

Expert Review of the MyCoast Application

Annika Acuna, Dylan Bishop, Olivia Dissen,
Julia Escarda, Ananth Rao, Jasmine Soni

Under the supervision of Professor T.J. Rainsford
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Gerrit Knaap, NCSG Executive Director
Kimberly Fisher, PALS Director



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ABSTRACT

The MyCoast app is a mobile and web-based application used by the Maryland Department of Natural Resources to document and analyze pictures and data of flooding caused by precipitation and coastal events. The data it collects is used for various purposes, including visualizing impacts of flood events, as well as enhancing awareness of flood events among Maryland residents.

This project's goal was to create an expert review of the MyCoast application. Initially, the goal was to create wireframes and a new schema for the app. After discussion, the goal shifted to interviewing people with different backgrounds (who work in sector, peers, etc) and creating a list of recommendations from our findings.

This report reviews the MyCoast application and end-user feedback on app functionality and user experience, makes recommendations for improvements to the app and recommendations for improvements to end-user documentation to improve the user experience and data quality.

The team worked with the following individuals throughout the project.

Name	Description
Sasha Land	Maryland Department of Natural Resources
Sandra Olek	Maryland Department of Natural Resources
Angela Baldwin	Park Manager, Assateague Island State Park
Sophie Kotzker	PALS
Bryan Lightner	Board Member, Maryland Association of Floodwater and Stormwater Managers (Cecil County)
Kara Buckmaster	Specialist, Emergency Management (Calvert County)
DeCarlo Brown	Specialist, GIS (Geographic Information Systems)
Kate Vogel	Coastal Program Fellow, Maryland Department of Natural Resources
Mickey Beall	Public Works Director, University Park
Necolle Maccherone	Chair, Maryland Association of Floodwater and Stormwater Managers

METHODS

The project began with a requirements interview to resolve any questions about the statement of work. We learned more about the project and its goals. Next, we downloaded the application to see its function and capabilities.

The next step, finding interview candidates was challenging since we lacked connections to many of the stakeholders. However, Ms. Land and Ms. Olek put us in contact with many involved stakeholders. Some interview questions were based on understandings from the requirements interview and others were based on first impressions of the application.

The first round of interviews was with stakeholders and potential end-users. A second round of interviews with student peers gathered a younger perspective on the application's layout and functionality. Interview responses were documented in Google Docs files, organized by interview.

Their feedback was first analyzed for issues that were common between the two interview groups as well as for suggestions that we thought would be helpful. Based on the analysis, we created mockups of layout improvements and created a list of recommendations for application improvements.

One of the greatest obstacles was finding time for the entire team to meet. Team members had busy schedules that left us with few available times. This also impacted the number of team members available to conduct interviews. To resolve this, we held meetings with as many people as possible and updated unavailable members with the content covered in the meetings. This was not as big of an issue for the interviews because we only needed one or two people to conduct each interview.

DESCRIPTION OF DELIVERABLES

These deliverables are intended to achieve the project's goals by supplying user design and interaction recommendations that can be carried forward by the professionals developing and building the MyCoast user base.

Application Feedback—Usability

From the interviews, the first feedback was that the application doesn't offer enough usability. Without the ability to create a user account, it's difficult to return to the app as an uploading user. A user profile and account would also allow users to network with each other. Moreover, with a user account, individuals can view their own uploads and ensure their photos are uploaded.

Reviewers also noted that there are no filters available when searching for reports. Adding filters such as location, type of flood, and date will allow users to search for pictures more efficiently. Additionally, we received feedback that there is a lack of metadata for pictures and information. For example, to view the date of an uploaded report, users must click into each report rather than

seeing it when browsing. Correspondingly, the lack of design cues within the application, gives no indication that a picture was successfully uploaded.

The final feedback was about inaccurate live data. Tidal data represented in the application isn't updated live; it relies on National Oceanic and Atmospheric Administration (NOAA) updates. A note on the application to indicate this may clear up any misconceptions for users.

Application Feedback—Layout

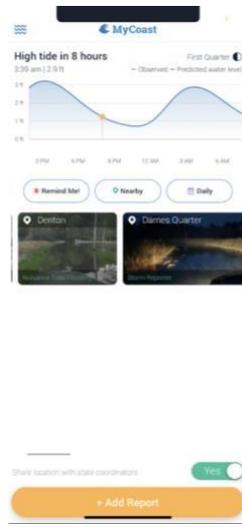


Figure 1. The current homepage of the MyCoast app.

Much of the layout feedback came from the younger audience, as well as from some professionals and referenced the general layout of the app based on their first impressions.

It should be noted that some interviewees were using a model of iPhone 10 and above, which uses a screen layout that creates “pockets” in upper corners (shown by the black bar at the top of Figure 1). This interferes somewhat with the header, pushing the navigation bar into the top left corner, which is where the time is also displayed. This overlap makes the navigation bar unresponsive at times and can make it hard to navigate through the app.

Users also found it a little tedious to navigate back to the home page through opening the menu. They noted it would be more convenient to have a single button to return.

As for the graph, several users noted that it would be easier to see if it were larger or interactive. Underneath the graph, is the live stream of user reports. However, interviewees noted that it isn't labeled, so they only knew what it was once explained.

It was also mentioned that vertical scrolling may be more intuitive, since there is a good amount of white space underneath. This space is one of the first things that tended to catch their eye, so they suggested filling it with content.

RECOMMENDATIONS

Major Recommendations

1. Provide more context on how to use the app
 - Quick step-by-step walkthrough of the app’s features (uploading pictures, coastal tide information, etc.)
 - Explain how the data will be used (include in the “About Us” section)
 - Include a guide that users can refer to for definitions and tools
It’s vital to provide sufficient context for first-time users or those who don’t know flooding terminology or the three MyCoast tools. This will help make the application less intimidating for the everyday user. Guidance on uploading the extent of flooding and storms was a popular recommendation. Including non-tidal or non-coastal flood report examples was also proposed so the app can gain traction beyond tidal and coastal areas. Users also sought guidance on whether old incident pictures were necessary for records. Likewise, is incident data over time needed (users shouldn’t “flood” the app if they want to post the same place).
 - Create a user profile
Allowing users to track previous uploads addresses the feedback received about the difficulty of locating previously uploaded reports. It also allows trends to be identified and networking with other users.
 - Create a search and filter feature for uploaded pictures
The filter should be based on location and/or date and should allow searing by Nuisance Flooding, Coastal Damage, Storm Reporter. This can be in the form of a dropdown menu on the Live Stream of Reports section.
2. Standardize information across web application and phone application
 - Full reports should be accessible from the phone application
Currently, reports on the phone application link to the website version, which features more information about the report (see Figures 2 and 3). Having all the information available directly on the phone application would make it more effective.
 - Enable users to find the nearest tide stations from web app.
 - Enable equal scalability and consistency across the app’s mobile and desktop versions (e.g., less scrolling and more navigation menu usage on mobile).
3. Provide feedback to users after they upload pictures

Thank them for their participation (“Thank you for making Maryland safer!”) and showing them the report they just uploaded and other indications that their action was successful will assure users that their report can be seen and used.

Minor Recommendations

1. Publicizing the app for Scouts and citizen scientists already doing activities could even lead to this being added as a mandate of what they do. These are usually individuals already looking for ways to help.
2. A privacy disclaimer letting users know how the data is being used could be available in the “About Us” section.
3. Marketing the application as a way to help one’s local community will provide an incentive for people to return to the app.
4. Work with the Maryland park service to share the app with park personnel can use MyCoast to record this data.
5. Including flooding extent (how wide it spans) and water levels on report would make the data more useful.
6. Using crowdsourcing to supply notifications like “parking lot not usable” was a popular recommendation for further down the line.
7. Clarifying to users that they don’t need to download the app (can use web) to contribute may increase use. This could be noted in the messaging on the login page.
8. Adding messaging pointing users to another app for evacuation routes and other extra info could be useful.
9. One interviewee proposed that if the app should reach beyond a coastal audience, the name MyCoast may make it more difficult to spread elsewhere (though the name also does draw the attention of the key coastal audience).

Developer Recommendations

1. An interactive tide graphic on home page (users thought they could swipe it right to left) and interactive tide gauge map where gauges can be selected for extra information or addresses might be searched were requested. Interactive graphics are more informative than numbers.
2. On some devices, the current color scheme makes the time unreadable.
3. Scaling the application to newer phone models will assist some layout fixes.

4. The swipe gesture for the side menu can be helpful since the menu button is hard to tap on.
5. The white space on the home page below the images allows users to scroll through images; is this intended? Vertical scrolling could solve this.
6. Adjust the settings to add a location changing option (it's currently auto-set from device location) so users can check information on different tide stations.
7. Improve picture and report sorting: uploaded pictures could be sorted geographically and chronologically and report sorting method should be clearly stated.
8. Allowing past uploaded reports to link to a map instead of only by town name can help users see exactly where flooding took place (or in relation to their location).
9. The GIS specialist requested an API to query responses (perhaps geojson responses). Scraping data from the website in the CSV form isn't ideal for them. This change would streamline the extract, transform, load procedure in their systems.

Screenshots of Current Application

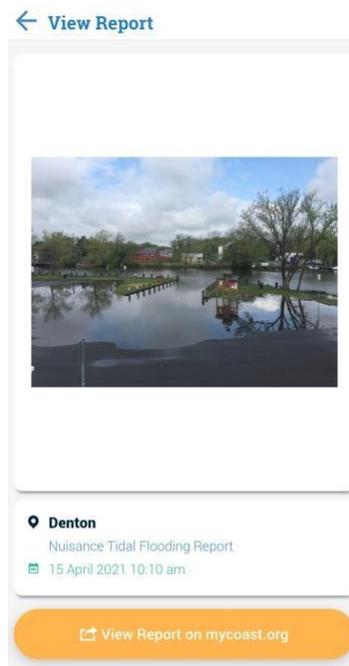


Figure 2. A report on the MyCoast mobile application.

Nuisance Tidal Flooding Report

"Denton Crouse Park"



04/15/2021 | 10:10 am



Tidal Overview

1 hours 18 minutes before high tide

Data from HILLSBORO, TUCKAHOE CREEK (6.4 miles away)

All heights shown relative to Mean Lower Low Water (MLLW): the daily low tide level averaged over a 19-year period. (NWS flood status: *Not defined*)

High Tide (Predicted): 11:28 am, 2.7'



(Tidal data via NOAA Tides & Currents)

Weather Overview



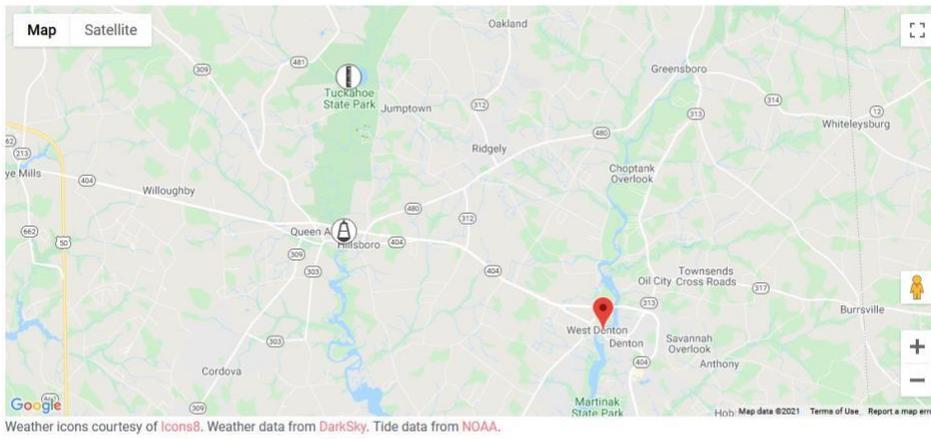
- Wind Speed: 6 MPH
- Wind Direction: WNW (286°)
- Temperature: 58°F
- Rainfall (Calendar Day): 0.06"
- Rainfall (Past 24 Hours): 0.23"

(Click here for full weather details)

Riverine Overview

Data from TUCKAHOE CREEK NEAR RUTHSBURG, MD (8.2 miles away)

Water level: 1.72' (NWS flood status: Not defined)



Weather icons courtesy of Icons8. Weather data from DarkSky. Tide data from NOAA.

You must be logged in to post a comment.

Figure 3. A report on the website/desktop version; it features additional information such as weather and riverine overviews.

Ideas for Layout Improvement

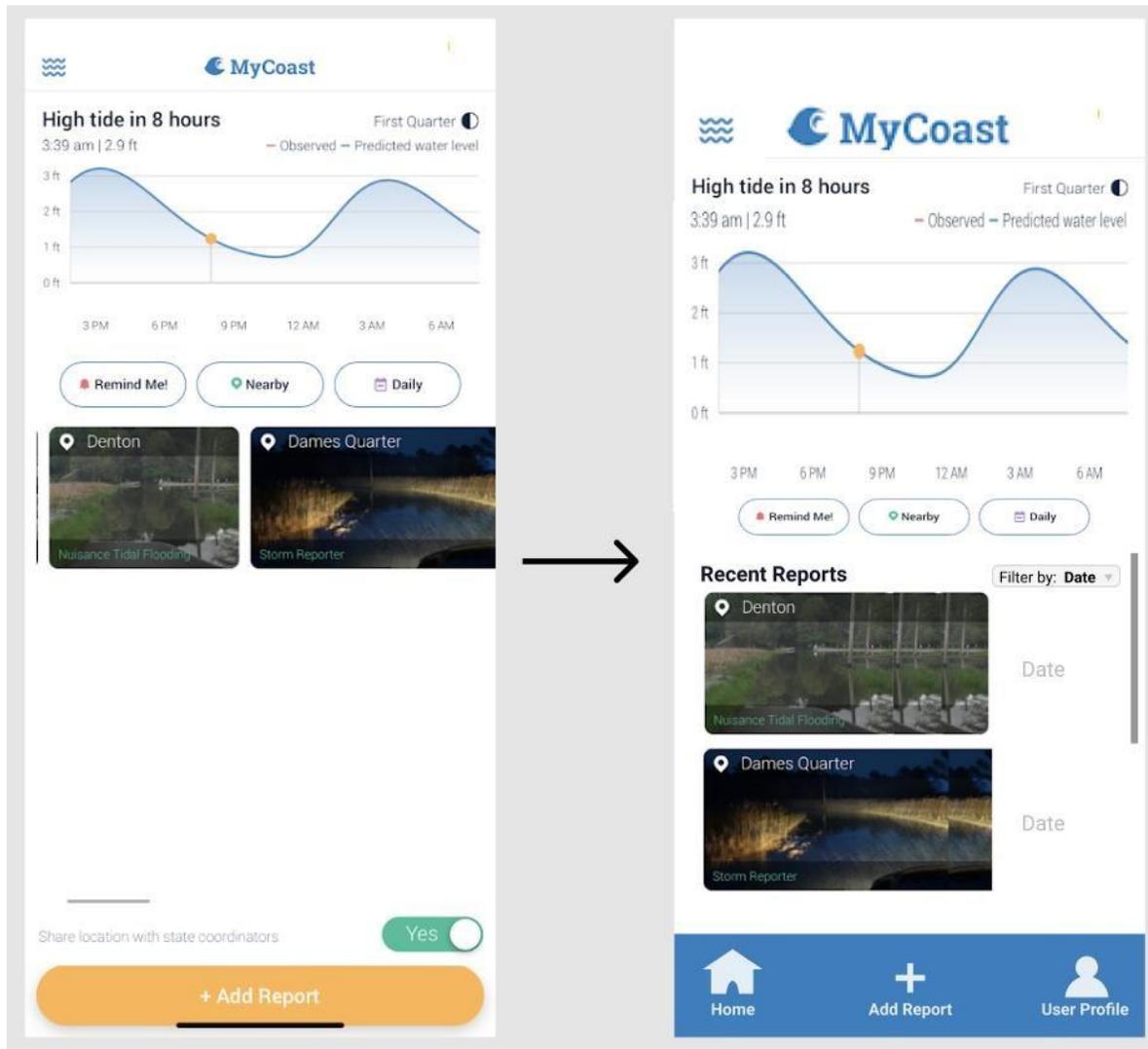


Figure 4. Suggested layout changes for the phone application's homepage.

The figure above shows a possible layout change for the homepage, which is the main hub. These changes can serve as next steps that developers can undertake improve user interaction.

The changes:

- increase the size of the title and the navigation button
- add more padding to the header to keep the navigation bar from overlapping with the time
- increase graph size
- label stream of user reports and adjust to vertical scrolling
- add a filter option for the reports

- add a static navigation bar at the bottom for basic functions, as well as a new user profile option. This bar will remain in place and will still be displayed from any screen in the application.

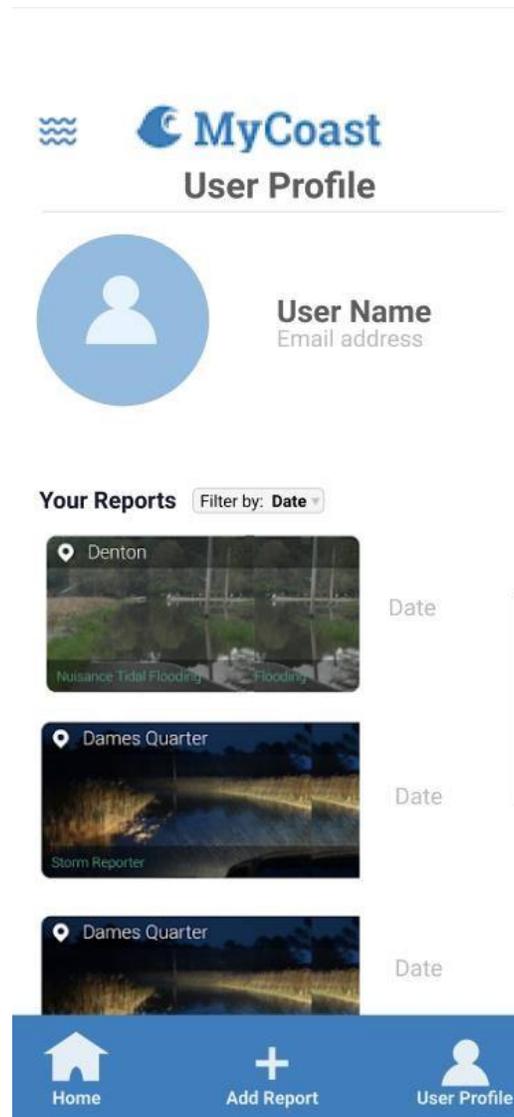


Figure 5. A possible layout for a user profile feature.

Figure 5 shows a potential design layout that could be implemented for user profiles. It is a basic layout that includes the user's username, email, and reports uploaded, with the latter being the most important function.

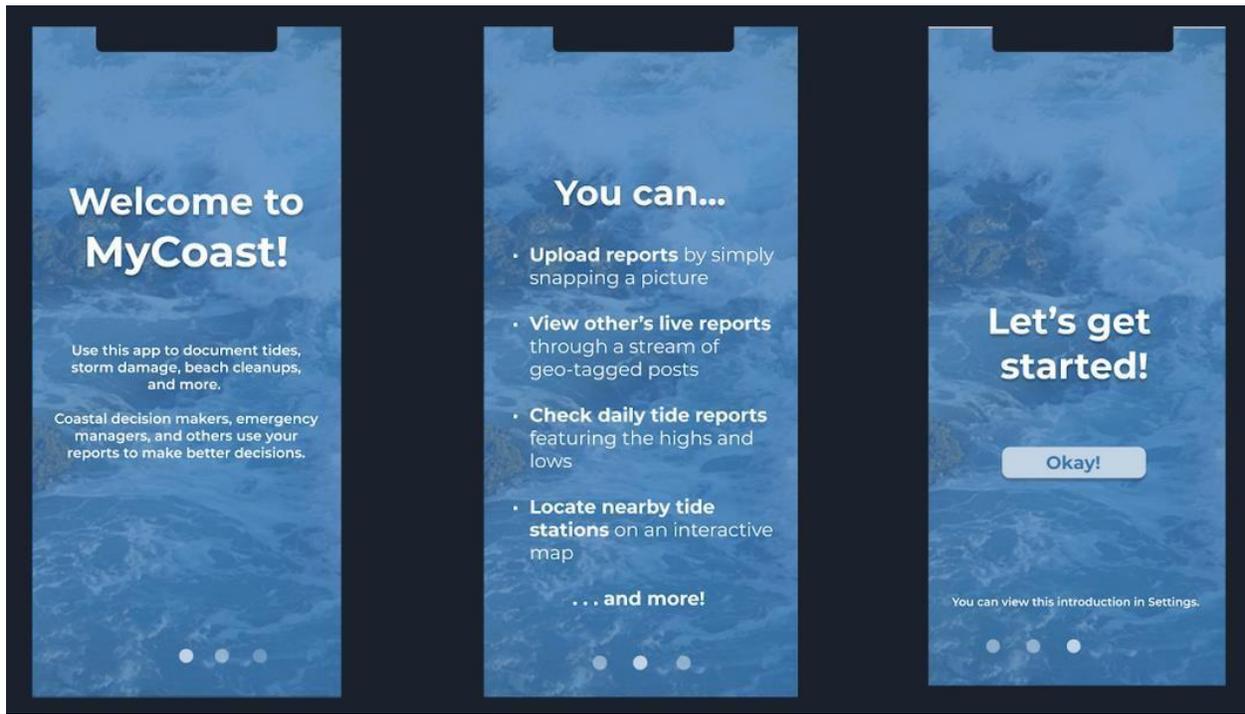


Figure 6. Potential ideas for a brief introductory slideshow. The description on the first slide is from the MyCoast website. The three slides provide context for a first-time user unfamiliar with the app's capabilities. This brief introduction should be able to be viewed again in Settings, if the user needs a refresher.

NEXT STEPS

As mentioned, this project's main objective was to provide recommendations for improving the application. To meet time constraints, the scope was narrowed to focus on gathering feedback from several interviews of stakeholders, field professionals, and the potential average everyday user.

The feedback provides a foundation of information and opens several opportunities for future projects to work. For instance, further research can be conducted into app's accessibility in lower income neighborhoods, rural areas, and for individuals with language barriers. Future interviewees might include individuals living in affordable housing units, particularly those

susceptible to flooding events or near the coast. Land near the coast tends to be cheaper, as developers recognize the difficulty of building on areas prone to recurrent flooding.¹

According to a study by the Institute of Physics,² Maryland's affordable housing units are "most at risk of repetitive flooding, with over 200 units exposed to at least four flood-risk events per year." Thus, this demographic would be ideal to begin with as they regularly experience coastal and flood events and could provide the MyCoast app with direct reports in their neighborhoods.

Another area for further development is wireframes or design mockups to improve the overall user experience. This project wasn't centered on the user experience or the layout of the MyCoast app, but it was a common denominator in feedback we received. A pleasant user experience is likely to draw users back to the application. Some visual ideas for the homepage are provided in this report, but a continued collaboration could go into more depth and provide layout improvements for more of the app's pages. A further step would be to work with the developers to implement these recommendations, while also working with users and to test and gather feedback on different designs.

CONCLUSION

We were asked to interview stakeholders, compile data received, and create a feasible list of recommendations for the MyCoast app. We hope the data will positively affect the Department of Natural Resources decision-making processes by assisting in user experience improvement and, in turn, increasing user satisfaction and usage of the MyCoast application.

We also hope the data benefits the work processes of state and municipal employees, planners, and developers, along with Maryland residents who seek an intuitive way to obtain accurate information that can reduce flood risks throughout the state.

We have identified what we think are key difficulties when stakeholders use the application. Our recommendations include providing instructions where necessary, allowing for the creation of user profiles, implementing of a search and filter feature, a standardized format, and user feedback after a report is submitted.

¹ <https://www.smithsonianmag.com/smart-news/rising-tides-brought-climate-change-threaten-already-limitedaffordable-housing-market-180976441/>

² <https://iopscience.iop.org/article/10.1088/1748-9326/abb266>

We enjoyed working with you and hope we were able to provide purposeful and rational recommendations to help improve an already incredibly useful application. Please feel free to contact us with any questions.

Jasmine Soni (team liaison): js.collegeapp@gmail.com

Annika Acuna: annikaacuna@gmail.com

Dylan Bishop: dylandbishop@gmail.com

Olivia Dissen: ogdissen@gmail.com

Julia Escarda: juliaescarda1@gmail.com

Ananth Rao: ananth3rao24@gmail.com