

CS CAPSTONE REVISED REQUIREMENTS DOCUMENT

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DEVELOP A VISUAL MODEL FOR SEA TURTLE BEACH STRANDING EVENTS

PREPARED FOR

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Abstract

The Pacific Ocean off of the Oregon Coast has constantly changing weather and sea conditions. With this, many different animal species, including threatened sea turtles, end up stranded on the shore and perishing. In order to better understand how weather and ocean conditions affect where and when animals get stranded, historical statistics will need to be combined and reviewed. This will aid in the finding of correlations to help rescuers to find stranded animals in a timely manner. This document outlines the project program that will help to accomplish these tasks. The minimum requirements are outlined in detail.

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1 REVISION TABLE

Section	Old Requirement	Revision
4.2	The user should be able to download the software program from the client's website.	We do not currently have access to our client's website server or source code. For this reason we cannot complete this requirement.
4.2	The user should be able to import data files that contain data on stranded animals.	Our standalone project executable is not a powerful enough engine to process data. Instead of uploading data to our program, it would be better to upload data to a more powerful tool like ArcGIS Pro. ArcGIS Pro is designed to handle data processing.
4.2	The user should be able to display imported data in a table.	This requirement cannot be completed because it is dependent on the above requirement.

TABLE 1
Table 1: Document Revisions

2 INTRODUCTION

This section provides information on the contents for the rest of the document. Sources and definitions are also provided.

2.1 Purpose

The purpose of this document is to serve as a guide to the creation of a visual representation of beached sea turtles. A detailed description of the project and related research is outlined.

The audience for this document is anyone who is involved in the development of the aforementioned model.

2.2 Scope

These requirements are meant to help guide the project team in the meeting of the client's, Dr. William Hanshumaker, needs and agreed upon functions. This will help form correlations about how ocean and weather conditions affect where sea turtles become stranded.

2.3 Definitions

Geographic Information System (GIS) - A program designed to process and represent multiple forms of data and layer them over maps [1].

Olive Ridley Sea Turtle - A species of sea turtle that is mainly found in warm climates. This species is the primary focus for this project [2].

NOAA - An abbreviation for National Oceanic and Atmospheric Administration. This administration provides scientific data about weather and sea conditions [3].

NANOOS - An abbreviation for Northwest Association of Networked Ocean Observation Systems. This association monitors and studies sea levels and sea life through data collection and visualizations [4].

2.4 References

The following resources will be used to collect data and provide assistance to the project:

- [1] A. Lovett and K. Appleton, *GIS for Environmental Decision-Making*. Boca Raton, FL: CRC Press, 2008. [E-book]. Available: ProQuest Ebook Central.
- [2] National Oceanic and Atmospheric Administration Fisheries, "Olive Ridley Turtles," *National Oceanic and Atmospheric Administration*. [Online]. Available: <https://www.fisheries.noaa.gov/species/olive-ridley-turtle>. [Accessed: Oct. 28, 2018].
- [3] National Oceanic and Atmospheric Administration, "National Oceanic and Atmospheric Administration," *Noaa.gov*. [Online]. Available: <https://www.noaa.gov/>. [Accessed: Oct. 28, 2018].
- [4] Northwest Association of Networked Ocean Observation Systems (NANOOS), "NANOOS," *NANOOS*. [Online]. Available: <http://www.nanoos.org/home.php>. [Accessed: Oct. 28, 2018].
- [5] ArcGIS, "ArcGIS — Main," *arcgis.com*. [Online]. Available: <https://www.arcgis.com/index.html>. [Accessed: Oct. 28, 2018].
- [6] Marine Mammal Institute, "Oregon Marine Mammal Stranding Network," *Oregon State University Marine Mammal Institute*. [Online]. Available: <https://mmi.oregonstate.edu/ommsn>. [Accessed: Oct. 28, 2018].

- [7] Seaside Aquarium, "SEASIDE AQUARIUM." [Online]. Available: <http://www.seasideaquarium.com/>. [Accessed: Oct. 28, 2018].
- [8] NANOOS Visualization System (NVS), "NVS: Tuna Fishers," *NANOOS Visualization System*. [Online]. Available: <http://nvs.nanoos.org/TunaFish>. [Accessed: Oct. 28, 2018].
- [9] Oregon Shores Conservation Coalition, "Coastwatch — Oregon Shores," *Oregon Shores*. [Online]. Available: <https://oregonshores.org/coastwatch>. [Accessed: Oct. 28, 2018].
- [10] U.S. Fish and Wildlife Service, "Oregon Fish and Wildlife Office - Newport Field Office," *Fws.gov*. [Online]. Available: <https://www.fws.gov/oregonfwo/promo.cfm?id=177175715>. [Accessed: Oct. 28, 2018].

Additionally, various research papers will be read throughout the duration of the project.

2.5 Overview

The requirements document is intended to provide clear guidelines and project details that will assist in making data visualizations that include weather and oceanographic conditions and stranded animals.

2.5.1 Section 2

Section 2 provides functional details on the project product and its intended users.

2.5.2 Section 3

Section 3 displays all specific requirements and goals of the project. This includes any stretch goals. A chart is provided to show a time line for finishing product features.

3 OVERVIEW DESCRIPTION

The purpose of this section is to provide a general overview of the visual model for sea turtle beach strandings software. All major product functions and user characteristics are explained, and any constraints and assumptions will be outlined.

3.1 Product Perspective

This product allows researchers and rescue teams to look at data in a visual way. Without the product there are no visual constructions of data surrounding marine life strandings.

3.2 Product Functions

The visual model of stranded sea turtles will incorporate the following data.

3.2.1 Data on turtle strandings

The location where the turtle was found and the date the turtle was found.

3.2.2 Data on climate and weather

Information on the wind current and direction and any unusual, or annual, events will be taken into consideration.

3.2.3 Data on ocean conditions

This includes data of sea surface temperatures and ocean currents.

3.3 User Characteristics

The intended users of this software are animal rescue workers and researchers.

- Researcher: marine biologists will be able to examine trends and statistics in the archived data and possibly be able to find correlations. The data might also be the basis for future research.

3.4 Constraints

The team would prefer to use ArcGIS due to the features it provides.

3.5 Assumptions and Dependencies

The success of this project relies on the availability of data on sea turtle beach strandings. The planning of this project is done with the assumption that the team will be able to gather enough data on sea turtle beachings to create a meaningful model. If there is not enough data, then our visual representation of the data will serve little purpose.

Another dependency is that the data collected may be organized in various forms so it must be possible to standardize the data received.

4 SPECIFIC REQUIREMENTS

This section of the document will outline all interface and functional requirements, along with projected stretch goals and a projected time line of project milestones.

4.1 Interface

4.1.1 User Interface

The interface implemented in this project will be an executable download from the client's web page. In the executable, the user will be able to select what data they want included on a map, such as weather and water surface temperature. The user will also be able to choose the date or date range that they want to view. Then, a map will be generated with locations of where an animal has been found stranded on the beach. The overlays of the map will be dynamic based on what data the user wants to display with regards to weather, sea conditions, and date.

4.1.2 Software Interface

In the background, the software will need to take in a database or list of sea animal strandings. This software will allow for the user to input information about each individual animal's strandings so that the GUI will provide a map overlay. This sort of database connection will allow users to quickly and efficiently access individual animals information and visual overlays.

4.2 Functional Requirements

This section describes various use cases for our project.

ID:FR1

TITLE: Program Download

DESCRIPTION: The user should be able to download the software program from the client's website.

RATIONALITY: This allows the user to access the functions of the software.

DEPENDENCIES: None

ID:FR2

TITLE: Open Software

DESCRIPTION: The user should be able to start the software to start using the map.

RATIONALITY: This allows the user to start with a blank map.

DEPENDENCIES: FR1

ID:FR3

TITLE: Import Data

DESCRIPTION: The user should be able to import data files that contain data on stranded animals.

RATIONALITY: This allows the user to start to manipulate the chosen data on the map and in the tables.

DEPENDENCIES: FR2

ID:FR4

TITLE: Display Map

DESCRIPTION: The map will be visible to the user.

RATIONALITY: This allows the user to get a visual representation of data based on location and conditions.

DEPENDENCIES: FR2

ID:FR5

TITLE: Interactive Map

DESCRIPTION: The user should be able to manipulate the map with the mouse. The user should be able to zoom and change location of view.

RATIONALITY: This allows for the user to get the visualization of data that is desired, and it allows for a simplified interface to the map.

DEPENDENCIES: FR4

ID:FR6

TITLE: Map Overlays

DESCRIPTION: The user should be able to change overlays of the map. These overlays should include sea surface temperature, sea currents, and wind direction.

RATIONALITY: This allows the user to examine the effect conditions have on the timing of animals becoming stranded.

DEPENDENCIES:FR4

ID:FR7

TITLE: Map Date

DESCRIPTION:The user should be able to view weather and ocean conditions based on the desired date.

RATIONALITY:This allows the user to look for trends in conditions and animal behavior.

DEPENDENCIES:FR4

ID:FR8

TITLE: Map Data Point Inclusion

DESCRIPTION:The user should be able to include imported data points for stranded animals.

RATIONALITY:This will allow the user to visualize stranded animals on the map in relation to the weather and beach location.

DEPENDENCIES:FR3, FR4

ID:FR9

TITLE: Map Data Point Selection Criteria

DESCRIPTION:The user should be able to decide which data points to include on the map based on animal species, date ranges, and location.

RATIONALITY:This will help the user to start examine trends with species in relation to weather and ocean conditions.

DEPENDENCIES:FR8

ID:FR10

TITLE: Data Tables Displayed

DESCRIPTION:The user should be able to display imported data in a table.

RATIONALITY:This will give the user an easy method to look at the data without having to click through the map.

DEPENDENCIES:FR3

ID:FR11

TITLE: Data Table Sort

DESCRIPTION:The user should be able to sort the data table based on a chosen criteria. This criteria should include date, species, location, animal outcome, and animal age.

RATIONALITY:This will allow the user to organize the data in a way that is desired.

DEPENDENCIES:FR10

ID:FR12

TITLE: Data Error Handling

DESCRIPTION:When the user imports data that contains an error, the user should be notified with a description of the problem and a possible solution.

RATIONALITY:This gives the user feedback on data importation issues and how to ameliorate the problems.

DEPENDENCIES:FR3

4.3 Performance Requirements

This section outlines the minimum performance requirements that the project must achieve for the client.

ID:QR1

TITLE: Easy Installation

DESCRIPTION:The software download package should include all necessary software files to run the program after it has been installed. There should be different downloads for different computer operating systems.

RATIONALITY:This allows the user to use the software without any unnecessary steps.

DEPENDENCIES:None

ID:QR2

TITLE: Intuitive Map and Data Manipulation

DESCRIPTION:Manipulation of the map and data should be easy to understand, and the user interface should perform how a user has come to expect based on popular software.

RATIONALITY:This lowers the burden on the user to learn how to use the software, which would detract from functionality.

DEPENDENCIES:None

ID:QR3

TITLE: Intuitive Menu

DESCRIPTION: The menu and main functions of the software should be clear, visible, and easy to find.

RATIONALITY: This will enable the user to use the software with less time wasted on completing simple tasks.

DEPENDENCIES: None

4.4 Gantt Chart

