

Anne Linja

Evaluation Assignment #4: Usability Test Plan

Team 3: Quadrilateral Cowboys

App: Eelgrass Tracking

Usability Test Task Outline

1. Introductions (participant, team members, myself)
2. Review consent form; if acceptable, sign and continue. If participant declines to sign consent form, thank them and tell them they're excused. (Find another participant to replace them.) See Appendix A.
3. Explain that I'll be recording them via video/audio, keylogging and taking notes. Obtain permission to record them. If they decline, thank and excuse them. (If declined, find another participant.)
4. Introduction to study - explain the following:
 - a. the Eelgrass app
 - b. what they'll be expected to do
 - c. why we're doing this
 - d. encourage their real-time feedback (concurrent think-aloud protocol)
 - e. we'll be asking for demographic information
 - f. there will be a few questions asked prior to their testing, and following their testing
5. Ask participant to fill out Demographics questionnaire (Google Forms). See Appendix B.
6. Ask participant to respond to Pre-Test Questionnaire (Google Forms). See Appendix C.
7. Review Eelgrass Monitoring instructions for Citizen Scientists. See Appendix D.
7. Run scenarios for testing with guidance of Quadrilateral Cowboys (QC) team member
 - a. scenarios are described later section in this document
 - b. 3 scenarios for "Citizen Scientist" user
 - i. participant engages in concurrent think-aloud protocol
 - ii. participant is recorded (video, audio, keylogging), notes are taken by QC team member (frustrations, confusion, problems, questions related to app)
 - iii. QC team members document questions asked, and respond to questions about the data being asked for, but not the app itself
 - c. 2 scenarios for administrator exporting .csv data
(items i, ii, and iii in 7.b.)
8. Participant responds to Post-Test Questionnaire (Google Forms). See Appendix E.
9. Participant is debriefed, thanked, and dismissed.

Instructions for Eelgrass App Usability Testing Participants

Participants will be given the following instructions. The Standard Operating Procedures include the official instructions that citizen scientists are given when collecting eelgrass data.

Following introductions, participant is given consent form to sign. Tell them, "*The test imposes minimal risk, no harm should come to you performing the test, the results of the usability test are anonymized, and if at any time you wish to terminate the testing you may.*" Participant signs consent (continues with study) or not (terminate study and thank them for their time.)

Say: "*Scientists at the Massachusetts Division of Marine Fisheries have developed a protocol to measure the amount of eelgrass at specific locations of the Duxbury-Kingston-Plymouth Bay. This eelgrass monitoring program will be used to get an idea of the estuary's health. Under normal circumstances, citizen scientists are trained to collect and document data as per the Massachusetts Division of Marine Fisheries Standard Operating Procedure for Citizen Scientist Eelgrass Monitoring (Carr, et al, 2018). They are given the necessary supplies, are assigned specific locations (harbors and stations) and then asked to go out on boats during the day and collect the data. However, since its impractical to obtain first-hand measurements for this test, you will be given the data they collect and you'll be asked to enter their data into a new app developed especially for this purpose.* Participant is handed a printed copy of the SOP.

This app will replace their current data repository; they are currently writing their data on paper. For obvious reasons - they're outside on boats - it is believed that an app will be more effective. Your role is to use the app, and provide feedback to us. Any feedback you have is welcome - there is no right or wrong feedback - all feedback is important.

Prior to using the app you'll be asked for demographic information. Then you'll complete a pretest. Following that you'll use the app. While you're using the app, you'll be asked to "think aloud". Next, you will be asked to respond to a post test questionnaire. And lastly, you will be verbally asked for additional feedback and when that's been completed, you'll be free to go.

Let's begin. Please enter your demographic information using this google form. Then, complete the pre-test questionnaire." Participant fills out demographic questionnaire and pre-test questionnaire.

"You will now be given the data that you'll need to enter into the app. (Participant is handed a printed copy of the first scenario.) First, let's open the app. The url is printed on top of the first scenario. Open Safari, enter the url, and we'll begin." (Participant opens app)

"Please enter the data from the Scenario data you've been given. While you're doing that, I'd like you to "think aloud". For example, "It says 'Start A Trip!' so I'll click here first. Now it looks like I need to enter the date.", etc.

If you have any questions about the data you need to enter, feel free to ask. You're allowed to ask questions only about the data you're entering. While you're entering data into the app, we'll also be taking notes, recording you and the screen, and using a keylogger app. Will that be ok?" Participant agrees. (If they disagree, ask them what they don't want done, and then make a decision on if we'll continue with the study.)

Participant begins the first scenario they've been given.

Scenarios:

Scenario - See Appendix F	Goals - Enter data correctly with minimal intervention. Participant is allowed to ask questions about the data being entered, but not about the app itself. Participant is asked to "think aloud".	Quantitative Measurement	Qualitative Measurement
Citizen Scientist - 1	Indicator station data, testing for validation on blank/incorrect values in fields 2,7,8,15,16,22,24,25,39	Length of Time to Complete Scenario	Scale 0 (not confusing at all to follow app and what participant should be entering) to 10 (extremely confusing) as determined by participant
Citizen Scientist - 2	Not an indicator station, testing for validation on blank/incorrect values in fields 8,17,23,58	Length of Time to Complete Scenario	Scale 0 (not confusing at all to follow app and what participant should be entering) to 10 (extremely confusing) as determined by: 1- participant and 2- observer
Citizen Scientist - 3	Not an indicator station, testing for validation on blank/incorrect values in fields 3,4,12,15,34	Average length of time between reading data and successfully inputting it into app	Scale 0 (not confusing at all to follow app and what participant should be entering) to 10 (extremely confusing) as determined by: 1- participant and 2- observer
Admin - 1	Download Measurement Data	Length of Time to Complete Scenario	Scale 0 (not confusing at all to follow app and what participant should be entering) to 10 (extremely confusing) as determined by: 1- participant and 2- observer
Admin - 2	Download Shoot Data	Length of Time to Complete Scenario	Scale 0 (not confusing at all to follow app and what participant should be entering) to 10

			(extremely confusing) as determined by: 1- participant and 2- observer
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Participant will go through at least one citizen scientist scenario and one admin scenario.

Equipment: iPhone with keylogger app, laptop for admin to export data into csv files, Video recorder, laptop for taking notes, bug report (see Appendix G)

Depending on the information gathered so far, participant is asked follow-up questions such as:

1. Did the app work as you expected it to?
2. Do you have any issues that you haven't brought up?
3. Were there any difficult parts of the app?

When testing is done, participant is asked to fill out post test questionnaire.

Participant is debriefed, thanked, and dismissed.

***NOTE: Screenshots of app (see Appendix H) were taken on 4/8/2019. It is hoped that the program will be more complete with all the necessary fields by the first usability test. If not, we'll just do our best and work with the app as it is at that time. I am unable to write a scenario for the admin data export and Help sections as those are still under construction.

Appendix A: Consent Form

Computer User Interface Usability Testing Consent Form

You are being invited to participate in a research study to determine the usefulness and usability of computer user interfaces. This study is being conducted by Dr. Robert Pastel of Michigan Technological University Computer Science Department and students in Dr. Pastel's Human-Computer Interaction (HCI) courses. The students are performing the usability tests as part of their project and to fulfill the HCI course requirements.

There are no known risks if you decide to participate in this research study. There are no costs to you for participating in the study. The information you provide and tasks that you will perform will determine the usefulness and usability of user interfaces. The questionnaires and the tasks should take less than an hour to complete. The information collected may not benefit you directly, but the information learned in this study should provide more general benefits.

The questionnaires and test are anonymous. Do not write your name on the survey. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study except for the instructor of the class that is giving you credit for participating. Should the data be published, no individual information will be disclosed.

Your participation in this study is voluntary. By completing the questionnaires and performing the tasks, you are voluntarily agreeing to participate. You are free to decline to answer any particular question you do not wish to answer or not to perform a task for any reason.

If you have any questions about the study, please contact Dr. Robert Pastel, Assistant Professor, Computer Science Department, Michigan Technological University, Houghton, MI 49931.

The MTU Institutional Review Board has reviewed my request to conduct this project. If you have any concerns about your rights in this study, please contact Joanne Polzien of the MTU-IRB at 906-487-2902 or email jpolzien@mtu.edu.

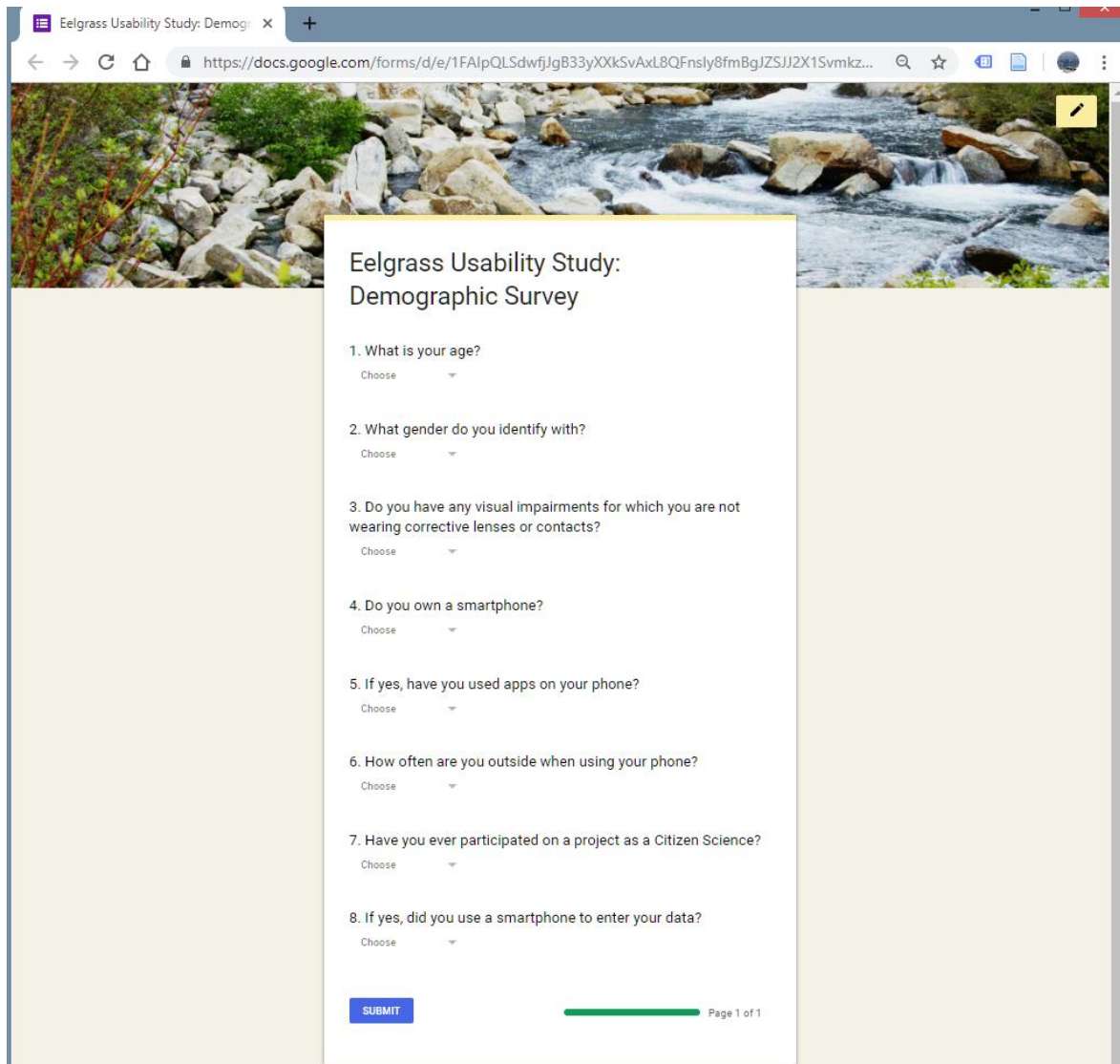
Participant signature and date:

Signature

Today's Date

Printed Name

Appendix B: Demographic Survey



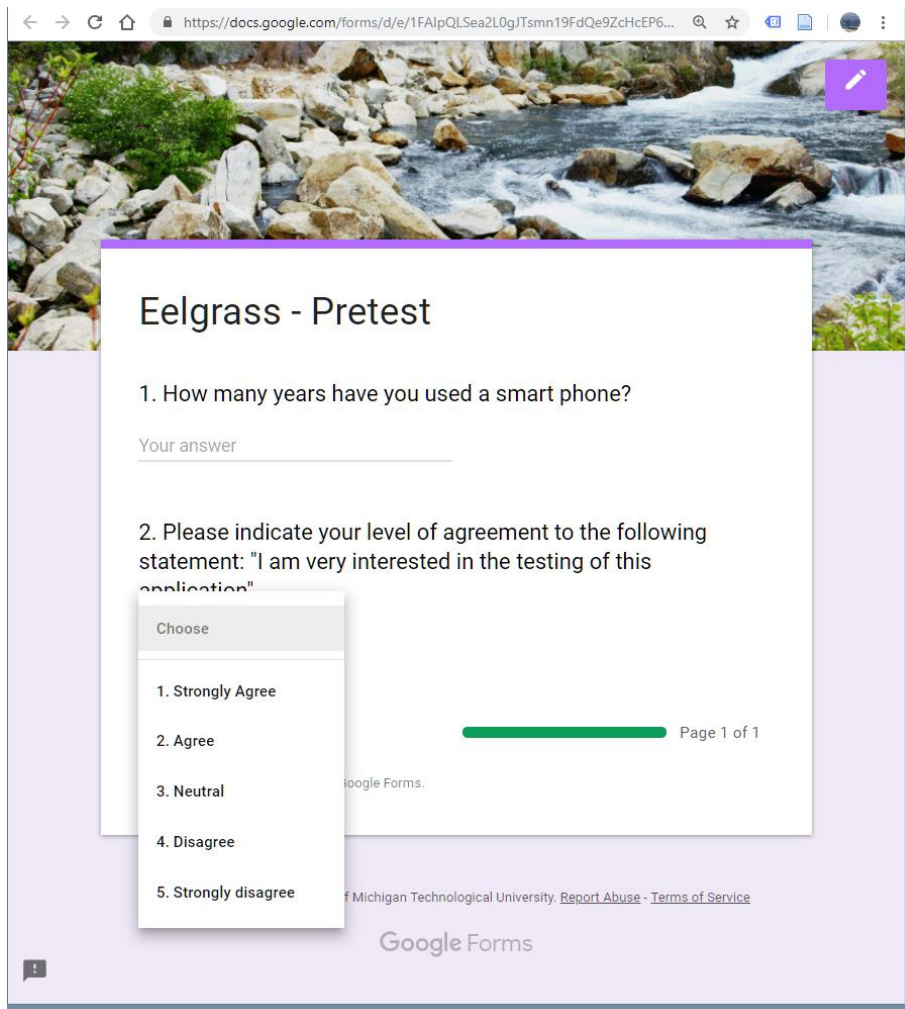
The image shows a screenshot of a Google Forms survey titled "Eelgrass Usability Study: Demographic Survey". The survey is displayed on a light beige background with a header image of a rocky river. The survey contains eight questions, each with a "Choose" dropdown menu. At the bottom, there is a blue "SUBMIT" button, a green progress bar, and the text "Page 1 of 1".

Eelgrass Usability Study:
Demographic Survey

1. What is your age?
Choose
2. What gender do you identify with?
Choose
3. Do you have any visual impairments for which you are not wearing corrective lenses or contacts?
Choose
4. Do you own a smartphone?
Choose
5. If yes, have you used apps on your phone?
Choose
6. How often are you outside when using your phone?
Choose
7. Have you ever participated on a project as a Citizen Science?
Choose
8. If yes, did you use a smartphone to enter your data?
Choose

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Appendix C: Pretest



The image shows a Google Form titled "Eelgrass - Pretest" displayed in a browser window. The form has a background image of a rocky river. The first question is "1. How many years have you used a smart phone?" with a text input field labeled "Your answer". The second question is "2. Please indicate your level of agreement to the following statement: 'I am very interested in the testing of this application.'" with a dropdown menu open showing five options: "1. Strongly Agree", "2. Agree", "3. Neutral", "4. Disagree", and "5. Strongly disagree". The form is on "Page 1 of 1" and includes the Google Forms logo and footer text: "Michigan Technological University. Report Abuse - Terms of Service".

https://docs.google.com/forms/d/e/1FAIpQLSea2L0gJTsmn19FdQe9ZcHcEP6...

Eelgrass - Pretest

1. How many years have you used a smart phone?

Your answer _____

2. Please indicate your level of agreement to the following statement: "I am very interested in the testing of this application"

Choose

- 1. Strongly Agree
- 2. Agree
- 3. Neutral
- 4. Disagree
- 5. Strongly disagree

Page 1 of 1

Google Forms.

Michigan Technological University. [Report Abuse](#) - [Terms of Service](#)

Google Forms

Appendix D: Standard Operating Procedure

Appendix G: Standard Operating Procedure

Massachusetts Division of Marine Fisheries Standard Operating Procedure Citizen Scientist Eelgrass Monitoring

Version 1, Created by T. Evans and J. Carr, 08/2018

Point of Contact:
Jillian.Carr@state.ma.us
MA DMF Annisquam River Field Station
30 Emerson Ave.
Gloucester, MA 01930
978-282-0308

OBJECTIVE: Volunteer monitoring of eelgrass extent and condition annually in DKP. Volunteers will take measurements at fixed stations assigned throughout the embayment using a stratified repeated random design, in accordance with the document titled "Eelgrass Monitoring: Development of a Citizen Scientist Monitoring Method - Pilot Study in Duxbury-Kingston-Plymouth Bay". Sampling will be performed at peak biomass in August according to the following procedure.

I. GEAR LIST:

Shallow draft vessel

Coast guard required safety gear

Boat anchor

GPS unit with accuracy of 4 m or better

Monitoring Kit contents:

Clipboard, datasheets, pencils, laminated SOPs

Underwater digital camera, reel, and case

0.25 m² PVC quadrat drop-frame, line

SD card and charged battery for camera

Secchi disk, line

Measuring tape

View Scope bucket

Small Danforth anchor and small mushroom anchor, line

Misc: zip ties, duct tape

II. SUMMARY

At all stations:

- Navigate to the station using GPS coordinates and anchor the boat, record actual coordinates and other topside information.
- Record secchi disk measurements at two locations on the sunny side of the boat using the view bucket.
- At four cardinal directions around the boat, use the drop-frame to take a sample picture and estimate the percent cover within the quadrat using the visual guides.
- Review data to ensure accuracy. If there are any changes, cross out the original and initial the change.
- If not an "indicator" station, raise the anchor and navigate to the next station.

Additional sampling at indicator eelgrass stations:

- At each of the four cardinal directions around the boat where eelgrass was observed, use the Danforth anchor to take a bottom grab sample, collecting at least three shoots per sample.
- Identify the longest leaf from each shoot. Measure the leaves and estimate coverage of wasting disease and epiphytes, and record.
- Lay the shoots on the tote cover and fan the leaves, collect photos of the sample using the underwater camera.
- Raise the anchor and navigate to the next station.

Appendix D: Standard Operating Procedure (cont)

III. DETAILED METHODS:

1. Navigating to the station

- Volunteers navigate using their boat's GPS (or a hand held unit if necessary) to get as close to the monitoring station as possible. Stations are defined as the area within a 10-m radius circle of the GPS location, accounting for boat swing and GPS error.
- Once on station, turn the boat into the wind or current, whichever is strongest. Anchor the boat by lowering the anchor off of the bow. Let out the necessary scope.

2. Data collection at all stations: Secchi disk

A Secchi disk is a weighted 20 cm diameter disk painted black and white with an attached line. Ideal weather conditions for accurate secchi data collection include sunny or partly sunny skies; calm winds (≤ 10 knots) and little to no chop (waves on the water). Collect secchi measurements between 10 am and 4 pm. Ideally, water level should be about 50% greater than the secchi depth so that it is viewed through the water column rather than against bottom-reflected light. This may not always be possible in DKP. If the disk hits the bottom, record "bottom" under secchi depth with the water depth indicated.

- Record the time, weather observations, water depth and other trip information on the datasheet.
- Remove your sunglasses, as they will give you an inaccurate reading (but be sure to wear regular corrective lenses if you need them).
- Unwind several meters of the Secchi disk rope from the holder.
- Lean over the sunny side of the boat and submerge the bottom 1-2" of the view bucket into the water.
- Another volunteer slowly lowers the secchi disk into the water until the viewer can no longer see it. Slowly raise the disk. When the secchi disk reappears, mark the rope at the surface of the water with a clothespin.
- Bring the secchi disk back on board and measure the length of the line from the disk to the clothespin location with your measuring tape and record this measurement on your data sheet. Repeat from another location on the boat and record.
- If you need to re-take a measurement, don't erase the old one, just cross out and initial the suspect data so that it can be used if needed to troubleshoot later.
- If two different people will regularly be making secchi measurements, both should take the first few measurements to ensure that the results are similar.
- Useful website with tips: <http://www.secchidipin.org/?s=secchi+disk>

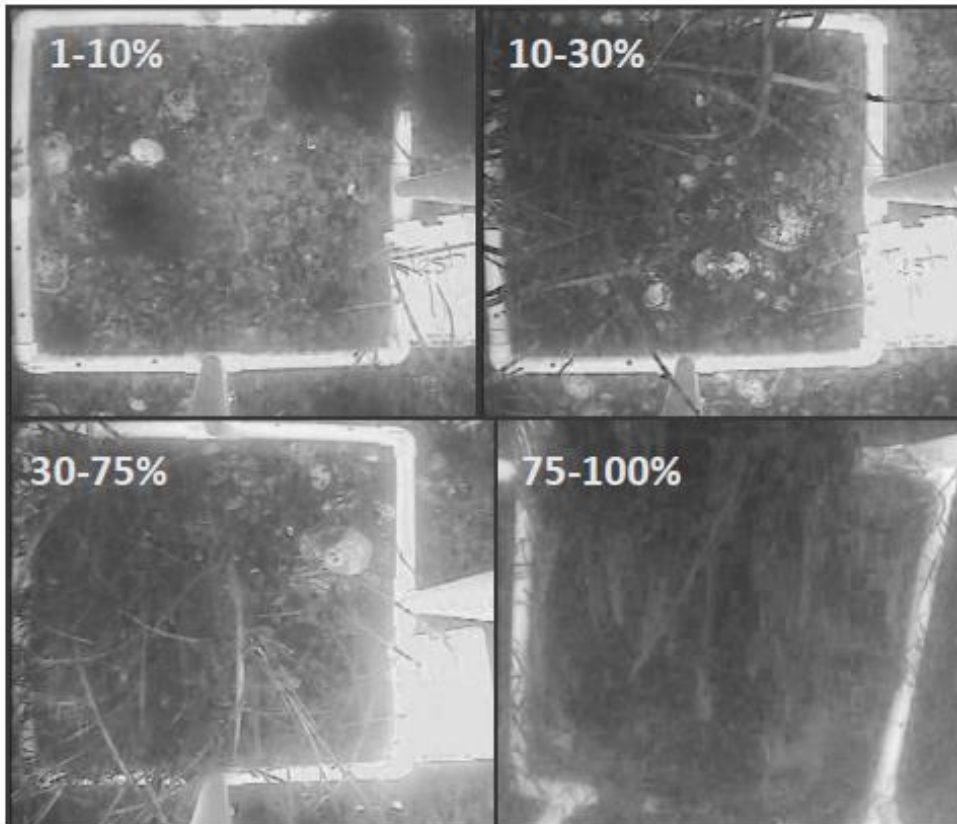
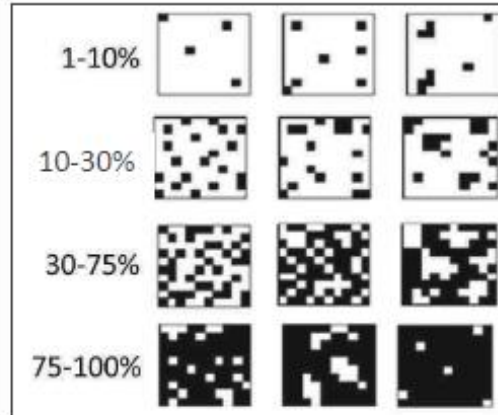
3. Camera set up and operation: Follow the laminated camera guide included in the camera case.

4. Data collection at all stations: pictures and percent cover data

- Four samples will be collected off the four corners of the boat.
- Write the station number and sample ID on the frame labeler (e.g. "101_1" for the first sample at station 101).
- Beginning on the windward and up-current side of the boat, with the camera on, gently lower the drop-frame over the side. Once it hits the bottom leave it there for 10 seconds to allow sediment to settle. View the camera screen to ensure the quadrat landed flat.

Appendix D: Standard Operating Procedure (cont)

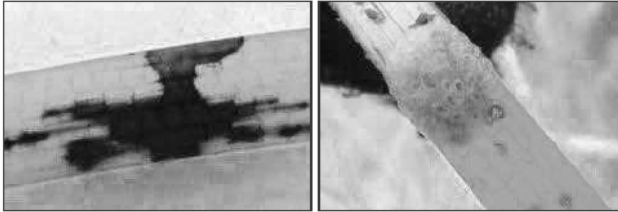
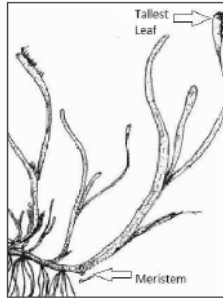
- Look at the monitor and ensure that the image is of the whole quadrat and the bottom (and/or eelgrass) is clearly visible. On the DVR unit, press the center "OK" button to take a picture. If you are unsure if a picture was taken, press the "Preview" button on the DVR unit to view the last image captured.
- Record the timestamp from the picture.
- Record sediment type as mud, clay, sand, gravel and/or cobble and note other benthic characteristics (mussels, debris, algae or other observation) on the datasheet.
- Estimate the percent cover of eelgrass using the following bins (0%, 1-10%, 10-30%, 30-75%, 75-100%) and the provided coverage guide (right).
- Repeat at the remaining 3 corners of the boat, be sure to update the labeler.
- If this is an indicator station, continue to step (5).



Appendix D: Standard Operating Procedure (cont)

5. Additional data collection at indicator stations: Eelgrass length and width anchor sample measurements

- If eelgrass was present at a given sample location (e.g. corner of the boat), collect a sample by tossing the anchor out about 5 feet from the boat and gently dragging it several feet, attempting to collect at least three eelgrass shoots. Slowly pull it up, deploying again as necessary. This will be repeated at each of the four corners of the boat to generate four samples, each containing three shoots.
- From the sample, select three intact shoots and place the shoots on the white tote lid, fanning the leaves. Place the Station label in the field of view. Slide the lid under the frame and collect as many pictures as needed to capture the entire sample.
- Identify the longest leaf in each of the three sample plants. Measure the length and width of the leaf using the measuring tape. Length is measured from the meristem to the leaf tip (see below), and width is measured across the widest part of the leaf. If the tallest leaf is broken indicate this with an asterisk (*). Record the measurements on the datasheet.
- Estimate cover of epiphytes (encrusting algae or tunicates) on the three leaf samples by looking over all of the leaves for all of the shoots and assigning none, low, med. or high for the entire sample (see guide below).
- Estimate cover of wasting disease on the three leaf sample by looking over all of the leaves for all of the shoots and assigning a none, low, med. or high category for the entire sample (see below).
- Discard plants overboard and repeat at remaining corners. (Note: If colleagues or scientists request sampling collection, samples should be placed in clean, clearly labeled zip-lock bags and stored on ice in a cooler until transfer to the requester).



Wasting disease (left) and epiphyte coverage (right) on eelgrass. Photos from Cornell Cooperative Extension/SeagrassLI.org

INDEX FOR MEASURING COVERAGE OF WASTING DISEASE AND EPIPHYTES



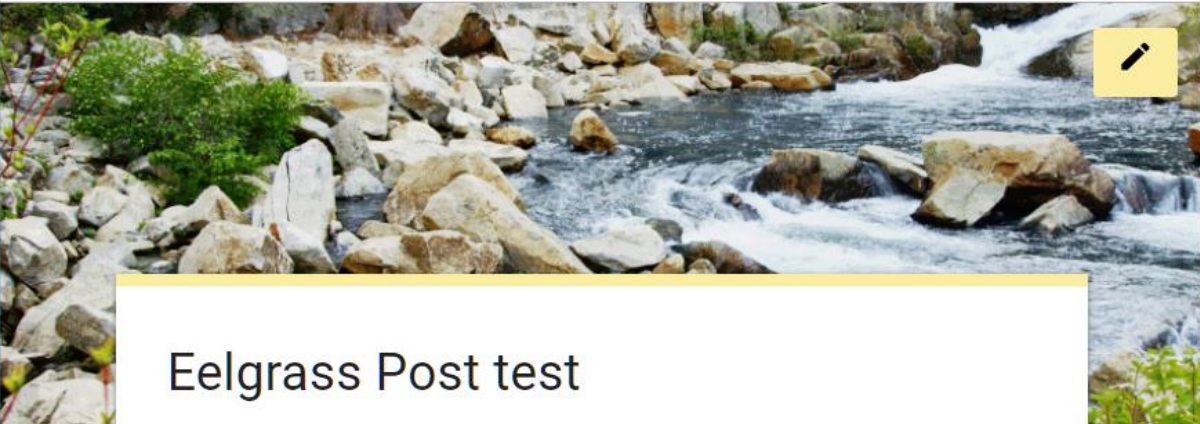
Image altered from Burdick et al. 1993.

6. Cleaning and storage

- At the end of each field day, inspect all equipment to ensure everything is accounted for and in similar condition to when it was received at the beginning of the day. If any items are missing, damaged, or altered in any way, note the change(s) and inform the organizer.
- Rinse all gear that came in contact with salt water, taking particular care with the camera and lowering frame. Soak the camera in a tub of warm water.
- Be careful not to allow any cables, connections, or electronic equipment from the waterproof box to come into contact with water. The two plugs attached to the camera cable reel must also remain clean and dry at all times.
- Inspect the camera case to make sure it has remained clean and dry after each use. If necessary, carefully clean that monitor screen with a paper towel. If water is present in the box, remove it as soon as possible with a dry paper towel and inspect all electronic equipment to ensure no damage occurred.
- Allow all gear to dry and store in a cool, dry place.
- Recharge batteries if needed, and give SD card and data sheets to the organizer.

Appendix E: Post test Questionnaire

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Eelgrass Post test

1. Please indicate your level of agreement to the following statement: "Overall, I found the tasks easy to perform in this application."

Choose ▾

2. Please indicate your level of agreement to the following statement: "I enjoy using this application."

Choose ▾

3. Please indicate your level of agreement to the following statement: "I would use this application again."

Choose ▾

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Appendix F: Scenarios

Step	Field		Scenario 1 Data
1		<input type="button" value="Start a Trip!"/>	
2	Date of Trip	Date of Trip: <input type="text" value="mm/dd/yyyy"/>	Leave blank
3	Harbor	Harbor: <input type="text"/>	Houghton
4	Crew Members	Crew Members: <input type="text"/>	TE, KF, PV
5	Boat Name	Boat Name: <input type="text"/>	Gloucester Maritime
6	Station Number	Station Number: <input type="text"/>	9065
7	Latitude	Latitude: <input type="text"/>	XYZ
8	Longitude	Longitude: <input type="text"/>	Leave blank
9	GPS Device	GPS Device: <input type="text"/>	Garmin Echomap
10	Wind Direction	Wind Direction: <input type="text" value="Select One..."/>	NE
11	Wind Speed	Wind Speed: <input type="text" value="Select One..."/>	0-5
12	Sea State	Sea State: <input type="text" value="Select One..."/>	Glass -calm
13	Cloud Cover		25-50%
14	Tide	Tide: <input type="text" value="Select One..."/>	Flooding
15	Secchi Water Depth	Water Depth: <input type="text" value="0"/> <input type="text" value="0"/>	Leave blank
16	Secchi Time	Time: <input type="text" value="--:--"/>	4

Step	Field		Scenario 1 Data
17	Secchi (1) Secchi Depth	Secchi Depth: 0 <input type="checkbox"/> Disk at Bottom	2.93
18	Secchi Did disk touch the bottom?		no
19	Secchi (2) Secchi Depth	Secchi Depth: 0 <input type="checkbox"/> Disk at Bottom	2.71
20	Secchi (2) Did disk touch the bottom?		no
21	Is this an Indicator Station?		yes
22	Drop Frame (1) - Picture Taken?	Picture Taken: Yes ▾	Leave blank
23	Drop Frame (1) - Picture Timestamp	Picture Timestamp: --:--	14:41:32
24	Drop Frame (1) - Sediment	Sediment: <input type="checkbox"/> mud <input type="checkbox"/> gravel <input type="checkbox"/> clay <input type="checkbox"/> cobble <input type="checkbox"/> sand	Sand & cobble
25	Drop Frame (1) - Eelgrass Percent Cover	Eelgrass Percent Cover: 0	-6
26	Indicator Station only: (1-Shoot 1) length		42
27	Indicator Station only: (1-Shoot 1) width		4
28	Indicator Station only: (1-Shoot 2) length		44
29	Indicator Station only: (1-Shoot 2) width		4
30	Indicator Station only: (1-Shoot 3) length		52
31	Indicator Station only: (1-Shoot 3) width		3
32	Indicator Station only: (1) Wasting disease		med
33	Indicator Station only: (1) Epiphyte cover		none
34	Drop Frame (2) - Picture Taken?		yes

Step	Field	Scenario 1 Data
35	Drop Frame (2) - Picture Timestamp	14:43:01
36	Drop Frame (2) - Sediment	sand
37	Drop Frame (2) - Eelgrass Percent Cover	1.11
38	Indicator Station only: (2-Shoot 1) length	66.5
39	Indicator Station only: (2-Shoot 1) width	4
40	Indicator Station only: (2-Shoot 2) length	52.29
41	Indicator Station only: (2-Shoot 2) width	3
42	Indicator Station only: (2-Shoot 3) length	59.1
43	Indicator Station only: (2-Shoot 3) width	3
44	Indicator Station only: (2) Wasting disease	low
45	Indicator Station only: (2) Epiphyte cover	high
46	Drop Frame (3) - Picture Taken?	yes
47	Drop Frame (3) - Picture Timestamp	14:45:32
48	Drop Frame (3) - Sediment	sand
49	Drop Frame (3) - Eelgrass Percent Cover	0
50	Indicator Station only: (3-Shoot 1) length	68
51	Indicator Station only: (3-Shoot 1) width	5
52	Indicator Station only: (3-Shoot 2) length	76
53	Indicator Station only: (3-Shoot 2) width	5
54	Indicator Station only: (3-Shoot 3) length	64
55	Indicator Station only: (3-Shoot 3) width	4
56	Indicator Station only: (3) Wasting disease	high
57	Indicator Station only: (3) Epiphyte cover	med

Step	Field		Scenario 1 Data
58	Drop Frame (4) - Picture Taken?		yes
59	Drop Frame (4) - Picture Timestamp		14:46:54
60	Drop Frame (4) - Sediment		sand
61	Drop Frame (4) - Eelgrass Percent Cover		0
62	Indicator Station only: (4-Shoot 1) length		87
63	Indicator Station only: (4-Shoot 1) width		4
64	Indicator Station only: (4-Shoot 2) length		92
65	Indicator Station only: (4-Shoot 2) width		4
66	Indicator Station only: (4-Shoot 3) length		103
67	Indicator Station only: (4-Shoot 3) width		4
68	Indicator Station only: (4) Wasting disease		none
69	Indicator Station only: (4) Epiphyte cover		low

Appendix F: Scenarios

<u>Step</u>	<u>Field</u>		<u>Scenario 2 Data</u>
1		<input type="button" value="Start a Trip!"/>	
2	Date of Trip	Date of Trip: <input type="text" value="mm/dd/yyyy"/>	4/3/2019
3	Harbor	Harbor: <input type="text"/>	Hancock
4	Crew Members	Crew Members: <input type="text"/>	AB, TE, SV
5	Boat Name	Boat Name: <input type="text"/>	NB Maritime
6	Station Number	Station Number: <input type="text"/>	9066
7	Latitude	Latitude: <input type="text"/>	42.00925
8	Longitude	Longitude: <input type="text"/>	Leave blank
9	GPS Device	GPS Device: <input type="text"/>	Garmin
10	Wind Direction	Wind Direction: <input type="text" value="Select One..."/>	NE
11	Wind Speed	Wind Speed: <input type="text" value="Select One..."/>	0-5
12	Sea State	Sea State: <input type="text" value="Select One..."/>	Small ripples
13	Cloud Cover		0
14	Tide	Tide: <input type="text" value="Select One..."/>	ebbing
15	Secchi Water Depth	Water Depth: <input type="text" value="0"/> <input type="text" value="0"/>	10.70
16	Secchi Time	Time: <input type="text" value="--:--"/>	14:40

<u>Step</u>	<u>Field</u>		<u>Scenario 2 Data</u>
17	Secchi (1) Secchi Depth	Secchi Depth: <input type="text" value="0"/> <input type="checkbox"/> Disk at Bottom	-2.95
18	Secchi (1) Did disk touch the bottom?		no
19	Secchi (2) Secchi Depth	Secchi Depth: <input type="text" value="0"/> <input type="checkbox"/> Disk at Bottom	bottom
20	Secchi (2) Did disk touch the bottom?		yes
21	Is this an Indicator Station?		no
22	Drop Frame (1) - Picture Taken?	Picture Taken: <input type="button" value="Yes"/>	yes
23	Drop Frame (1) - Picture Timestamp	Picture Timestamp: <input type="text" value="--:--"/>	6
24	Drop Frame (1) - Sediment	Sediment: <input type="checkbox"/> mud <input type="checkbox"/> gravel <input type="checkbox"/> clay <input type="checkbox"/> cobble <input type="checkbox"/> sand	mud/sand
25	Drop Frame (1) - Eelgrass Percent Cover	Eelgrass Percent Cover: <input type="text" value="0"/>	0
26	Indicator Station only: (1-Shoot 1) length		
27	Indicator Station only: (1-Shoot 1) width		
28	Indicator Station only: (1-Shoot 2) length		
29	Indicator Station only: (1-Shoot 2) width		
30	Indicator Station only: (1-Shoot 3) length		
31	Indicator Station only: (1-Shoot 3) width		

Step	Field		Scenario 2 Data
32	Indicator Station only: (1) Wasting disease		
33	Indicator Station only: (1) Epiphyte cover		
34	Drop Frame (2) - Picture Taken?		yes
35	Drop Frame (2) - Picture Timestamp		10:33:00
36	Drop Frame (2) - Sediment		mud/sand
37	Drop Frame (2) - Eelgrass Percent Cover		0
38	Indicator Station only: (2-Shoot 1) length		
39	Indicator Station only: (2-Shoot 1) width		
40	Indicator Station only: (2-Shoot 2) length		
41	Indicator Station only: (2-Shoot 2) width		
42	Indicator Station only: (2-Shoot 3) length		
43	Indicator Station only: (2-Shoot 3) width		
44	Indicator Station only: (2) Wasting disease		
45	Indicator Station only: (2) Epiphyte cover		
46	Drop Frame (3) - Picture Taken?		yes
47	Drop Frame (3) - Picture Timestamp		10:32:00
48	Drop Frame (3) - Sediment		mud/sand

<u>Step</u>	<u>Field</u>		<u>Scenario 2 Data</u>
49	Drop Frame (3) - Eelgrass Percent Cover		0
50	Indicator Station only: (3-Shoot 1) length		
51	Indicator Station only: (3-Shoot 1) width		
52	Indicator Station only: (3-Shoot 2) length		
53	Indicator Station only: (3-Shoot 2) width		
54	Indicator Station only: (3-Shoot 3) length		
55	Indicator Station only: (3-Shoot 3) width		
56	Indicator Station only: (3) Wasting disease		
57	Indicator Station only: (3) Epiphyte cover		
58	Drop Frame (4) - Picture Taken?		no
59	Drop Frame (4) - Picture Timestamp		10:31:00
60	Drop Frame (4) - Sediment		mud/sand
61	Drop Frame (4) - Eelgrass Percent Cover		0
62	Indicator Station only: (4-Shoot 1) length		
63	Indicator Station only: (4-Shoot 1) width		
64	Indicator Station only: (4-Shoot 2) length		

<u>Step</u>	<u>Field</u>		<u>Scenario 2 Data</u>
65	Indicator Station only: (4-Shoot 2) width		
66	Indicator Station only: (4-Shoot 3) length		
67	Indicator Station only: (4-Shoot 3) width		
68	Indicator Station only: (4) Wasting disease		
69	Indicator Station only: (4) Epiphyte cover		

Appendix F: Scenarios

<u>Step</u>	<u>Field</u>		<u>Scenario 3 Data</u>
1		<input type="button" value="Start a Trip!"/>	
2	Date of Trip	Date of Trip: <input type="text" value="mm/dd/yyyy"/>	4/4/2019
3	Harbor	Harbor: <input type="text"/>	None
4	Crew Members	Crew Members: <input type="text"/>	Leave blank
5	Boat Name	Boat Name: <input type="text"/>	Adventure
6	Station Number	Station Number: <input type="text"/>	9067
7	Latitude	Latitude: <input type="text"/>	42.00249
8	Longitude	Longitude: <input type="text"/>	-70.64184
9	GPS Device	GPS Device: <input type="text"/>	LOWRANCE
10	Wind Direction	Wind Direction: <input type="text" value="Select One..."/>	W
11	Wind Speed	Wind Speed: <input type="text" value="Select One..."/>	0-5
12	Sea State	Sea State: <input type="text" value="Select One..."/>	Select One
13	Cloud Cover		
14	Tide	Tide: <input type="text" value="Select One..."/>	FLOODING
15	Secchi Water Depth	Water Depth: <input type="text" value="0"/> <input type="text" value="0"/>	-10.10
16	Secchi Time	Time: <input type="text" value="--:--"/>	9:40

Step	Field		Scenario 3 Data
17	Secchi (1) Secchi Depth	Secchi Depth: 0 <input type="checkbox"/> Disk at Bottom	bottom
18	Secchi (1) Did disk touch the bottom?		yes
19	Secchi (2) Secchi Depth	Secchi Depth: 0 <input type="checkbox"/> Disk at Bottom	bottom
20	Secchi (2) Did disk touch the bottom?		yes
21	Is this an Indicator Station?		no
22	Drop Frame (1) - Picture Taken?	Picture Taken: Yes ▾	yes
23	Drop Frame (1) - Picture Timestamp	Picture Timestamp: --:--	9:41:34
24	Drop Frame (1) - Sediment	Sediment: <input type="checkbox"/> mud <input type="checkbox"/> gravel <input type="checkbox"/> clay <input type="checkbox"/> cobble <input checked="" type="checkbox"/> sand	sand
25	Drop Frame (1) - Eelgrass Percent Cover	Eelgrass Percent Cover: 0	1-10
26	Indicator Station only: (1-Shoot 1) length		
27	Indicator Station only: (1-Shoot 1) width		
28	Indicator Station only: (1-Shoot 2) length		
29	Indicator Station only: (1-Shoot 2) width		
30	Indicator Station only: (1-Shoot 3) length		
31	Indicator Station only: (1-Shoot 3) width		
32	Indicator Station only: (1) Wasting disease		
33	Indicator Station only: (1) Epiphyte cover		
34	Drop Frame (2) - Picture Taken?		no
35	Drop Frame (2) - Picture Timestamp		9:42:34

Step	Field	Scenario 3 Data
36	Drop Frame (2) - Sediment	sand
37	Drop Frame (2) - Eelgrass Percent Cover	0
38	Indicator Station only: (2-Shoot 1) length	
39	Indicator Station only: (2-Shoot 1) width	
40	Indicator Station only: (2-Shoot 2) length	
41	Indicator Station only: (2-Shoot 2) width	
42	Indicator Station only: (2-Shoot 3) length	
43	Indicator Station only: (2-Shoot 3) width	
44	Indicator Station only: (2) Wasting disease	
45	Indicator Station only: (2) Epiphyte cover	
46	Drop Frame (3) - Picture Taken?	yes
47	Drop Frame (3) - Picture Timestamp	9:43:15
48	Drop Frame (3) - Sediment	sand
49	Drop Frame (3) - Eelgrass Percent Cover	75-100
50	Indicator Station only: (3-Shoot 1) length	
51	Indicator Station only: (3-Shoot 1) width	
52	Indicator Station only: (3-Shoot 2) length	
53	Indicator Station only: (3-Shoot 2) width	
54	Indicator Station only: (3-Shoot 3) length	
55	Indicator Station only: (3-Shoot 3) width	
56	Indicator Station only: (3) Wasting disease	
57	Indicator Station only: (3) Epiphyte cover	
58	Drop Frame (4) - Picture Taken?	yes
59	Drop Frame (4) - Picture Timestamp	9:41:34
60	Drop Frame (4) - Sediment	sand

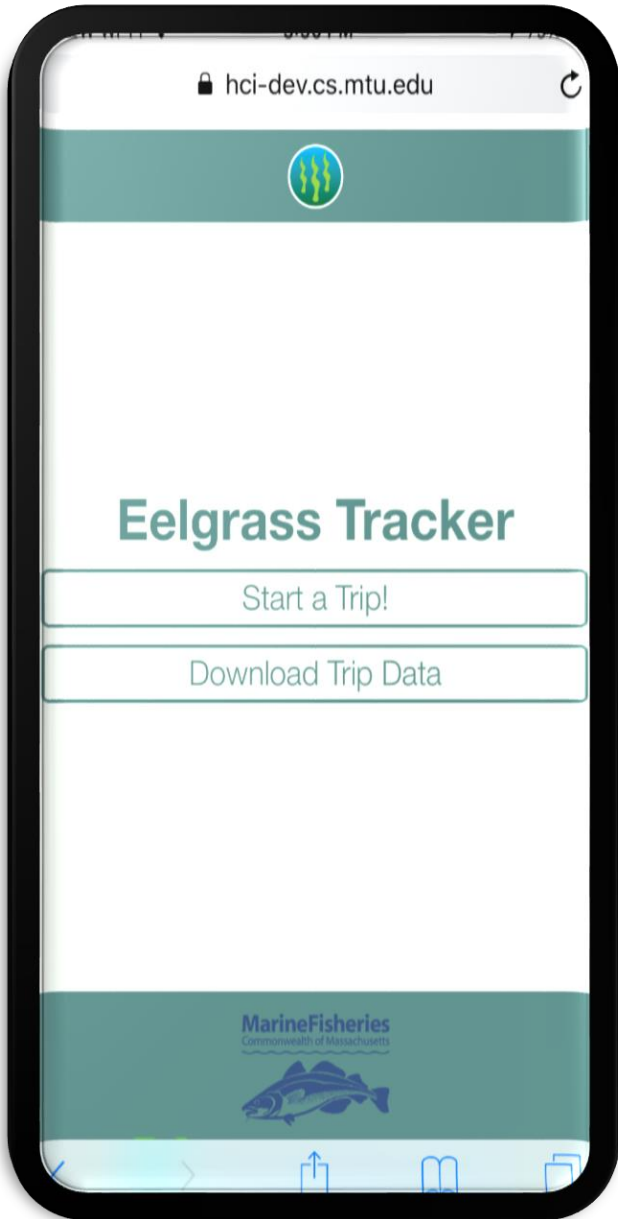
Step	Field		Scenario 3 Data
61	Drop Frame (4) - Eelgrass Percent Cover		1-10
62	Indicator Station only: (4-Shoot 1) length		
63	Indicator Station only: (4-Shoot 1) width		
64	Indicator Station only: (4-Shoot 2) length		
65	Indicator Station only: (4-Shoot 2) width		
66	Indicator Station only: (4-Shoot 3) length		
67	Indicator Station only: (4-Shoot 3) width		
68	Indicator Station only: (4) Wasting disease		
69	Indicator Station only: (4) Epiphyte cover		

Appendix G: Bug Report Form

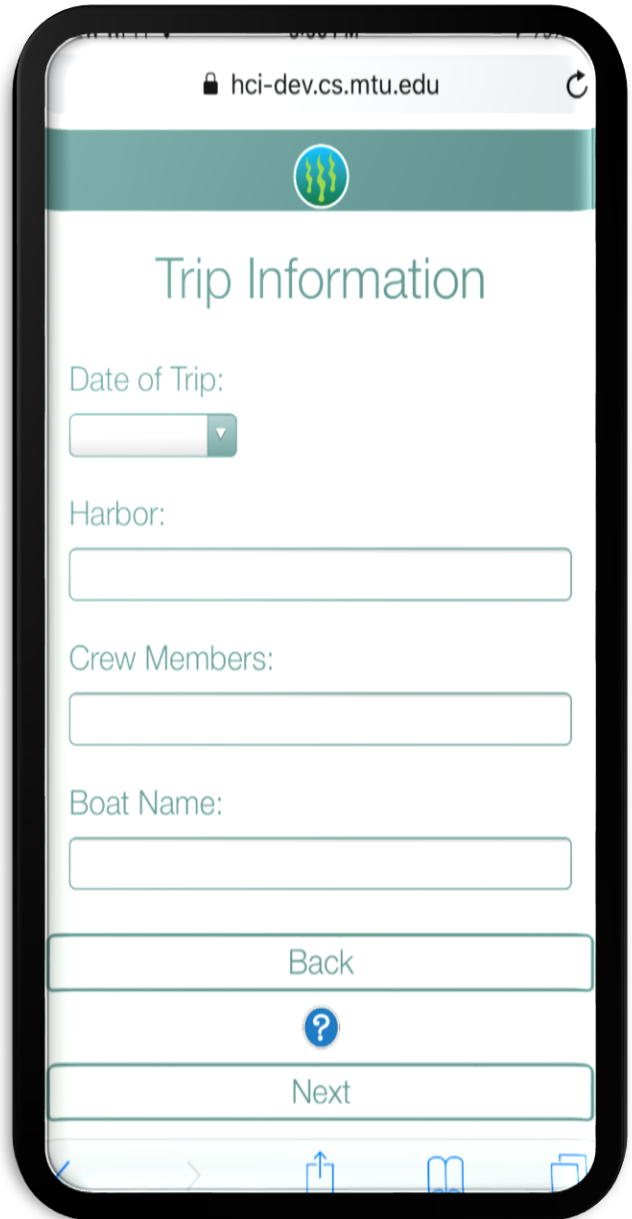
<u>Bug #</u>	<u>Bug Name</u>	<u>Bug Uniqueness</u>	<u>Bug Location</u>	<u>Bug Description</u>
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Appendix H: Screenshots of app

Citizen Scientist Screen 1: Home Screen




Citizen Scientist Screen 2: Trip Information



Appendix H: Screenshots of app (cont)

Citizen Scientist Screen 3: Location Information

hci-dev.cs.mtu.edu



Location Information


Station Number:

Latitude:

Longitude:

GPS Device:


Back



Next

Citizen Scientist Screen 4: Weather Information

hci-dev.cs.mtu.edu



Weather Information


Wind Direction:

Wind Speed:

Sea State:

Tide:

Back




Next

Appendix H: Screenshots of app (cont)

Citizen Scientist Screen 5: Secchi Sample Information

Citizen Scientist Screen 6: Drop Frame Data 1

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Secchi Sample Information


Water Depth:

Time:

Secchi Depth:

Disk at Bottom

Back



Next

hci-dev.cs.mtu.edu

Drop Frame Data

Picture Taken:

Picture Timestamp:

Sediment:

mud

gravel


clay

cobble

sand

Eelgrass Percent Cover:

Back

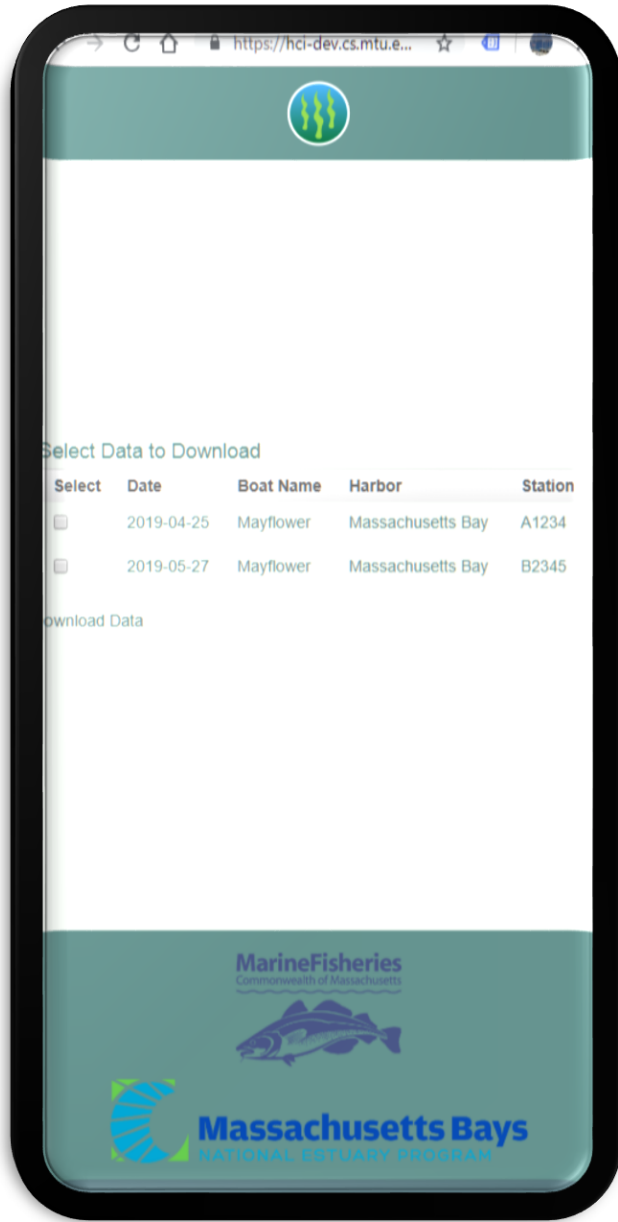
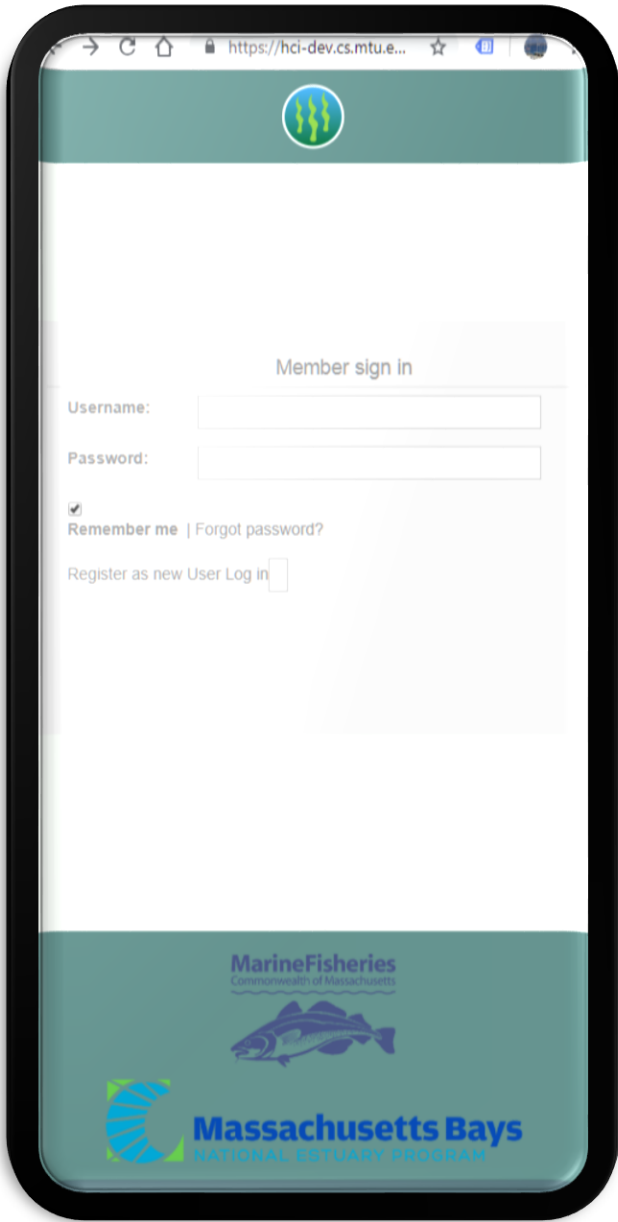


Submit Data

Appendix H: Screenshots of app (cont)

Admin Screen 1: Login

Admin Screen 2: Parameter Selection



References:

Jillian Carr, J., Ford, K., Evans, T., Frew, K., Boeri, A., Vella, P., and Grady, S. (2018). Eelgrass Monitoring: Development of a Citizen Scientist Monitoring Method.