

CoastSnap: Community Coastline Monitoring

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Abstract

CoastSnap is a project that aims to monitor coastline change in the city of Santa Cruz in which data collection is achieved through citizen science efforts. This means that visitors and residents can collect data by taking frequent coastal pictures and sharing them with the project team. Crowdsourcing images is a cost-effective method for monitoring shoreline changes since anyone with a smartphone can contribute to data collection. Additionally, citizen scientists can learn important information about coastal changes in the Pacific coast related to climate change and human activities in their local communities. CoastSnap has the potential to increase public awareness on multiple coastal processes from coastal erosion to sea-level changes in the long-term. Moreover, we have two major stakeholders, the United States Geological Survey (USGS) and the City of Santa Cruz. These supportive organizations are collaborating with us so that we can bring CoastSnap to our coastal communities. We wish to obtain city permits, so we can place multiple camera mounts at multiple local beaches where visitors can place their smartphones to take images at a fixed position. These camera mounts are designed to keep consistent data by providing a fixed position to smartphones so that images properly capture the coastline. Since anyone with a smartphone can participate in data collection, the project expenses can be reduced thanks to the frequent crowdsourcing of images. Furthermore, the main insights we want to analyze from collected pictures are monitoring rapid changes of coastal erosion and predicting climate change impacts on our local coastal communities. Overall, this method of coastline monitoring is low-cost, informative, and resourceful for preparing responses to ongoing changes in the marine environment and coastal communities.

Introduction

a. Context and Background

Climate change is causing rapid changes in the environment, and some of these changes can have severe and lasting consequences for coastal communities. Some examples of climate change impacts are higher sea level, faster rates of erosion, higher ocean acidification, and more frequent and intense storms (NOAA 2018). Besides climate change, coastal development contributes to coastline changes such as habitat destruction, increasing pollution of heavy metals, and displacement of native species (Neumann 2015). Satellite imagery and air photographs are technological advances that have shown evidence that our coastlines have experienced multiple changes over time from coastal infrastructure to beach erosion (Bird 2005). These coastline changes can lead to a chain of harmful effects in the marine environment and our coastal communities. For instance, high rates of beach erosion is a current concern that not only threatens the ecological balance of marine ecosystems, but it also affects coastal communities and local businesses near the shoreline (Dean 1976). Even though beach erosion is a natural phenomenon, the abrupt changes due to its increased rate does not allow species and ecosystems time to adjust (Gravois et al., 2016). For instance, some consequences of an eroded beach are increasing collapse risks of shoreline structures, flooding of native species, displacement of sand supply, loss of tourism revenue, and loss of diversity in wetland and intertidal ecosystems (Alexandrakis et al., 2015). Overall, beach erosion, unregulated coastal development, and climate change impacts are some of the main reasons that the marine environment and our coastal communities experience drastic changes. According to public surveys, the United States spends billions of dollars on rebuilding damaged infrastructure from beach erosion, and billions of dollars more are needed to protect coastal ecosystems from pollution and intense natural phenomena (Cat 2019). There are traditional methods for coastline monitoring such as maps, charts, air photographs, and satellite imagery that have helped the scientific community to analyze oceanographic patterns and predict changes in the coastline so that communities are better prepared for these expected outcomes (Genovese & Green 2015). However, these traditional methods tend to be costly and time consuming to maintain and update over time.

b. Problem Context

In multiple parts of the world, coastal communities are facing various impacts from rapid beach erosion that can damage not only infrastructure, but it can threaten the safety of people if these buildings collapse (Genovese & Green 2015). Moreover, coastal ecosystems are being altered by the constant expansion of shoreline structures and unregulated practices of habitat destruction (Heberger et al., 2016). Besides beach erosion, there are other environmental factors affecting the stability of coastal ecosystems and our coastal communities. So, it is important to design sustainable solutions that protect them; and our pilot project, CoastSnap, wishes to inform the general public on coastal processes and climate change impacts. Our project is inspired from Australia's CoastSnap which is currently active in collecting data of their coastline changes. As climate change progresses as well as coastal development, it is crucial to monitor coastline changes so that we improve response efforts to harmful climate change impacts and destructive human activities. Overall, our project is primarily focused on data collection through crowdsourcing images of our local beaches, and these images can provide relevant information about coastline change.

c. Problem Statement

CoastSnap is a citizen science project with the goal of monitoring coastline change by engaging our community in a cost-effective method of data collection. CoastSnap is a sustainable project because it uses resources that are already available and in circulation in our coastal communities from beach access to smartphones. That is, this method of crowdsourcing images from the general public is an effective method that decreases the project's budget because less research efforts, materials and maintenance are needed to sustain frequent data collection. Additionally, the CoastSnap website will contribute to monitoring coastline changes by gathering chronological images taken by beach visitors and storing them in a Google Drive folder. Scientists can easily access all of the collected images by visiting that folder. Frequent pictures at a fixed position from different sites is important so that a specialized software can analyze patterns in the images, and these patterns can help predict coastal impacts from various environmental factors such as erosion and climate change. For instance, collected images are going to be analyzed through photogrammetry which is a technique that gathers all collected

images and stacks them all up so that changes can be recorded through time. The more collected images, the more information and predictions we can obtain from our project.

Investing a significant amount of effort and capital into the construction of permanent camera structures would not be convenient and cost-effective in the long term. For this reason, CoastSnap seeks to work directly with local communities and tourists to crowdsource coastline images from visitors' smartphones. Therefore, it is important to engage the general public for promoting frequent interaction with the camera mounts and informing them about our project's goals, expectations, and results. This engagement with the general public is crucial for educating local populations on changing coastal behavior, and how important it is to protect our marine ecosystems and coastal communities. CoastSnap is a significantly cheaper alternative to existing permanent camera structures, as the data would be crowd-sourced through participants' own smartphone cameras during their visit to a local beach. Overall, CoastSnap is expected to provide a deeper understanding of changes in the marine environment, predictions of future impacts, and solutions that protect coastal ecosystems and coastal communities.

Project Description

CoastSnap provides a low-cost method for mapping shoreline changes by using images that are uploaded from community members to social media (CoastSnap, 2017). CoastSnap has the potential to inform the general public about environmental problems, coastal community issues, and major coastal concepts thanks to its dynamic method of data collection and displayed information at the site. One of our objectives is to assist in the development and implementation of CoastSnap in the city of Santa Cruz so that we can help monitor coastal change caused by climate change and other environmental factors. We have been testing data collection with a "DIY" photo station at the Natural Bridges State Beach for 4 months, and we have been designing a website for users to upload their photos. We have collected several chronological images taken by members of our team and have created time-lapse reels that would help inform the United States Geological Survey (USGS) about the technologies required for data acquisition and monitoring of coastline change. We have also built a website, which allows users to upload their coastline images. Our website will provide CoastSnap participants with another option to quickly upload their images by filling out a short form. We believe that this simplified method will increase community involvement. Our main sprint goals were to allow a user to upload their

photos with other needed information (e.g. location, time and date that the photo was taken, type of device used to take the photo), store all the photos and information, and host the website through UCSC's server. All three goals were met, and our website can be visited at <https://coastsnap.ucsc.edu/> for anyone to easily access it, provide feedback, and test its main features as early as possible. Because we are building on CoastSnap ideas, we have analyzed the success and challenges in deploying, maintaining, and promoting CoastSnap. For instance, a major success is that the program helps promote sustainability and educates the local community about climate change. In addition to community engagement, the use of social media yields a significant amount of data for determining the current ocean health. Both smartphones and social media are ubiquitous, thus making CoastSnap accessible through social media can result in a larger compilation of data. CoastSnap in general is extremely beneficial because some places may have limited monitoring records of the coastline, making it difficult to form effective coastal management and planning strategies. By using this crowdsourcing approach, any visitor could add more records of the coastline at any time. This would result with recent data policymakers could use for future planning and development of regulations. Another major benefit of using a crowdsourcing approach is that the uploaded images can be used by scientists for monitoring urban beaches as well as measuring the ecological health of marine ecosystems (Wazny 2018). That is, a timelapse of images of the same urban beach can give great insight into both the physical and oceanographic properties that are changing. One example could be that because there is a progressive decline in seashells seen on the beach during the summer months, arthropod's mortality rate is increasing, and we could see this decline through images of the coastal shore. The establishment of the CoastSnap mount in a location that is both highly effective in data collection and has high participation is essential for the success of the project. A quality site would observe the coastline on an elevated location for more coverage. It should be framed in a central location for consistent imagery and have stable points that don't change. It must also be in an area that has sufficient public visitation for large data interactions and a decently pretty and open beach to avoid visual impact as well as look "instagrammable". On top of all that, it needs to have a low vandalism risk, and be safe. Citizen scientists show engagement and passion by collecting vital data for our coasts. These local users help maintain the community interests with our project and goals.

Methods

a. Site selection

We first chose two site locations at Natural Bridges State Beach, through the guidance of Dr. John Warrick, a research geologist at the United States Geological Survey. These two site choices were strongly recommended by Dr. Warrick for a variety of reasons. The first site is located behind the Natural Bridge arch, in the parking lot near the park entrance kiosk. Site 1, has a more extensive view of the ocean and shoreline at an angle that can more accurately collect data. This site also displays a more beautiful view of the beach which will increase user interaction, but unfortunately this site is not accessible to wheelchair users (more Site 1 details on page 15, Appendix 2). Site 2, is located more inland on a pier over the beach itself. The second site is in fact accessible to wheelchair users but is limited in its data collection ability, and has more difficult ground point to reference (more Site 2 details on page 16, Appendix 2). Both sites were marked with sharpie on the railing, to ensure minimal disturbance to the areas while creating accurate reference points for our team to take identical photographs over the course of the quarter.

b. Image Analysis

Adobe Photoshop 2022 was used to edit the photos acquired from each of the selected locations. The photo collectors of the group uploaded the images they took to a shared Google Drive. From the shared Google Drive, the photos were downloaded to the Photoshop computer and inputted into the graphic editor. To do this, you select *File*, then *Scripts*, and then *load files into stacks* (see Appendix 1). This will show all the images overlapping on the screen. Next, you need to choose a target image that will be used to frame the rest of the photos. You want to select the clearest and best-aligned image because all the other images will line up with the focal point from that photo. To do this, you click *browse*, then *select images*, and then *lock target image*. After locking your target image, you want to align the rest of the photos with the one you chose. This requires you to click *select*, then *all layers*, then *edit*, and then *auto-align layers*. Now that the images are aligned, you want to crop them so they all match up with your target image. To do this, you want to hold down on the control key on your keyboard and click on your locked target image. Once you've clicked on the locked target image, a pixelated line will show up around the image on the screen. To crop the images, you click *image* and then *crop*. Now the photos should

all be aligned and ready to export. To export, you need to select *file*, then *export*, and then *layers to files*. To make sure you have the correct quality of images downloaded to your computer, you need to delete the filename prefix and select JPEG quality 12. Once you've completed all these steps, you are ready to put the images into reels via iMovie. After all the images are aligned, ensuring that the ground points remain consistent, the photos are taken to iMovie. In iMovie, the images are uploaded, creating a time lapse effect of progress. In order to impose a smooth reel, the transitions are then edited out, and the images are held at a time of 2 seconds. This creates a reel with the ground point remaining stable throughout the pictures, but the coastline shows clear changes.

c. Website Development

A draft of the website for this project has been completed and hosted through UCSC. The homepage contains an introduction to CoastSnap, how to get involved, a list of our DIY photo stations in Santa Cruz, and a short description of our current team (see Appendix 3 for screenshots of the homepage). Clicking on one of the DIY sites will bring the user to a page that tells them more information about the location, such as what we expect the pictures to look like, a brief description about the location, timelapse videos created with the pictures that our team has taken so far, an interactive map that marks exactly where to take the picture, and directions to get to the location (see Appendix 4 for screenshots of a DIY site page). To encourage community engagement, we frequently placed buttons throughout the website that navigate the user to a simple form for uploading their coastline pictures. Each location's page contains a personalized button that automatically fills out the location field in the upload form (see Appendix 5 for a snapshot of the upload form). Once the form is submitted, the photo and its information will be saved in our team's shared Google Drive folder. We decided to save the data on Google Drive because we constantly upload and check photos in that folder every week. In addition, UCSC provides storage space for students that use Google Drive. Commonly used databases like MySQL and Google Cloud's Firebase have been considered but were ruled out in the end due to usage costs and harder accessibility for our current and future non-technical team members. Documentation on how to modify and add more content to the website is detailed at <https://github.com/venuswku/CoastSnap#readme>. For future iterations of the website, we will continue to improve its usability based on feedback that we get from testing. Team members who normally take pictures at our DIY sites can save time by using our website to upload their

pictures, skipping the process of transferring the pictures from their phones to the shared Google Drive folder, and relabeling the uploaded pictures. This can also allow us to test the user experience within our team so that we get more effective feedback when we test with people outside of our team. Aside from creating a more user-friendly website, we plan to add a footer with ways that users can contact our team and links to more resources from the City of Santa Cruz about climate action.

c. Stakeholder Meetings

A few meetings were held with three of the stakeholders for the CoastSnap project. We met with Tiffany Wise West from the city of Santa Cruz, Dr. Jon Warrick from USGS, and Borja Reguero. Some of the topics we discussed with Tiffany Wise West were the current status of city permits, funding, and project updates. With Dr. Warrick we discussed site selection, short-term data collection at Natural Bridges State Beach, and the components for camera cradles. Borja Reguero is more hands on with how to use the data, so he directed us away from taking photos without a stable camera mount because the images were too distorted for scientific use.

d. Event Presentations

On April 23rd, our CoastSnap student group presented our pilot project during the Climate Action Market event at the Seymour Center. We printed out and laminated images and infographics about the camera mount set-up, coastline changes, and Santa Cruz map with potential sites. Moreover, we played image reels from our two sites at Natural Bridges so that we showcase what CoastSnap is all about to prospecting stakeholders from the scientific community along with teaching Santa Cruz citizens. An outcome of the event was scheduling a meeting with Jonathan Hicken, director of the Seymour Center, and Jen Cormier, visitor programs manager. In this meeting, we spoke to Jonathan Hicken about installing a camera mount outside of the Seymour Center and near the gray whale skeleton. Director Hicken said he was very excited about having one camera mount near the Seymour Center. Unfortunately, we did not have the time to go through the lengthy permit process before the Spring quarter ended. On the same day, April 23rd, our team presented CoastSnap at Rachel Carson College (RCC) during Earth Week. Presenting our project at RCC had the goal to inform other students about IDEASS labs and the process of developing sustainable projects.

e. Links for Site Reels

Click on the following links to see our short movies of chronological images at Natural Bridges State Park where we took pictures at two different sites.

Site 1 Reel This site has a better angle and position for coastline monitoring as this spot is located parallel to the shoreline.

Site 2 Reel This site has an accessible entrance and front angle to the beach, not useful enough for coastline monitoring.

Next Steps

The next steps for UCSC's involvement in the CoastSnap project into the Fall quarter of 2022 will primarily consist of tasks begun in the Spring quarter of the prior year. Our main objective is to assist in the development and implementation of CoastSnap into Santa Cruz county to help monitor coastal change and push the project forward in any way we can. To continue in our pursuit, first and foremost we intend to schedule more meetings with the stakeholders to get updated after the three month summer break. Due to Jonathan Hickens' eagerness to install a camera mount at the Seymour Center, we intend to contact him about getting the ball rolling to make that happen and begin the permitting process. Having a stable mount set up will be beneficial to jumpstart camera collection again and provide reliable data. Additionally, we plan to meet with Jon Warrick to learn how to geotag the photos from the Natural Bridges sites. We also plan on updating the website as needed and work towards shifting the domain owners to one of the stakeholders. As the project is still in the early pilot stages Tiffany Wise West deterred us from pursuing public engagement, although as the project continues, we hope to implement the mounts that will allow public interaction at the chosen sites. In order to spread knowledge of these mounts, updates on the data, as well as information of the project as a whole, we believe that creating an Instagram social media page would be the best way to attract attention. This Instagram account would feature a monthly highlight of "best picture," incentivizing the public to upload more pictures to be featured. We would also post the reels of the data we've been collecting to show an overview of how the coastal changes are monitored and how everyone is contributing. This would not only spread awareness about the project, but keep our users updated and more inclined to continue participating in our data

collection. Another way to provide feedback for users who may not be on social media, is to create an E-mail newsletter that provides monthly updates on the project.

Expected Results

CoastSnap has launched a variety of prototypical deliverables further developing goals, by raising awareness of climate impacts, observing erosion dynamics, involving local communities, collecting coastal change data and monitoring overall seasonal shifts in the coastal area of Santa Cruz. These targets will eventually be met through the construction of photo mounts, by involving the public as active participants through the collection of data. The USGS has currently created a prototypical model of these mounts, and upon implementation will subsequently allow residents of Santa Cruz and tourists to participate in reaching said goals. The team has scouted two trial sites located at Natural Bridges State Park and marked them with sharpie. The marked sites were then treated like a normal CoastSnap camera mount, and weekly photographs were taken. After collecting several images of the coastline, we tend to see noticeable chronological changes through the tide changes, weather conditions, and varying times of day. Our intention is to enable the CoastSnap team and all its partners to begin collecting data through an automated data processing protocol. Additionally, our meeting with Jonathan Hickens suggests we have the ok to implement a mount at the Seymour Center once gaining a permit which could help move the project along to getting the more complicated city permits for the Natural Bridges sites. Coincidentally, our team member Venus Ku, who studies computer science, has been instrumental in the construction of the CoastSnap website. The website consists of our mission statement, team members, future mount locations, reels, and a photo uploading section. The uploading section automatically renames images in our Google Drive with the device type, date, and time the photo was taken at.

These deliverables have advanced this project and serve to allow for the team to set up standard CoastSnap mounts in the near future. The goal of CoastSnap has always been to increase public awareness and interaction with climate issues in a hands-on and accessible manner. Through the creation and usage of these mock up sites, our team has a familiarity with possible challenges and how to address them before even setting up the proper mounts. Certain challenges have been overcome over the course of the Spring 2022 quarter, including but not limited to meeting with the director of the Seymour Center to discuss setting up a mount. The

project deliverables have set the groundwork for future user interactions, as our team has personally seen the challenges certain sites present. Going forward, we need to align our efforts to match the needs of the larger CoastSnap Santa Cruz team including UCSC researchers and partners from the City of Santa Cruz and USGS as well as other non profit organizations. This shift will enable us to more accurately understand potential limitations and successes within our project, and maximize efficiency which will in turn encourage high participation levels. At that point, we could determine if CoastSnap would be successful based on the progress of installing mounts, as well as if our website and social media accounts gain traction through going public. This would be the most effective way to evaluate the trajectory of CoastSnap.

Data Analysis

As we are currently in the early stages of our project, we do not have specific data that has been analyzed from our collected images at Natural Bridges State Beach. For this reason, we do not have information to share in this section until we have more advances towards our project. As soon as CoastSnap gets city permits for setting up camera mounts, our team and future team members will collect more chronological images and find a software that can analyze these images.

Discussion

a. Limitations

As our team waits for city permits and updates from our stakeholders, we are limited to the activities we can proceed with our project. We have had meetings with people from USGS and the City of Santa Cruz so that we get informed on the progress of our project. Therefore, we have only practiced the protocols for data collection at our local beach, Natural Bridges, and we have prepared this project report as guidance for future team members. We have progressed towards bringing CoastSnap to our city, although we have faced some challenges. A limitation we encountered was coastline variability from a further ground point. One of the sites, Site 2 was more difficult to align due to its position, which therefore altered the images dimensions.

Additionally, the official smartphone mounts that will be established at the sites for people to lay their phones against are still not set up. This being the case, it's difficult to acquire

data as there is variability in the positions the phones are held to try and capture the photographs. This raises a problem of unreliable data, due to either the stretching or rotating of an image which would distort the coastline. People will also use different phones that have different picture qualities. This will cause a significant difference in the quality of data and Photoshop can only do so much to mitigate the effect. However accessibility plays a role, as the site that is further away from the coast is wheelchair accessible. This site sits on the edge of a wooden lookout, however it has been observed to be covered in sand most days, and very hidden and tucked away. It is worth noting that the accessibility factor, while important, may not be successful at this site regardless. Site 1 is not wheelchair accessible as it is in front of parked cars instead of the main beach entrance.

However, there are many more people in this area, and it has a very picturesque view which may inspire the public to take more pictures for the project. The tradeoff of removing site 2, hypothetically, would not greatly affect the amount of data collected. Most complicating, our CoastSnap group has not been in contact with the stakeholders for the project in approximately three months. From lack of expertise and guidance from those running the project we have found ourselves limited in what we can accomplish. We are unsure of the expectations the stakeholders have for the sites and have been noting our observations, but our knowledge has its limits.

b. Conclusion

CoastSnap is currently a prototypical model that has maintained its original mission to strive as a low-cost and informative resource for communities, and encourage citizen science efforts in response to climate change within the Santa Cruz coastline. The progress in creating the informal camera mounts, website and prototypical data sets has proven crucial in identifying limitations and necessary improvements prior to public interaction. As CoastSnap evolves, the need for stable mounts and public interactions becomes increasingly of value in identifying further necessities for the project. The implementation of real CoastSnap mounts will further test our current mock-up and provide extensive feedback on participation levels ensuring the construction of productive mounts. The participation of the public through the collection and uploading process of coastal pictures is a cost-effective method for monitoring the shoreline, and serves as an educational tool for climate change impacts on local communities. These interactions are priceless at a community, educational, and scientific level, and would be

incredibly valuable for the evaluation of participation levels and user feedback. CoastSnap's goal strives to engage the community directly within each aspect of its construction in an attempt to appoint each Santa Cruz citizen as a climate ambassador for their coastlines.

Appendices

1. Photoshop Photo Editing Instruction

File->scripts->load files into stacks

browse->select images

Lock target image(the most ideal one we want the others to match up with)

select->all layers

edit->auto-align layers

Hold control key, select locked target image(makes pixel lines around it)

image->crop

file->export->layers to files

Delete filename prefix, JPEG quality 12

2. Sites 1 and 2 at Natural Bridges State Beach

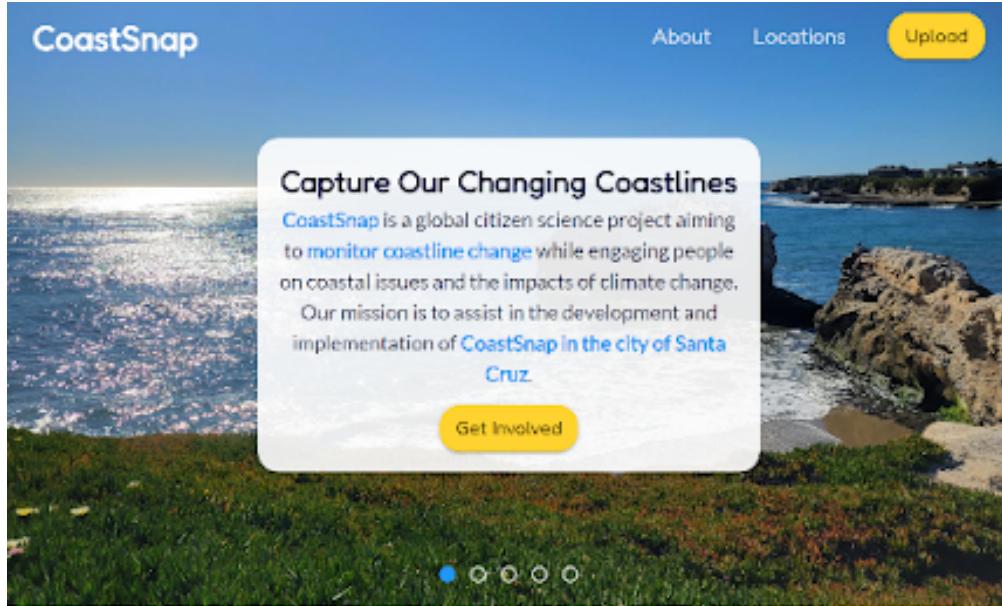


Figure 1. Site 1 at Natural Bridges, coastline view is located at the parking lot before the main entrance to the state beach



Figure 2. Site 2 at Natural Bridges, front view of the beach is located at the viewing area that is accessible for everyone.

3. Website Homepage



Building Resilience to Climate Change



Monitors Coastal Change

Crowdsourcing images from the community helps local governments, researchers and scientists monitor our dynamic coast.



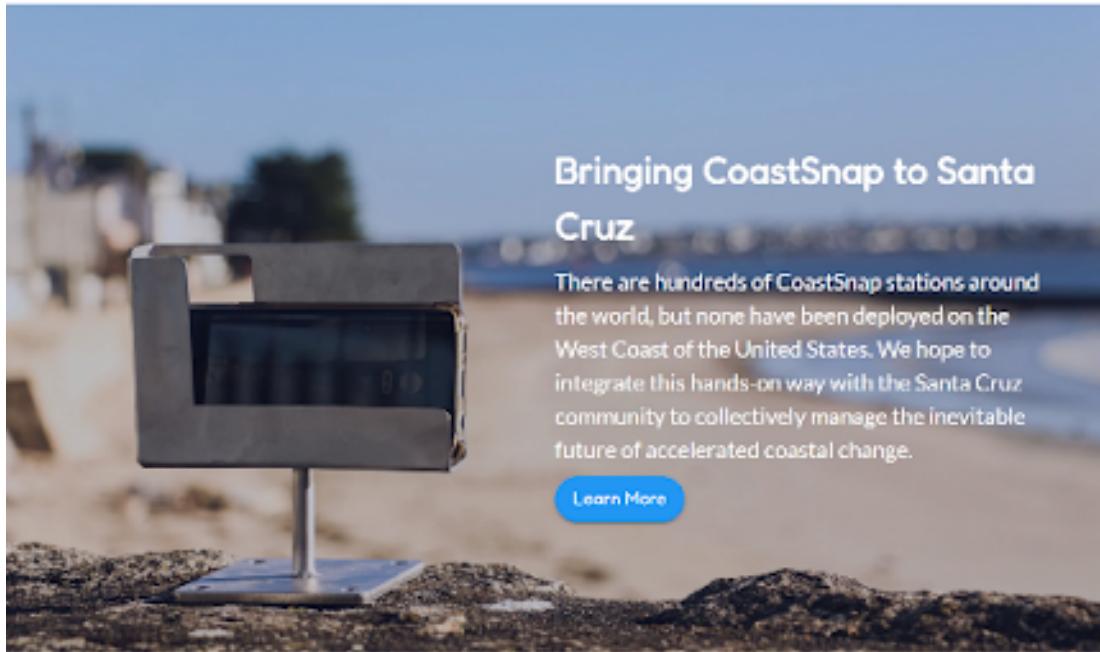
Encourages Community Participation

We welcome residents and tourists of all ages, incomes and abilities to actively participate in the data collection process.



Educes About Climate Change

Public participation raises community awareness, motivation and empowerment to build a more resilient coast in the face of climate change.



Santa Cruz Locations

Click on a location to view timelapses, directions and more!

To meet our main objective of bringing CoastSnap to Santa Cruz, we are first focusing on testing data collection with [DIY \(do it yourself\) photo stations](#) along the Santa Cruz coastline. Thanks to the guidance of John Warrick from the United States Geological Survey (USGS), we were able to find some decent sites for data collection. Currently, the photo stations are marked with Sharpie on the railings to ensure minimal disturbance to the areas while creating accurate reference points for our team to take identical photographs throughout our testing period. These sites will eventually be replaced with camera mounts available for public usage, which will ensure consistent photographs from a variety of device models that CoastSnap will compile together as demonstrated in the timelapse videos for the photo stations below.



Natural Bridges
Site 1



Natural Bridges
Site 2

Support Our Coast

The submission of coastline photographs by locals and tourists is crucial to create a large, diverse collection of data on Santa Cruz beaches. As long as you have a [smartphone connected to WiFi or data](#), you are ready to contribute! After taking a photo at one of the CoastSnap stations, [upload your photo through this website or the CoastSnap app](#). This collection of photographs will enable data collection on climate patterns in Santa Cruz coastlines and enable public interactions with climate issues from local citizens and passerby.



Use this Website
Fill out our form with your name, device and location, then submit your photo!

[Upload Now](#)



Download the App
Register your own user account with an email address, then start snapping!

[App Store](#) [Google Play](#)

UC Santa Cruz Team

The current UCSC team working on this project consists of Dr. Stella Hein and a variety of students with a passion for ocean sustainability. These students are involved with the UCSC sustainability program *Impact Designs: Engineering and Sustainability through Student Service* (IDEASS) and come from all sorts of backgrounds and specialities to create a strong, diverse team. They include Alfonso De Eguia Gutierrez, Andy Surin, Ella Thompson, Emily Nguyen, Iris Borius, Litzia Galvan, Sarita Parikh and Venus Ku.

4. Website Subpage for Natural Bridges State Beach Site 1

The screenshot shows a website for "CoastSnap" featuring a large, framed photograph of a coastal beach at sunset. The beach is sandy with some people, and the ocean waves are crashing against rocks on the left. The sky is blue with some clouds. At the top right, there are buttons for "About", "Locations", and "Upload". Below the photo, the title "Natural Bridges Site 1" is displayed in bold. A descriptive paragraph follows: "This station is very car accessible as it is located behind the Natural Bridges arch and in the parking lot near the Natural Bridges State Beach entrance kiosk. It has an extensive view of the shoreline at an angle which can help us more accurately collect data due to its good exposure and solid, reliable ground points." Below this is a yellow "Upload Photo" button. Further down, a section titled "Timelapses" is shown with a video thumbnail for November 15, 2021 - March 8, 2022, featuring a play button icon.

Natural Bridges Site 1

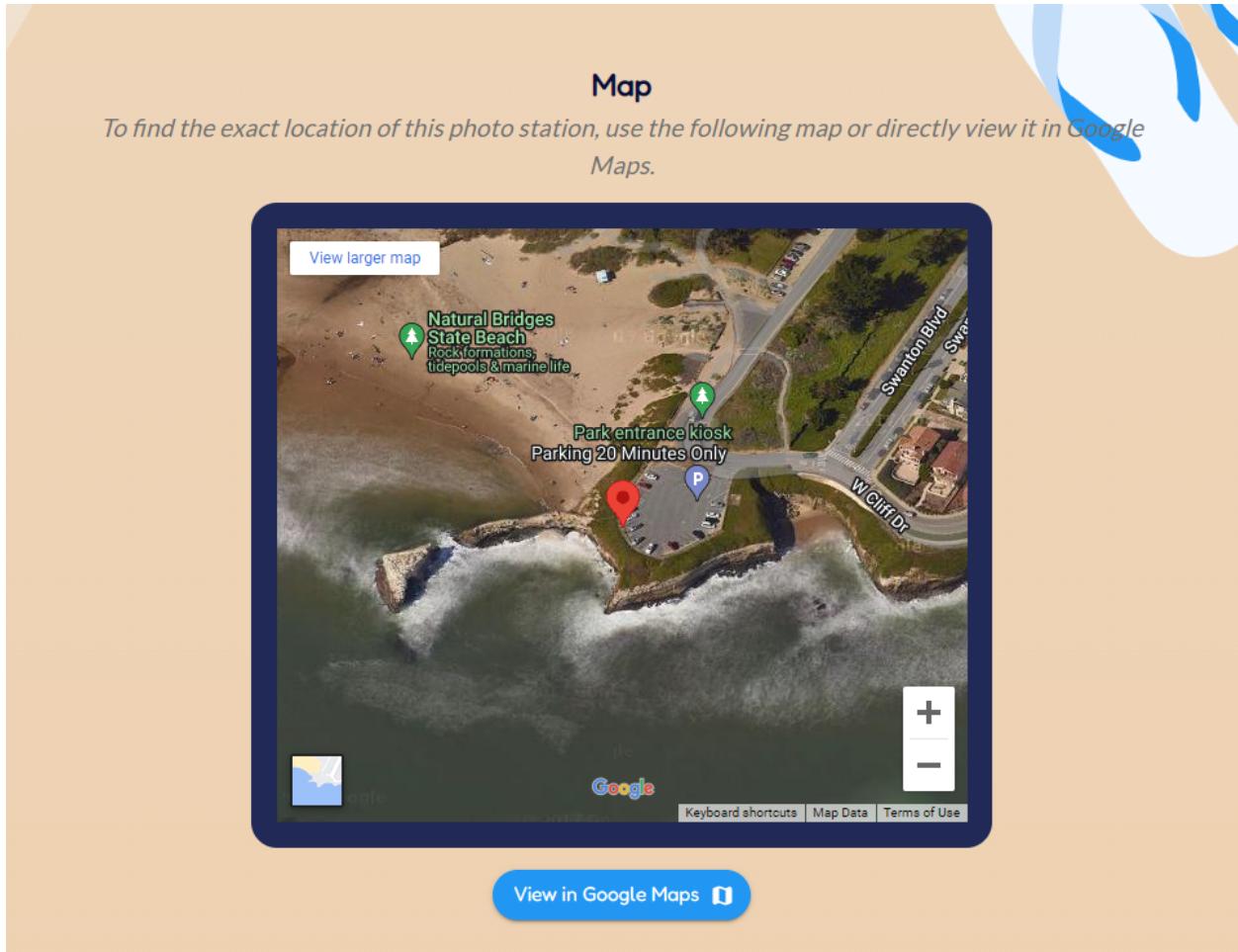
This station is very car accessible as it is located behind the Natural Bridges arch and in the parking lot near the Natural Bridges State Beach entrance kiosk. It has an extensive view of the shoreline at an angle which can help us more accurately collect data due to its good exposure and solid, reliable ground points.

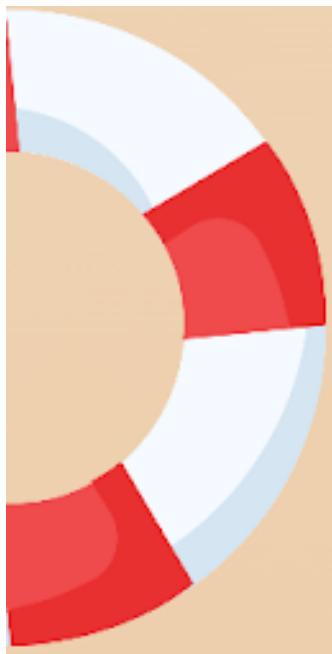
[Upload Photo](#)

Timelapses

The following videos have been compiled from the photos that our team has collected over several months.

V November 15, 2021 - March 8, 2022





Directions

Click on an image to enlarge it.

1. Walk down the lookout point towards the ocean.

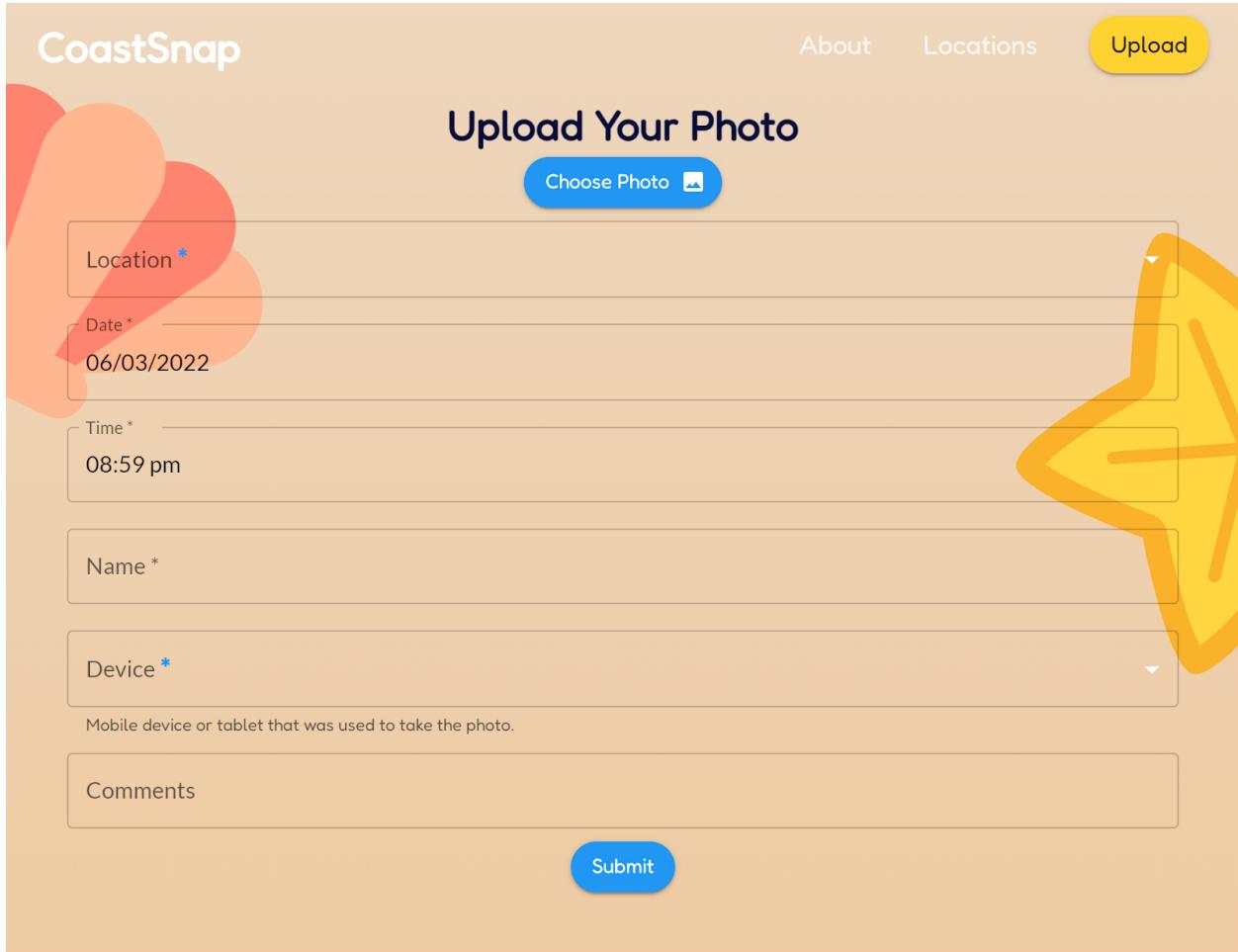
2. Approach the following Danger sign.

3. Find the subtle Sharpie markings over the sign (should be in the shape of a rectangle).
Notice the X mark over the nail, that's the side your device's camera should be facing!

4. Then place your device on the railing, line up the top of your device with the railing crack and face the camera towards the beach like the following.


[See Example Image](#)

5. Website Upload Form



The image shows a screenshot of a website called "CoastSnap". The header features the "CoastSnap" logo on the left and navigation links for "About", "Locations", and "Upload" on the right. The "Upload" link is highlighted with a yellow background. The main content area has a light beige background with a large orange and yellow abstract graphic on the right side. The title "Upload Your Photo" is centered at the top of the form. Below it is a blue button labeled "Choose Photo" with a camera icon. The form consists of several input fields: "Location *", "Date *", "Time *", "Name *", "Device *", and "Comments". A small note below the device selection says "Mobile device or tablet that was used to take the photo." At the bottom center is a blue "Submit" button.

CoastSnap

About Locations **Upload**

Upload Your Photo

Choose Photo 

Location *

Date *

06/03/2022

Time *

08:59 pm

Name *

Device *

Mobile device or tablet that was used to take the photo.

Comments

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