

# **Newport News Shipbuilding Climate Change Impact Prediction Tool**

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## 1. Executive Summary

### a. Problem Statement

Newport News Shipbuilding is a large supplier of design, refuel, and build work at scale for the U.S. Navy. It is not an exaggeration to say that NNSB is a fundamental support to U.S. warfighting capabilities and national defense. For this reason, along with many others, NNSB should be constantly evolving, adapting, and integrating next generation ideas into their workplace.

Climate change is a chronic issue that plagues coastal business and infrastructure. At current rates, climate change promises to change how businesses secure new coastal locations. Businesses that currently hold coastal property will have to reinforce existing sites to withstand enhanced storm surges as time moves forward. It is not a cost-effective solution to be satisfied with rebuilding damaged infrastructure.

NNSB has already taken the first step and realized that the issue of climate change could pose significant impact on coastal operations. By reaching out to our VCU Capstone team, NNSB has asked us to utilize our Computer Science knowledge and VCU resources to begin analyzing what the future may hold.

### b. Value

The proposed project is a climate change predictive system. As with any prediction system, the value coming from our project comes in the form of knowledge. Meaning that information learned by the end-user has significant value.

That information is how climate change or more specifically, sea level change, effects NNSB operations. Through analyzing southern chesapeake bay climate change data, a prediction can be made on what the projected sea level will be years in the future. Information like this is useful when securing coastal infrastructure such as building and also in NNSB's case, dry docks.

## 2. CCIPT Specifications

For this section, please observe the GitHub repository leveraged for this project:

<https://github.com/VCU-CS-Capstone/2019-CS308-Newport-News-Shipbuilding-Climate-Change>

The README.md file will specify the organization of folders in the repository. For convenience, a copy of this layout is also listed on the following page:

- **Code:** Contains scripts used to run CCIPT along with the **Data** directory.
  - **Data:** Contains csv and sql data that drives the modeling process.
- **Rubrics:** Contains binary files that hold the excel rubrics that evaluate this project.
- **System Documentation:** Contains all directories regarding documentation.
  - **Diagrams:** Contains all diagrams that map system process, entity relations, and overall design.
  - **Documents:** Contains all documents that depict sponsor related proposals and requirements.
  - **Draw IO Files:** Contains xml files that back the diagrams in the **Diagrams** directory.
  - **Notes:** Collection of meeting notes taken throughout duration of project.
  - **Sources:** Contains all documents and web addresses used as information insights for climate data.
  - **Status Reports:** Contains all status reports generate by developers for liability purposes.
  - **User Manuals:** Contains all manuals for front end users.

### 3. Further Work

There are two main components that leave a lot of room for future improvement for this project. First, if storm data becomes available, it would greatly enhance the meaningfulness of the project. There is already underlying code in the back end for the integration of storm data. Second, the automation of information sharing between native python and QGIS.

### 4. Deployment

To deploy this project, ensure that your system has both Python and QGIS downloaded. There are several imported modules required to operate the Python backend, all of which can be installed via pip. Once these modules are installed first run the “gather.py” script to build the Data folder that is utilized by the tool. Then run the “push.py” script to build sqlite tables on your system. Once this is done simply run the “gui.py” script to run the backend. At this point the user manuals express how to work this number into QGIS for a GIS map solution of the NNSB area.