

# Usability Test Report

## Calm B4 the Storm: Wet/Dry Mapping Application

Date of Report: 04/20/2018  
Date of Testing: 04/18/2018 - 04/19/2018  
Location of Test: Walker 120A, Michigan Technological University

Prepared by: Taylor King and Ellie Bruckner  
Course: HU 4628: Usability and User-Centered Design  
Instructors: Karla Kitalong and Robert Pastel

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## Executive Summary

Overall, there were several errors that occurred during testing. Most of these errors were already known and are intended to be addressed. There were, however, some errors which were presented that had not been considered. Of significance, there was an error in the ability to add waypoints between existing entries. Despite the errors, however, users reported that the application was easy to learn and use.

## Methodology

The methodology refers to the means of testing, including the scenarios, participants, and location of testing.

## Testing

The usability testing of the wet/dry mapping application was administered by Taylor King and Ellie Bruckner. In-person testing occurred over the course of two days, April 18th and 19th. One remote test was conducted by Taylor King on April 20th.

During the in-person usability testing, five participants were asked to spend, at most, one hour with the application. During this time participants completed a set of task scenarios and answered a post-test survey.

During the remote usability testing, the participant was asked to complete the same task scenarios, answer the post-test survey, and record the amount of time spent in testing.

## Participants

The six participants were between the ages of 18 and 24, and own a smartphone. They also have the following profile characteristics:

<u>Gender</u>		<u>Ethnicity</u>	
Female	2	Caucasian	5
Male	3	Hispanic/Latino	1
Prefer not to say	1	<u>Total</u>	<u>6</u>
<u>Total</u>	<u>6</u>		

Participants were recruited prior to testing with the assistance of Dr. Robert Pastel and the Computer Science department at Michigan Tech.

## Technology Comfort Level

This question was focused on the user's perception of their technological abilities and comfort with using technology. It was important to ask this question because a user's thoughts on their

own abilities can significantly impact their ability to enjoy using the app or their willingness to learn how to use the application.

Q1: Technology comfort level	
1 (not at all)	0
2	0
3	0
4	1
5 (very)	5
Total	6

Most participants are students of Michigan Tech and are, therefore, rather versed in computer use out of necessity. As we can see, the participants all feel comfortable and confident using technology.

### **Familiarity with Wet/Dry Mapping**

This question asks the participants whether they are familiar with the process of wet/dry mapping, or the intended use of the data collected. This is to gauge whether some participants may have more experience with the process of wet/dry mapping and the data entry associated with it.

Q2: Familiarity with wet/dry mapping	
1 (not at all)	4
2	2
3	0
4	0
5 (very)	0
Total	6

None of the participants are very familiar with, or have experience, wet/dry mapping. This means that the participant pool will be a good source of data for incoming or new volunteers for wet/dry mapping.

### **Familiarity with UTM Coordinates**

The participants were asked whether they were familiar with the UTM coordinate system. This acts as a way to identify which users may have more experience with mapping, in general. It also indicates whether users will be able to find errors with the use of the coordinate system in the application.

Q3: Familiarity with UTM coordinates	
1 (not at all)	2
2	2
3	1
4	1
5 (very)	0
Total	6

There are two users who are relatively familiar with UTM coordinates, however the majority of participants are not at all familiar with the coordinate system.

### Task Scenarios

During usability testing the participants were asked to complete five task scenarios. The tasks were presented in a numerical order and participants were instructed to complete the tasks chronologically.

The tasks were identified from the nominal use scenarios and application summary from the wet/dry mapping team.

Number	Task
1	Create a new team within the application.
2	Record a series of five given waypoints.
3	Edit the third waypoint.
4	Delete the fifth waypoint.
5	Navigate to the help page and back.

The total completion time for all in-person participants was recorded. All participant also completed a post-testing survey where they were asked, on a scale of 1 to 5, their experiences with specific portions of the application.

### Location of Testing

In-person testing occurred in the Walker Building, room 120A, on the Michigan Tech campus. The participants used the Google Chrome browser on either the test administrator's or the application developer's computer to access the site. The computer was set to display like an iPhone 6.

Remote testing occurred in the home of the participant. The participant used the Google Chrome application on their phone to access the application.

## **Findings and Recommendations**

During testing, the test administrator, also the response logger, took notes about the comments of the participant made during testing.

### **Task Analysis**

The task analysis' purpose is to identify and report usability findings specific to each task scenario.

Overall, it took users between 10-20 minutes to successfully complete the task scenarios without prompting or advice from the test administrator or application developer.

#### **Task 1: Team Creation**

For task 1 the users were asked to create a new team within the application using their name, the name of the test administrator, and the name of the application developer. The participants were also assigned the "Portage Test" reach, moving downstream for data collection.

At this point users did not report any problems with the creation of the team.

#### **Task 2, 3, 4: Record/Edit/Delete Data**

Task 2 gave the participants a list of six waypoints with information about water presence, chronology, and other findings. They were then asked to enter the first waypoint as the initial and then to continue chronologically and enter the other five waypoints. Each waypoint in the task scenario included information about the presence of water. Several also included secondary comments about wildlife.

Task 3 instructed participants to edit the third waypoint to reflect a given set of data. This also included an additional comment to be added to the point.

Task 4 instructed participants to delete the fifth waypoint.

#### **Error 1: Waypoint Editing and Organization**

The most pressing problem was that one participant deleted a waypoint and couldn't enter the data back in. Upon trying to add the

waypoint back into the data there was no way to add a waypoint between two existing waypoints. There is also not a way to edit the waypoint number to fix the chronology issue.

### **Error 2: UTM Character Limit**

Another error was that the character limits for the UTM-easting coordinates were not correct. The easting coordinates have a three character zone code followed by six digits. The input field, however, requires a three character zone code and seven characters. It was also suggested by a user that the zone code be in a separate field from the six characters following, to increase readability and to decrease likelihood of data entry errors.

### **Error 3: Starting Waypoint**

The intention was that when the starting point of the reach is also a wet spot that the waypoint be visibly recorded as the first wet spot waypoint. This function, however, did not work. Hence, the first recorded waypoint displays as the first point in the couplet which would typically indicate that it was a wet spot.

### **Error 4: Start/End Wet Spot Confusion**

About 80% of participants were confused about the mechanics of the start/end wet spot. The confusion was consistent, despite the buttons changing and the display at the top of the data entry page changing to show whether the point was intended to be a start or end of a wet spot. Another problem with the start/end wet spot was that when deleting a waypoint, the waypoint itself shows up as deleted but the buttons display as if the point was still present. For instance, if the deleted waypoint was the start of a wet spot then the the buttons would still display “end wet spot” despite the point being deleted.

### **Task 5: Access Help Page**

Task 5 asked the participants to navigate to the help page and then return to the recorded data point page, which lists the waypoints recorded. There was very little confusion at this step.

### **Error 5: Latin Help Page**

The help page has not been updated as of testing. Hence, the data on the help page is still Lorem Ipsum. This did not disrupt testing because it was accounted for, however in future use this page will require editing to make it useful.

## Other Errors

### Error 6: Opening Existing Files

This was not an error that was discovered during testing but it was, however, noted by the testing administrators. The second button for editing an existing file should allow for users to access the data file. Instead, the button only brings users to a page displaying that a file exists. By clicking on the button to start a new recording session the file can be accessed. This makes the edit button useless to the user, and not accurate about the navigational purpose of the button.

### Error 7: Deployment Error

In order to access the web application an address must be used. For this class, the application is intended to be hosted on a Tomcat server, and accessed through an address relative to this hosting method. There has been difficulty on the side of the development team in deploying the application code to the Tomcat server. This means that, for testing, the code needed to be hosted on the application developer's computer, and accessed through their IPv4 address. Because of this the application was not able to be hosted for the duration of the week and remote testing was not able to be done, outside of the one remote test.

## Survey Question Analysis

The purposes of this section is to address the general user's responses to the survey questions and highlight the importance of each question. It is important to note that users were asked to answer these questions on a scale of 1 to 5, with 1 being least and 5 being most.

### Instruction Clarity

The participants were asked whether they thought the instructions were clear and made it easier for them to complete the task scenarios.

Q4: Instructions were clear	
1 (not at all)	0
2	0
3	3
4	1
5 (very)	2
Total	6



Overall, users thought the instructional was useful and well written. They did not help clear up the confusion highlighted above in error 4, regarding wet/dry spot indication, though. They did, however, find the inclusion of the visual display of the buttons in the instructional to be useful.

Several users also commented on the instructions for the task scenarios, claiming that the scenarios were not necessarily clear. This means that some of the difficulty experienced by users could be corrected given that the tasks themselves were easier to understand and translate into clear actions. Some of this confusion is due to the application not being entirely functional yet and that information participants not being adequately informed of this.

### Learning to Use the Application

Participants were asked whether it was easy to learn how to use the application. This indicates whether the flow of the application is natural and intuitive, as well as whether the data recording process on each page is intuitive.

Q5: Easy to learn how to use	
1 (not at all)	0
2	1
3	0
4	1
5 (very)	4
Total	6

Participants, in general, found the application easy to learn. There was one instance where a participant found it difficult to learn how to use the application. This is presumably due to the presentation of '*Error 1: Waypoint Editing and Organization*' in their testing, causing a critical error to occur and testing to not be able to continue as intended. There may, however, have been other factors affecting the learnability of the application in this test which were not made evident during testing.

Overall, however, participants claimed that the application did well to prompt them for data and provided a clear flow between pages.

### Error Correcting and Editing

The most unanimous participant response was when asked about the ease of editing and correcting errors within the application. This question helped to gauge the ability to maintain data integrity by allowing participants to easily edit their data.

Q6: Easy to correct errors/edit data	
1 (not at all)	0
2	0
3	0
4	1
5 (very)	5
<b>Total</b>	<b>6</b>

All participants found it easy to edit and correct data within the application. Participants largely attributed this to the similarity of the edit and delete buttons to other applications they have used.

### Simplicity and Effectiveness of Design

This question asks about whether the design meets the intended purpose and functionality that the participants believe the application should have. The participants, during briefing, before beginning the task scenarios, should have been given an overview of the application and its intended use. The question then asks whether the application and the intentions of the application are met. The question also serves to address whether the design is aesthetically pleasing.

Q7: Design was simple and effective	
1 (not at all)	0
2	1
3	0
4	0
5 (very)	5
<b>Total</b>	<b>6</b>

Overall, participants liked the design of the application and believed it was appropriate for the application. One participant did not believe the application was simple enough, claiming it was difficult to use once multiple waypoints had been added, however it was easy to start. Again, this may be a result of the presence of Error 1, however may also be a factor not indicated during testing.

## Enjoyment of Use

This question asks whether participants enjoyed using the application and gauges overall satisfaction with the application. In this question there some agreement, although still dispersion of answers.

Q8: Enjoyment of use	
1 (not at all)	0
2	1
3	1
4	1
5 (very)	3
Total	6

About two-thirds of the participants enjoyed using the application, while one participant did not enjoy but did not dislike using the application. There was response indicating that the participant did not enjoy using the application. This indicates that, overall, the application is functional, aesthetically pleasing, and enjoyable, however there are areas that require more work. Specifically, error-correction will need to be done to eliminate the larger problems of editing waypoints and to address the confusion of the start/end wetspot mechanic.

## Conclusion

Overall, participants found the application to be easy to use, citing the instructional as being clear, and the flow through the application to be intuitive. There were seven errors reported. Only two errors significantly affected testing. The other errors did not critically affect the function of the application, and require only minor adjustments.

## Appendices

### APPENDIX A. Testing Schedule

#### Usability Testing Schedule

1. Administrator presents the project goals, ethics, and general information about wet/dry mapping.
2. Participant is presented the consent form to sign.
3. Administrator provides participant with access to the application and instructional material from the scientists and from the application.
4. Task scenarios will be provided for completion.
  - a. Participant completes scenarios using a think-aloud protocol.
  - b. Data logger will take notes about comments, bugs, concerns.
  - c. Developer may answer questions about data collection but not questions about app-related confusions.
  - d. Time will be recorded.
5. Participant fills out the post-test survey and has opportunity to ask questions about the application at this point.
6. Participant is given final information and allowed to leave.

### APPENDIX B: Test Participant Consent Form

Please read the following terms for participation in usability testing prior to beginning the testing session.

1. There are no risks or costs to you for participation in the usability test.
2. At any point you may choose to stop testing or have your comments omitted from the testing data.
3. You may elect to not answer specific survey questions or complete specific tasks without specifying a reason.
4. All data will be recorded anonymously, with no reference to your name or specific testing time/location.
5. The usability report, which will include analysis of our collected data and findings, will be made available to you within one week of usability testing.

I hereby acknowledge that I have read and understand the above terms of participation. By signing I also consent to the recording and release of data from my testing session to Michigan Tech faculty and to the Nature Conservancy.

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Participant Signature

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Date

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Participant Name (Printed)

## **APPENDIX C: Testing Task Scenarios**

### **TASK 1: Team Creation**

For this task you will need to set up a new team. Your team will consist of yourself, the person administering the usability test, and the application developer assisting the test administrator. You may need to ask for their names. (If testing remotely please use your name, John Doe, and Jane Roe for your team members.)

You and your team have been assigned to map the 'Portage Test' Reach, moving downstream.

### **TASK 2: Record Waypoints**

Your team starts their reach and records the following information from your GPS unit:

UTM-E: 16T 0379645

UTM-N: 5220446

Accuracy: 15 ft

There is no water at the start of the reach.

You and your team walk for a couple minutes and find a place where there is water. You record the following information from the GPS.

UTM-E: 16T 0380693

UTM-N: 5219929

Accuracy: 9 ft

You also notice that there are fresh deer tracks in the area.

Your team continues walking until you reach the end of the water. You record the following information:

UTM-E: 16T 0381715

UTM-N: 5219884

Accuracy: 15 ft

You walk until the next area of water and record data.

UTM-E: 16T 0382895

UTM-N: 5219593

Accuracy: 17 ft

You get to the end of the water..

UTM-E: 16T 0383631

UTM-N: 5218956

Accuracy: 11 ft

You put get to the end of the reach and put in one last waypoint.

UMT-E: 16T 0384110

UTM-N: 5218796

Accuracy: 22 ft

### **TASK 3: Edit Data**

You realized that you put in the wrong information for the third waypoint. You need to edit it so that it has the following information:

UTM-E: 16T 0382119

UTM-N: 5219902

Accuracy: 15

You also need to add the comment that deer tracks are present.

### **TASK 4: Delete Data**

You also realized that you accidentally added an extra waypoint at the end of recording. You need to delete the last waypoint.

### **TASK 5: Go to Help Page**

You forgot how to submit the data so you need to go to the help page and find information about submitting data. Once you've found the information you need to go back to the recording page.

**Note:** Currently the application doesn't allow for submission so you will not be able to submit your data.

## **APPENDIX D: Application Instructional**

### **Downloading the App**

**Webpage:** Open google chrome on your device. Then go to "*url.com*".

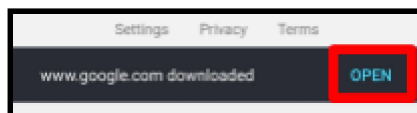
**Downloading:** 1) Click




2) Click



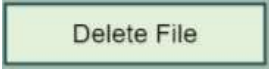
3) Click




## Homepage

**Starting a New Reach File:** While on the Homepage. Press . This will bring you to the Team Data Page and will create a new Reach File.


**Opening an Existing File:** While on the Homepage, then press . This will bring you to the Recorded Data Page.

**Deleting an Existing File:** While on the Homepage, then press . This will delete the data that has been saved. ONLY do this after the data has been successfully uploaded.

## Team Information Page: **Caution: Once confirmed the team information cannot be edited.**

**Adding a Team Member:** While on the Team Information Page, then press . This will open another textbox

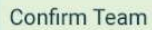
**Editing a Team Member:** While on the Team Information Page select the text box with the team member's name to be changed. The phone/tablet keyboard will pop up and the team member's information can be changed.

**Deleting a Team Member:** While on the Team Information Page press . This will delete the team member from the team list.

**Entering Reach Segment Name:** While on the Team Information Page select the textbox under 'Reach Segment Monitoring' and type the reach name in the box.

**Selecting Data Collection Direction:** While on the Team Information Page select the bubble under 'Direction of Data' that corresponds with the direction of the data collection.

**Moving on to Start the Reach:** While on the Team Information Page press

 Confirm Team

to move onto the Team Confirmation Page.

**Team Confirmation Page: Caution: Once confirmed the team information cannot be edited.**

**Recording Your Start Point:** While on the Team Confirmation Page press

 Start Reach

This will bring you to the Data Entry Page where the waypoint data can be entered.

**Editing Team Data:** While on the Team Confirmation Page press

 Edit Team

to return you to the Team Data Page where team information can be changed.

## **Data Entry Page**

**Entering a Waypoint:** While on the Data Entry Page select the textbox labeled 'Waypoint'. The information in this textbox can be edited by re-selecting the textbox. The waypoint number should be automatically populated.

**Entering a Time:** While on the Data Entry Page select the textbox labeled 'Time' and the time should be automatically populated or enter the time displayed on the phone/tablet.

**Entering an Accuracy:** While on the Data Entry Page select the textbox labeled 'Accuracy' and enter the Accuracy reading displayed by the GPS unit.

**Entering UTM-Easting:** While on the Data Entry Page select the textbox labeled 'UTM-E' and enter the Easting coordinate displayed by the GPS unit in the form of 12A 1234567.

**Entering UTM-Northing:** While on the Data Entry Page select the textbox labeled 'UTM-N' and enter the Northing coordinate displayed by the GPS unit in the form of 1234567.

**Entering Comments:** While on the Data Entry page select the textbox labeled 'Comments' and enter any observations made at the waypoint. (E.g. presence of debris, wildlife presence or tracks, water conditions, etc...)

**Selecting Water Presence:** While on the Data Entry Page select the bubble under 'Water Present?' next to the option that describes the water presence at that waypoint.



**Confirming a Waypoint:** While on the Data Entry Page press



**Recorded Data Page:** **Caution: Once the data has been Submitted the file will no longer be editable or accessible on your phone/tablet.**

**Starting a Wet Spot:** While on the Recorded Data Page press



. This will display the Data Entry Page where the waypoint data can be entered.

**Ending a Wet Spot:** While on the Recorded Data Page press



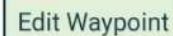
. This will display the Data Entry Page where the waypoint data can be entered.

**Editing a Data Point:** While on the Recorded Data Page press



. This will return

you to the Data Entry Page. After editing the waypoint, click



to return to the Recorded Data Page where the updated waypoint information will be displayed.

**Deleting a Data Point:** While on the Recorded Data Page press



. If this is pressed on the first data point of a couplet, it will delete both the data points in the couplet. If this is pressed on the second data point of a couplet, it will only delete the second data point.

**Submitting Your Data:** While on the Recorded Data Page press



. This will bring you to a password entry form, the password to which will be given to the team leader. Once the password is entered and the OK button is pressed the Submission Confirmation Success or Failure page will be displayed.

**-If directed to the Submission Confirmation Success Page you can close out of the application.**

**-If directed to the Submission Confirmation Failure Page refer to the troubleshooting directions below.**

## Troubleshooting

### Data Not Submitting

#### Submission Failed:

- You do not have cellular or wifi service necessary for submitting data. Go to a location with cellular service and attempt to submit again.
- You entered the password incorrectly. The password entry page will reappear. Try entering the password again and hit OK.

## APPENDIX E: Survey Questions and Responses

Timestamp	4/18/2018 16:02:05	4/18/2018 16:12:46
How old are you?	18-24	18-24
What gender do you identify with?	Male	Prefer not to say
What is your ethnicity?	Caucasian	Caucasian
Do you own a smart phone?	Yes	Yes
I am comfortable using technology (e.g. computers, tablets, cell phones...)	5	4
I am familiar with wet/dry mapping.	1	2
I am familiar with UTM coordinates.	3	2
I found the instructions to be clear.	3	4
It was easy to learn how to use the application.	5	5
It was easy to correct errors and edit data.	5	5
The design of the application is simple and effective.	5	5
I enjoyed using the application.	5	4
Describe any areas of the application you found confusing or difficult.	While entering coordinates in UTM-E, it's easy to make typos or enter an extra / too few digits. While the app automatically detects this, something to help the user format their coordinates (automatically spacing after the first three characters, preventing excess characters from entering) might help with this.	specify if units are needed for accuracy
Describe areas of the application that you liked or you thought was well done.	The process of entering team information streamlines nicely into data entry. I found that the automatic switch between start/end wet spot helped me keep track of where I was in the mapping process.	the prompts for what data to add were very clear and it was easy to edit or delete waypoints
Do you have any other comments about your experience with the application?	In the instructions, at the 'one last waypoint' step at the end of Task 2, I was unsure whether it was intended that I enter a normal data point or a End Reach / Finalize point. I nearly Finalized the data at this point, and wound up backing out once it was clear that this would submit the data and prevent the execution of the edit/delete segments of the instructions.	I can now be a professional wet/dry mapper.

4/18/2018 17:38:52	4/19/2018 18:26:27	4/19/2018 19:16:04	4/20/2018 14:24:46
18-24	18-24	18-24	18-24
Female	Male	Male	Female
Caucasian	Hispanic or Latino	Caucasian	Caucasian
Yes	Yes		Yes
5	5	5	5
1	1	1	2
4	1	1	2
3	3	5	5
4	2	5	5
5	5	5	4
5	2	5	5
5	2	3	5
I had no difficulties.	Creating way point was difficult after several were already created	Beyond initially reading the instructions, there weren't any major issues with using the application.	
Entering and editing/removing was simple and easy.	Easy to get started	I found that navigation between different menus was simple. Updating info was also easy, and editing any waypoints was also a simple task.	I am honestly quite unfamiliar with wet/dry mapping and the usage of UTM coordinates however the instructions were extremely well written.  I also really liked the fact that the application allowed us to individually add in the names of our group members and that we were given the ability to title our data. If a person were to be doing wet/dry mapping at multiple locations, they'd be able to title their data based on what location they're researching, what day they are recording, etc.
		This application was simple to learn to use; however, my familiarity with technology makes this biased. Thus, the provided handout/help button will be useful to those not technically literate.	Overall, the application was easy to use and offers a convenient means for people to be able to record data for wet/dry mapping.