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**Boston University**

**Electrical & Computer Engineering**

**EC464 Senior Design Project**

Final Prototype Test Plan

**Coastline Prediction using Existing Climate Change Models**

By

Team 18

Team Sea Rise



Team Members

Stacia Kolodziejski [skolodz@bu.edu](mailto:email1@bu.edu)

Wenyu (Jessica) Hu [wjhu@bu.edu](mailto:email1@bu.edu)

Saif Alblooshi [sjalbloo@bu.ed](mailto:email1@bu.edu)

Required Materials

Software

* MATLAB\_R2022b software
* Imported prediction data file from NOAA website (.csv file)

Hardware

* A computer with a strong hard drive (or a Mac Mini)
* Monitor, Keyboard, and Mouse (if using a Mac Mini)

Set Up

First, plug in the computer (or Mac Mini) and connect it to the monitor, keyboard, and mouse to turn it on. Open MatLab and the final function script. To download the prediction data files, go to this link: <https://oceanservice.noaa.gov/hazards/sealevelrise/sealevelrise-data.html> and navigate downward to find the .csv file in a zipped folder. Download the zipped folder to the device by clicking on the link and open it to find the correct .csv file needed for the final function. The file name is “SLR\_TF U.S. Sea Level Predictions.csv”. Drag and drop this file into the MatLab current folder space where the function will be run from. Once this file is successfully imported into the MatLab current folder, the function will be ready to run. The elevation data files do not need to be downloaded and imported by the user in order to be used in the final function correctly.

To run the final function, the user will need to click the run button at the top of the MatLab page. Once the script is run, there will be three prompts that show in the command window one after another. The user must type in specific answers to these prompts to continue running the program. After typing in the response, the user can then press enter to answer the next prompt and finally press enter again to run the rest of the program to see the results. Once the script is done running, the user will wait for the final figure output to show on the screen. There will be two figures that show on the screen: the original elevation data map visualization and the new predicted coastline map visualization of the chosen city.

The user has an option to choose a ‘scenario’ as one of the prompts. This means that the user can choose what level of carbon emissions (low, medium, or high) and at what depth in meters the sea level will rise by the year 2100 (0.3, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0) they would like to view the coastline for. These different scenarios will all have different corresponding prediction data values.The correct response in the command window will be typed using the depth level with a dash surrounded by spaces and following that dash the carbon level in all capital letters.

If the user does not type in the correct responses to the prompts, the code will not run and will have errors. The user must make sure to type in the answers exactly how prompted. The prompts will have an example that would work.

Testing Procedure

1. Open MatLab & the final function script
2. Navigate to the NOAA website using the link given and download the prediction data file to the device
3. Import all files into MatLab current folder by dragging and dropping
4. Run the script in MatLab
5. Answer the prompts as they show up in the command window and press enter after each prompt is answered.
6. Wait for the two maps to show on the screen (one behind the other).
7. For testing purposes, the user can rerun the function and try different cities, years, and scenarios to see how the function’s output will change.

Scoresheet

| **Task** | **Pass? Y/N** |
| --- | --- |
| Downloaded prediction data successfully from NOAA website |  |
| Imported prediction data successfully into MatLab |  |
| Final function runs correctly with no errors including user prompts |  |
| MatLab function has correct output maps that accurately depicts new coastline and accurately depicts the original elevation data for the city chosen |  |

Measurable Criteria

* Data can correctly import into MatLab (prediction data)
* MatLab function runs successfully
* Final function output shows a final map of the new coastline depending on the chosen year by the user and a map of the original elevation data.
* Final function can use prediction data every 10 years up to 100 years into the future
* Overall script and output can be made by a single MatLab function
* Final map visualization can be made for any year (10 year intervals) chosen by the user
* Final map visualization can be made for any scenario chosen by the user
* Final map visualization can be made for any city chosen by the user (except for cities near a military base)

Completed Deliverables & Engineering Requirements from MathWorks

* Can be used with one single MatLab function
* Uses & depicts data for up to 100 years into the future
* User can choose what region and year to see the output for
* Map output depends on time in years instead of depth in change of sea level rise
* Map can output for any preference from the user (year, city, scenario)