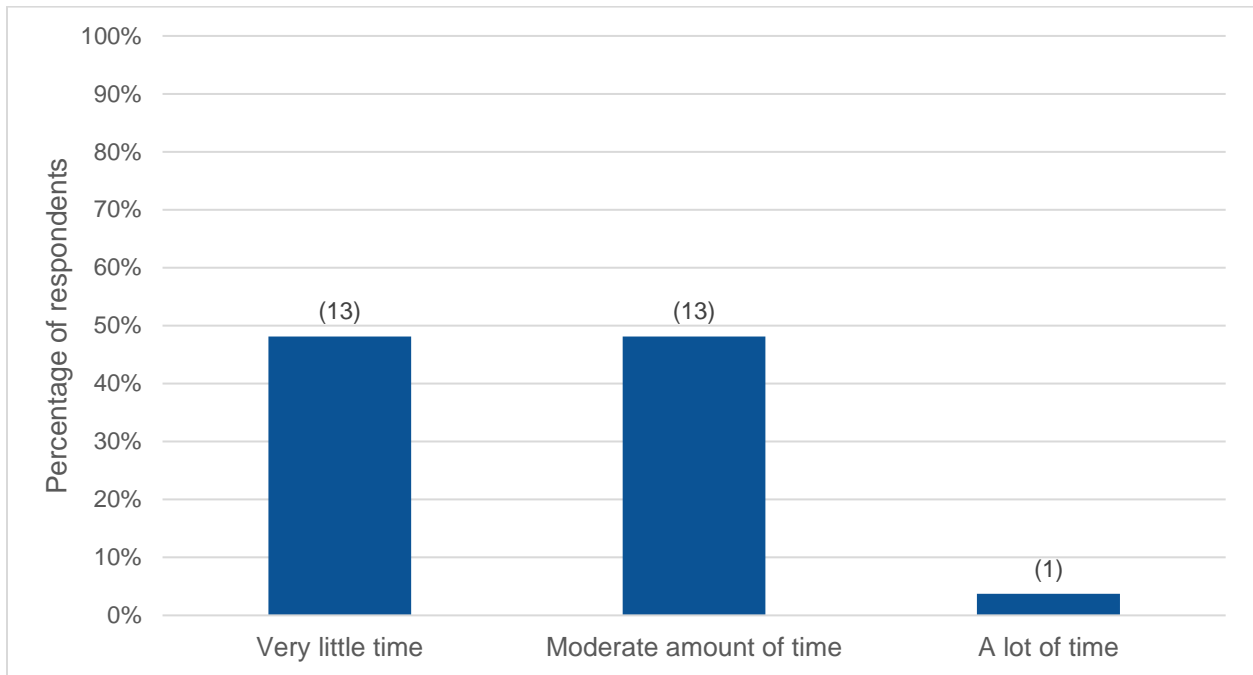


Figure 5. Perception of time spent completing Task 1. Answer frequency shown in parentheses.

Open-ended Responses

Participants were provided the opportunity to write additional feelings, opinions, or recommendations about the website and their experience associated with completing Task 1. (Note: Quotes are provided verbatim). The following themes emerged from this question:

Respondents reported that the website key is easy to understand and recommended that the effects, status map graphic and key all be available on the same page.

- *The Key seems very straight forward.*
- *A graphic would have been quicker to read the relative information.*
- *The key could cross walk current labels to associated effects.*

Respondents suggested making the information simpler and the font size larger, this was specifically noted for older populations.

- *Letters are too small to read for older people.*
- *Too wordy - too many "instructions" under each topic. Perhaps younger, very tech-oriented folks will do well but for seniors, just too much to read unless you want to spend a lot of time looking and like research. Giving the Red Tide info on daily news stations, or maybe on an app might be easier.*
- *Suggest a page with large fonts and easy to find links to current status only. Put all of your other info on separate pages. Have this page only for current status.*

Respondents suggested that the organization of the website made it difficult to find the information.

- *It was more like a treasure hunt.*
- *I had to leave the website to answer the survey question.*
- *Looked in Daily Sample Map, FAQ. Red Tide Current Status allowed me to find the concentration and then the corresponding color but I could not just see what yellow meant. Needed an extra step.*
- *I used the search bar and pasted the question - no clear response. I then shortened to "cell abundance" and "red tide effects" - no clear response. I then <ctrl F> for both shortened searches - no clear results.*
- *The effect of various concentrations was not easily found (effect of yellow concentrations).*
- *Disorganized website.*

Task 2: Respiratory irritation reports

Correct Responses

Thirty-three individuals completed Task 2. Participants were asked to select which county/counties had reported respiratory irritation. Participant responses were compared to the weekly red tide status reports for the corresponding dates. Responses were scored as either correct or incorrect. All counties with respiratory irritation had to be selected to receive a score of correct. 28% of participants were able to correctly answer the question, 59% reported an incorrect answer, and 19% responded that they were unable to find the information on the website (Figure 6).

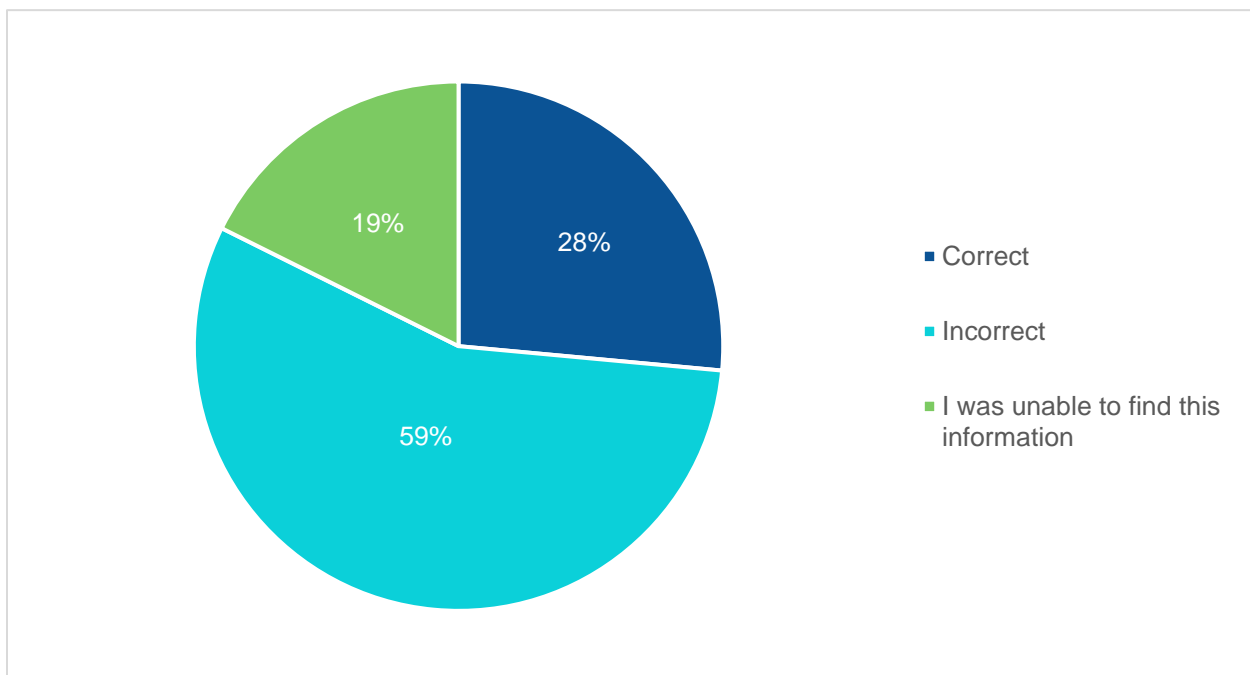


Figure 6. Percentage of respondents who correctly answered Task 2. Answer frequency shown in parentheses.

Time of Task

The amount of time it took the respondents to submit their answer (page submit) was recorded in seconds. The mean time to submit the page was 56.36 seconds. Participants clicked an average of 3.3 times within the website to try and find the information. Table 5 displays the full results.

Table 5. Task 2: Number and timing of clicks in seconds

(n = 33)	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Time of First Click	3.52	100.06	29.37	27.99
Time of Last Click	5.10	295.24	49.25	53.80
Time of Page Submit	11.09	297.52	56.36	55.30
Click Count	1	12	3.30	2.88

Respondent Perceptions

Respondents who provided an answer to Task 2 were asked to report a subjective account of their experience including ease of navigation and perception of time spent completing the task. Respondents' perception of ease in navigating the website to complete Task 2 was measured on a 5-point Likert scale (*strongly disagree* to *strongly agree*). 41.9% of respondents had a positive attitude regarding the ease of navigation, 35.5% of respondents had a negative attitude, and 22.6% were neutral in their perceptions (Figure 7). 70.8% of respondents believed that the amount of time to complete the task was *very little time* and 29.2% believed the task took a *moderate amount of time* to complete (Figure 8).

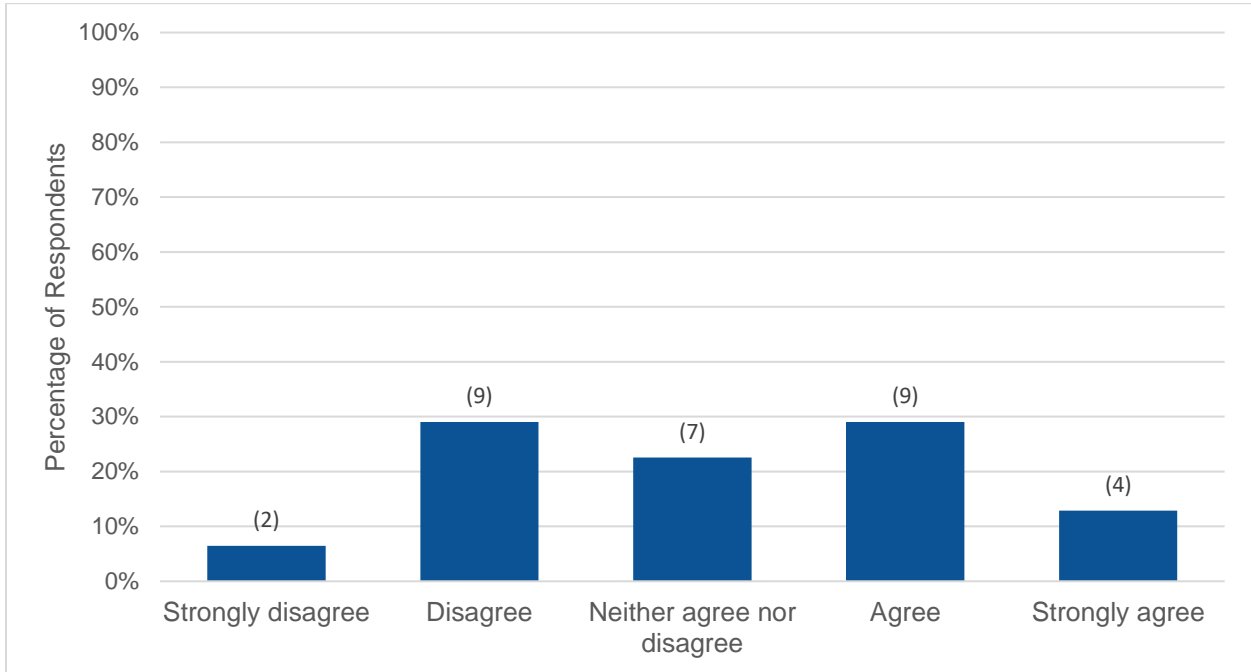


Figure 7. Percent agreement with the statement “I was able to easily find my way around the website to complete Task 2”. Answer frequency shown in parentheses.

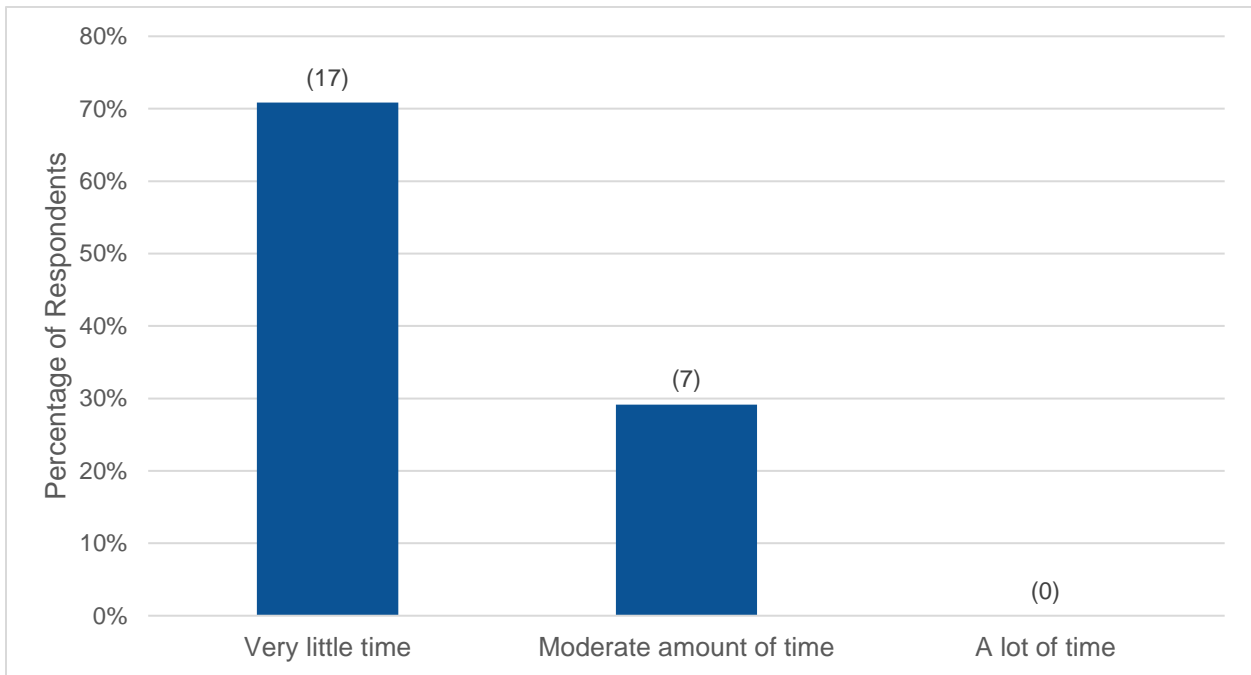


Figure 8. Perception of time spent completing Task 2. Answer frequency shown in parentheses.

Open-ended Responses

Participants were provided the opportunity to write additional feelings, opinions, or recommendations about the website and their experience associated with completing Task 2. (Note: Quotes are provided verbatim). The following themes emerged from this question:

Respondents found respiratory information in various places throughout the website and were confused by the multiple reports.

- *White-Very low is possible respiratory irritation; Task 2 was confusing - it said respiratory irritation not possible. So whether to include Sarasota and Charlotte counties was unknown.*
- *I knew where to look beforehand, but I don't think it would be easy if you were not familiar.*
- *Info should be under current conditions by region. Should not have to scroll to Respiratory Irritation.*
- *Found where it talks about respiratory effects but doesn't indicate where those document...another area says respiratory effects can be where red tide present so guess anywhere detected from low to high at any given time?*

Respondents suggested making the font size larger.

- *Letters are very small & hard to read.*

Task 3: Swimming safety

Correct Responses

Thirty-two individuals completed Task 3. The majority of respondents (65.5%) were able to correctly answer the question about the safety of swimming during a red tide in Florida. Only 12.2% of participants were unable to find the answer (Table 6).

Table 6. Number of respondents who correctly answered Task 3

Question	Answer Choices	f	%
<i>According to information on the website, is it safe to swim during a red tide in Florida?</i>	Yes, swimming is safe for all people	0	0.0
	Yes, swimming is safe for most people although people with respiratory illness may experience respiratory irritation and should use caution	21	65.5
	No, swimming could cause Neurotoxic Shellfish Poisoning	2	6.3
	No, swimming should be avoided for most people	4	12.5
	I was unable to find this information	5	12.2

Note. Correct answer is bolded.

Time of Task

The amount of time it took the respondents to submit their answer (page submit) was recorded in seconds. The mean time to submit the page was 48.44 seconds.

Participants clicked an average of 1.56 times within the website to try and find the information. Table 7 displays the full results.

Table 7. Task 3: Number and timing of clicks in seconds

(n = 32)	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Time of First Click	1.76	107.97	29.60	23.58
Time of Last Click	4.33	292.31	44.07	53.17
Time of Page Submit	11.09	309.49	48.44	55.36
Click Count	1	6	1.56	1.08

Respondent Perceptions

Respondents who provided an answer to Task 3 were asked to report a subjective account of their experience including ease of navigation and perception of time spent completing the task. Respondents' perception of ease in navigating the website to complete Task 3 was measured on a 5-point Likert scale (*strongly disagree* to *strongly agree*). 54.8% of respondents *agreed* or *strongly agreed* that it was easy to navigate Task 3, 29% *disagreed* or *strongly disagreed*, and 16% were neutral (Figure 9). 69.2% of respondents believed that the amount of time to complete the task was *very little time*, 26.9% indicated in took a *moderate amount of time* and 3.9% of respondents believed the task took a *lot of time* to complete (Figure 10).

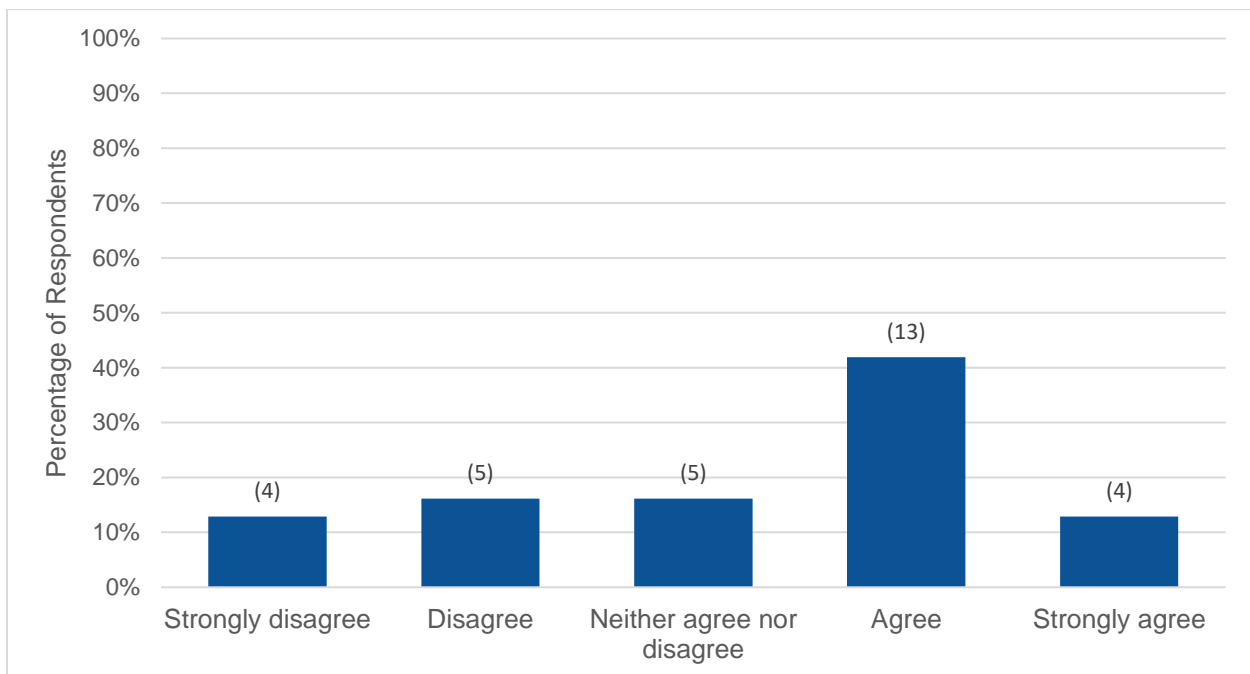


Figure 9. Percent agreement with the statement "I was able to easily find my way around the website to complete Task 3". Answer frequency shown in parentheses.

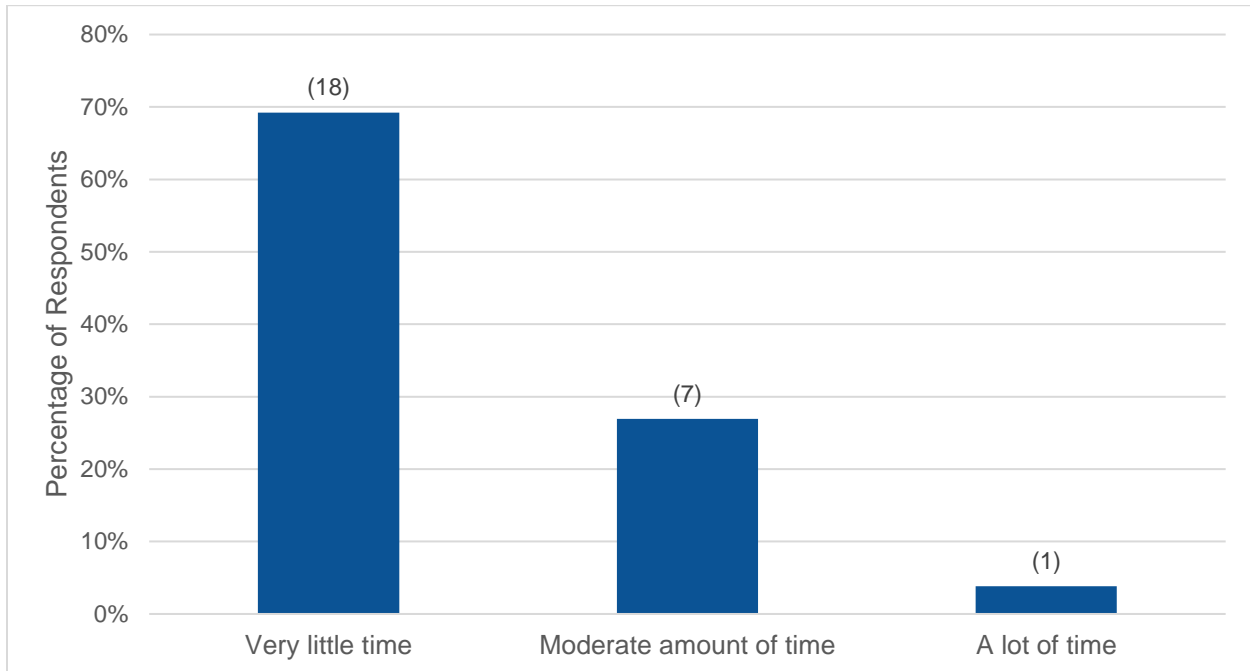


Figure 10. Perception of time spent completing Task 3. Answer frequency shown in parentheses.

Open-ended Responses

Participants were provided the opportunity to write additional feelings, opinions, or recommendations about the website and their experience associated with completing Task 3. (Note: Quotes are provided verbatim). The following themes emerged from this question:

Respondents had mixed experiences navigating the website to find information related to swimming; some found it easily whereas others could not find any information at all.

- *Task 3 - Website Current Status doesn't even mention Swimming!*
- *Where is it?*
- *It was in FAQ, makes sense.*
- *Easy to find but used Google to supplement the data to derive the answer quicker.*
- *Where I expected it in FAQ.*
- *Information you are asking for is on the website and easy to find.*

Respondents suggested alternative ways to present the information in a simpler, more straightforward way.

- *Provide a list of must-know safety would be helpful.*
- *Graphics would be easier to read and quicker to get information.*
- *Less greenwashing, more blunt and clear warnings.*

Task 4: Email updates

Correct Responses

Thirty individuals completed Task 4. Participants were asked to sign up for email updates using the email address redtide@ifas.ufl.edu. 45% of participants indicated that they were successfully able to sign up for email updates on the website, 55% reported an inability to sign up for email updates (Figure 11).

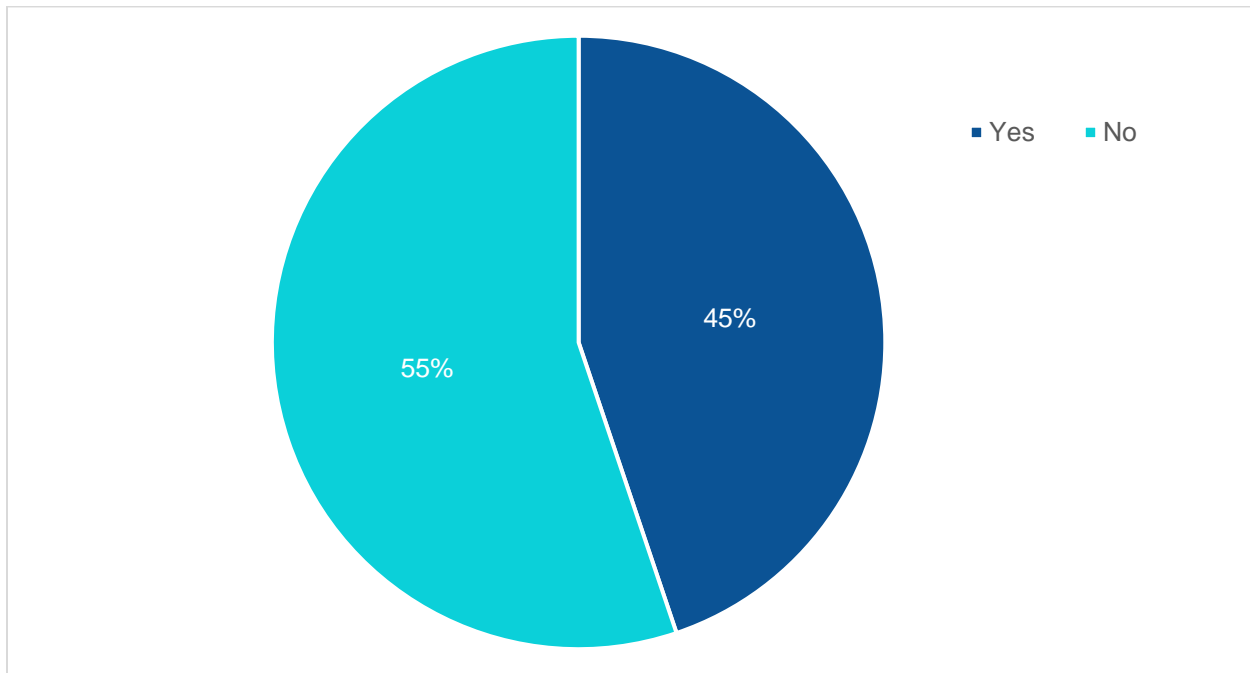


Figure 11. Percentage of respondents who were able to complete Task

Time of Task

The amount of time it took the respondents to submit their answer (page submit) was recorded in seconds. The mean time to submit the page was 78.56 seconds. Participants clicked an average of 2.17 times within the website to try and find the information. Table 8 displays the full results.

Table 8. Task 4: Number and timing of clicks in seconds

(n = 30)	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Time of First Click	2.51	199.29	27.77	50.94
Time of Last Click	2.51	271.66	37.77	70.93
Time of Page Submit	11.04	272.65	78.56	69.89
Click Count	1	7	2.17	1.51

Respondent Perceptions

Respondents who provided an answer to Task 4 were asked to report a subjective account of their experience including ease of navigation and perception of time spent completing the task. Respondents' perception of ease in navigating the website to complete Task 4 was measured on a 5-point Likert scale (*strongly disagree* to *strongly agree*). 37.9% of respondents had a positive attitude to the ease of navigation, 48.3% of respondents had a negative attitude, and 13.8% were neutral in their perceptions (Figure 12). 69.2% of the respondents believed that the amount of time to complete the task was *very little time* and 30.8% believed it took a *moderate amount of time* (Figure 13).

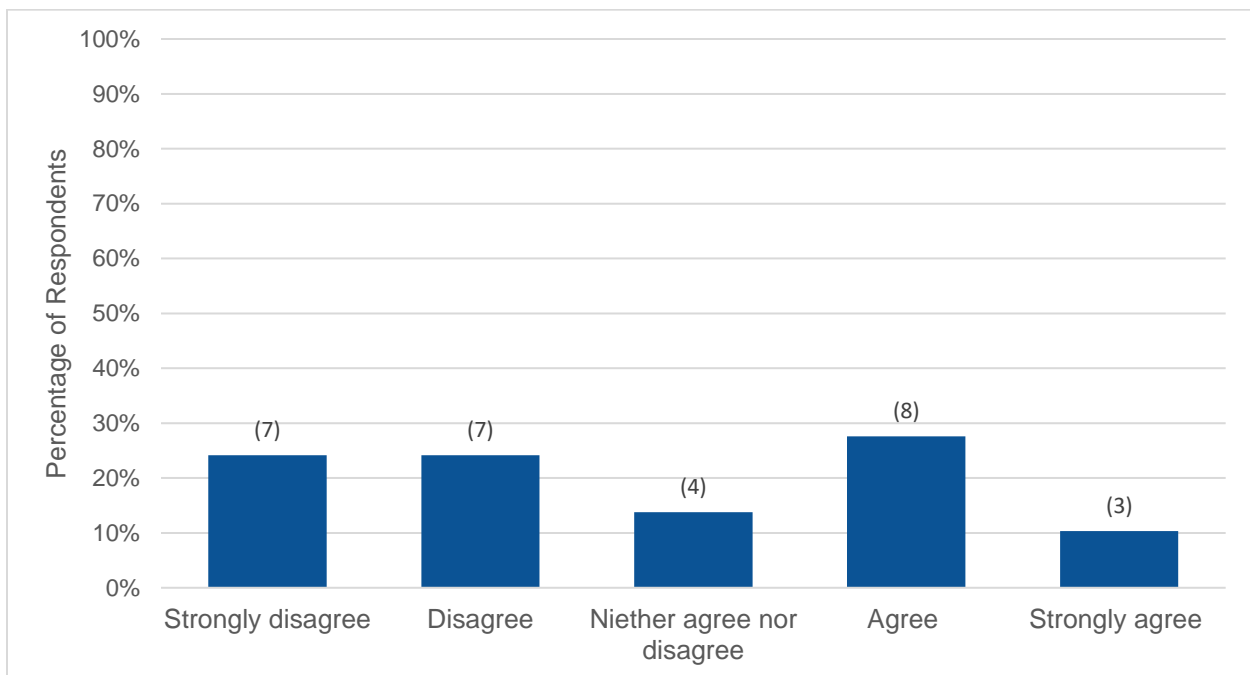


Figure 12. Percent agreement with the statement "I was able to easily find my way around the website to complete Task 4". Answer frequency shown in parentheses.

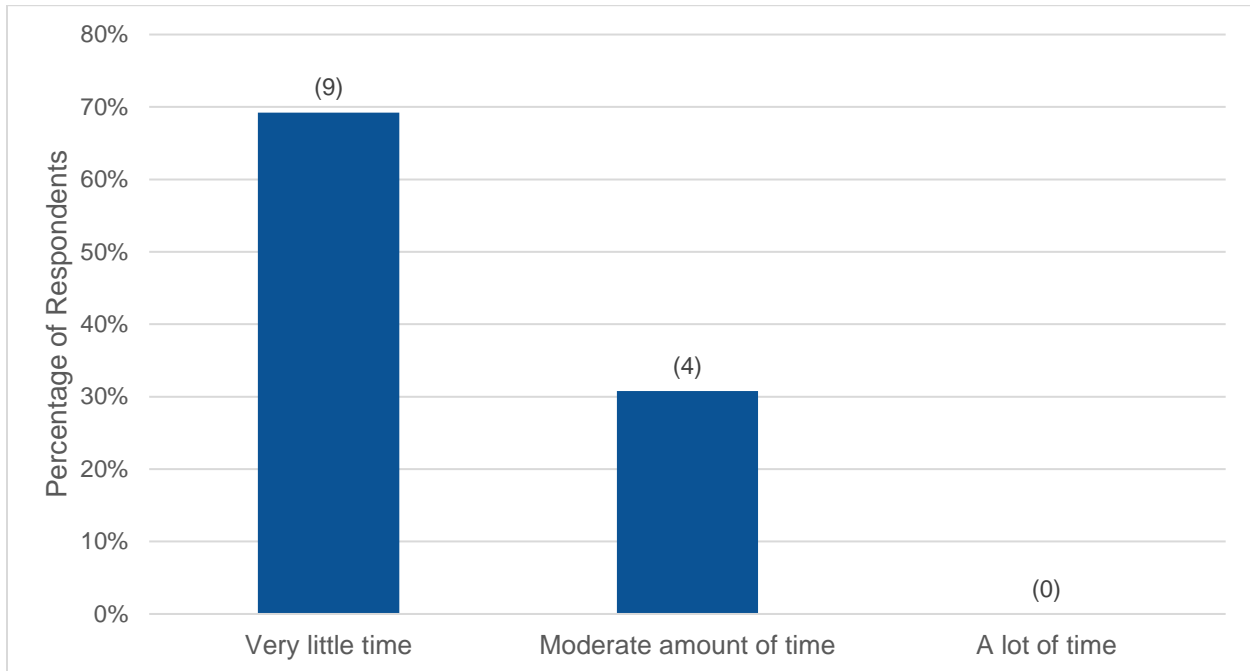


Figure 13. Perception of time spent completing Task 4. Answer frequency shown in parentheses.

Open-ended Responses

Participants were provided the opportunity to write additional feelings, opinions, or recommendations about the website and their experience associated with completing Task 4. (Note: Quotes are provided verbatim). The following themes emerged from this question:

Respondents were unable to find the location to sign up for email updates or thought that there were too many steps involved in the process.

- *At bottom of page?*
- *If possible, provide only a single link to sign up. You currently have two links to get to the subscription page.*
- *I put the red tide link address into Google and it brought up too many places. Then within the sample we were using for the survey, there was no "sign up here" or if you want to join our email, provide your email address" spot. I did see social medial and FB and others, but nothing specific that stood out for signing up via email.*
- *Never did find it.*

Respondent Variability

Standard deviation was high across the four tasks. Variability between respondents' task completion metrics is presented in Figures 14 and 15.

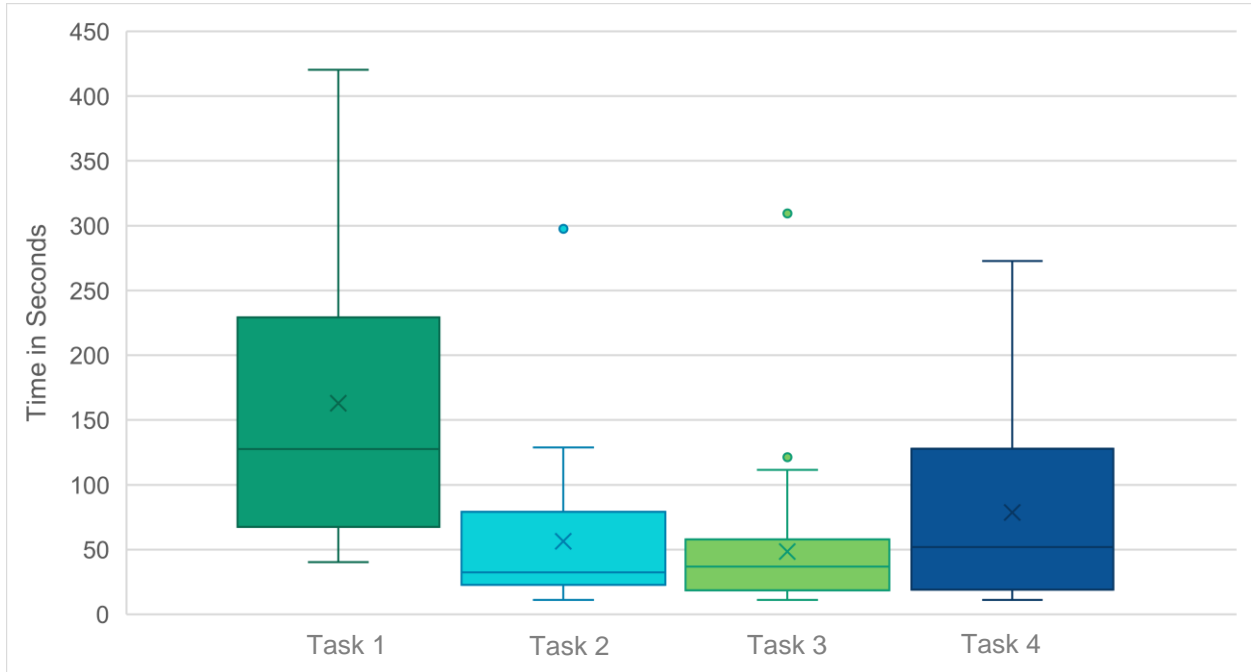


Figure 14. Respondents' time to click submit for all tasks

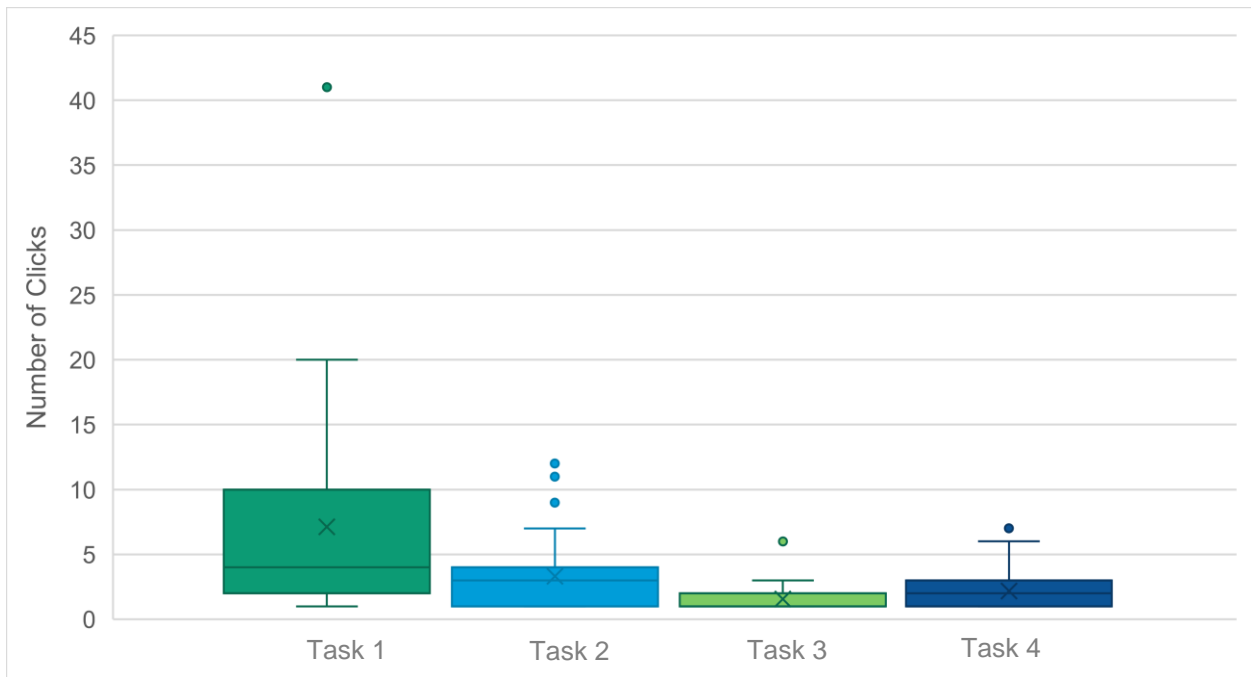


Figure 15. Respondents' number of clicks to complete all tasks

Attitudes Towards Website

Twenty-eight participants provided their level of agreement or disagreement with statements about the website functionality and visual appeal. Attitudes about the website were measured using a 5-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*). A construct mean was computed to represent respondents' overall attitude toward the website. On average, respondents were neutral in their attitude about the

website. Specifically, respondents had slightly negative attitudes about the usefulness of the content of the website. Respondents were neutral in their attitudes about the website attractiveness, logic, and ease of use (Table 9).

Table 9. Respondent's attitudes toward the website

Item	<i>M</i>	<i>SD</i>
This website has information that is of interest to me.	1.79	0.92
The pages on this website are attractive.	2.68	1.22
This website seems logical to me.	2.64	1.19
The layout of this website is confusing*.	2.79	1.26
Using this website for the first time was easy.	3.25	1.14
Everything on this website is easy to understand	2.79	1.13
Overall Attitude	2.82	1.10

*Real limits: 1.00 to 1.49 = strongly disagree; 1.50 to 2.49 = somewhat disagree; 2.50 to 3.49 = neither agree nor disagree; 3.50 to 4.49 = somewhat agree; 4.50 to 5.00 = strongly agree. *Note: Reverse scale (1 = strongly agree; 5 = strongly disagree)*

Website Experience

Respondents were asked if they had ever used the website prior to the survey evaluation. Those who indicated “yes” were asked to provide information about content they usually search for on the website. 46% of respondents (n = 28) have accessed the FWC-FWRI red tide website before (Figure 16).

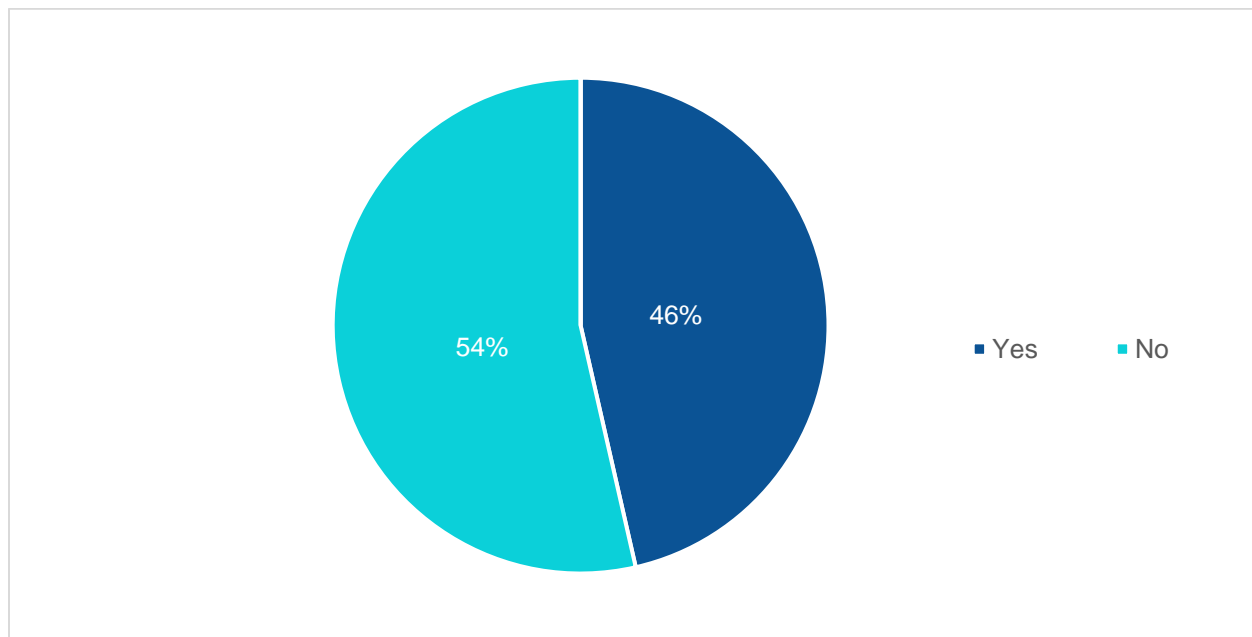


Figure 16. Percent of respondents who have used the FWC-FWRI website before

The kinds of information that participants use the website for were reported as:

- *Current status, location and cell concentrations of red tide (8 responses)*
- *State of affairs that Mote educates the public with*
- *Exec summary provided by FWC for fishermen*

Conclusions & Recommendations

Results suggest that there is opportunity to improve the website's usability for the public. The website is most successful at meeting efficiency standards, but changes should be considered to improve ease, effectiveness, and user satisfaction.

Website Visibility

- The website is highly visible among the five most used search engines in the United States and consistently appeared among the top ten search results using the search terms "Florida red tide".
- The website was used by nearly half of all respondents prior to participating in the survey.

Mapping the Homepage

- The majority of the respondents indicated that the area of the homepage where their eyes first went was the red tide image. However, the areas where they would most likely go for more information were identified as the Red Tide Current Status link followed by the Daily Status Map. Users gravitate to images and these results suggest that there is an opportunity to make navigation easier for users by shifting visual focus to the area(s) where people would go for more information by using graphics and images.

Website Tasks

- Successful completion among the four tasks was only 46.5%.
- The average time to submit a response for all four tasks was 86.58 seconds (*S.E.* = 30.30, *n* = 4) and participants had an average of 3.57 (*S.E.* = 1.93, *n* = 4) clicks across all four tasks.
- For those participants who were able to complete the tasks, the perception of how easy it was to navigate the website was mixed. On average, 41.8% of respondents had positive feelings overall, 39.7% of respondents had negative opinions, and 18.5% were neutral. Overall, respondents believed that the time it took to complete the tasks was *very little time* (64.4%).
- These results and the open-ended responses suggest that the layers of navigation necessary to find desired information are challenging for users. The website should integrate graphics, could be simplified for the general public, and the search bar optimized for frequently sought information.

Attitudes

- Overall, respondents had a neutral attitude about the website's aesthetics, content, and functionality. Specific comments suggest that the website may be too complex and wordy for older populations.

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