Cetacean: Beneath the Reign of Giants

Work-in-progress website: https://com-480-data-visualization.github.io/WhereWereWhales/

In our project we aim to provide a comprehensive overview of cetaceans by offering visualizations of complementary information from different sources. The final project will be organized in a main page hosting generic information about cetaceans as well as three buttons guiding the user to each of the three main visualizations, namely the world map of sightings of cetaceans, the phylogenetic tree of cetaceans and a list of profiles cards. (See Figure 1) The main page also displays panels with information about the dangers and challenges that cetaceans face.

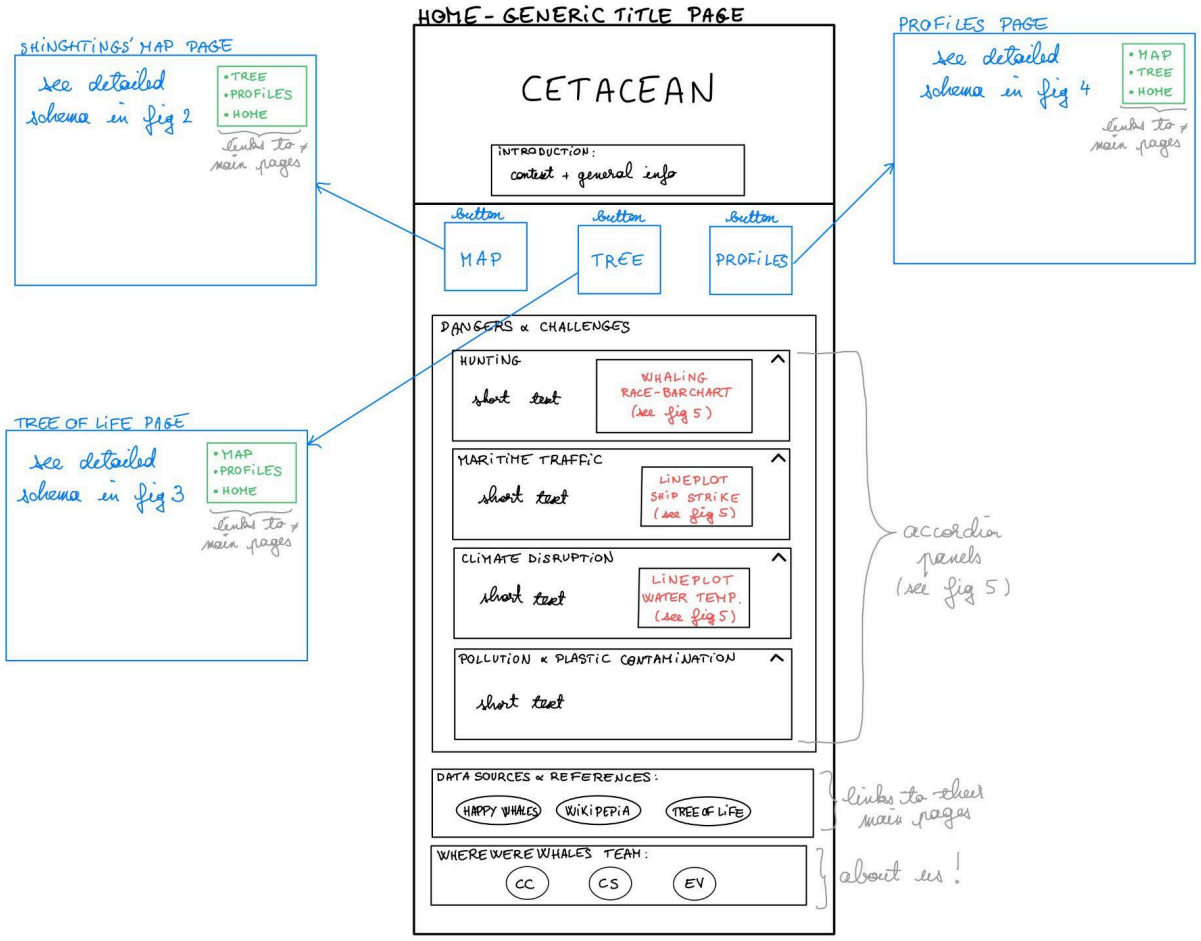


Figure 1: Schema of the general navigation flow between the different visualizations in our project. Starting from the home page, three buttons allow the user to go to any of the three main visualizations: the sightings' map, the phylogenetic tree (tree of life) or the profiles' pages. From either of the three visualizations the user can go to any other of the three pages thanks to a small menu at the top right corner of the page, making the navigation dynamic.

Map of Cetaceans Sightings

We aim to create an interactive 2D navigable map showing cetacean sightings and how they align with marine protected areas. The user will be able to: select specific cetacean species, filter by conservation status (e.g., endangered species only), explore seasonal positioning to infer potential migration patterns, and choose a time range to observe changes across years. To manage dense data, similar sightings will be clustered to reduce visual clutter while preserving essential insights. The primary objective of this visualization is to highlight: where endangered cetacean species are most frequently sighted, how these areas overlap (or not) with current conservation efforts, and give preliminary insights into migration routes. An extra idea is to add a legend showing which countries still hunt whales, along with a 2D/3D toggle switch to switch between map views. (See Figure 2)

Tools used for this visualization: d3.js, Leaflet
Lectures: 8.-Maps, 5.-Interactions, 4.-D3.js

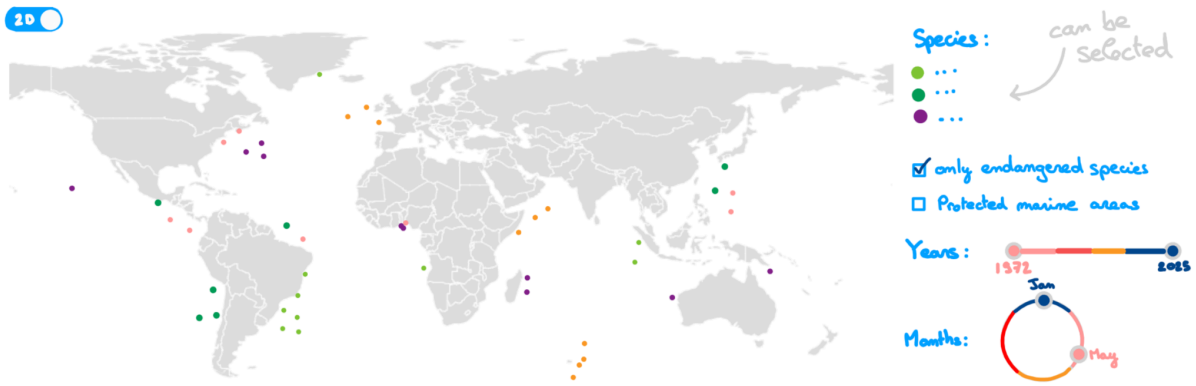


Figure 2: Schema of the expected final map of Cetaceans sightings. On the right, the user may choose among different filters to dynamically change the information displayed on the map and focus on the species and timestamp they wish to explore.

Tree of life of Cetaceans

One of the navigation pages we propose in our website is a tree of life of the extant species of cetaceans. This page is a phylogenetic tree displaying the branching evolution between the different species that allows the visitor to see how many species the cetaceans currently contain and to visualize the similarity and distances between each of them. As the visitor may zoom in on some subparts of the tree, they may see the name of the family, subfamily and genus each species belongs to. If the user wants to know more about a particular species, they may click on their name and be redirected to its species profile page for more information about the selected species.

Tools used for this visualization: d3.js, Figma
Lectures: 4.-D3.js, 5.-Interactions, 6.-Mark and Channels

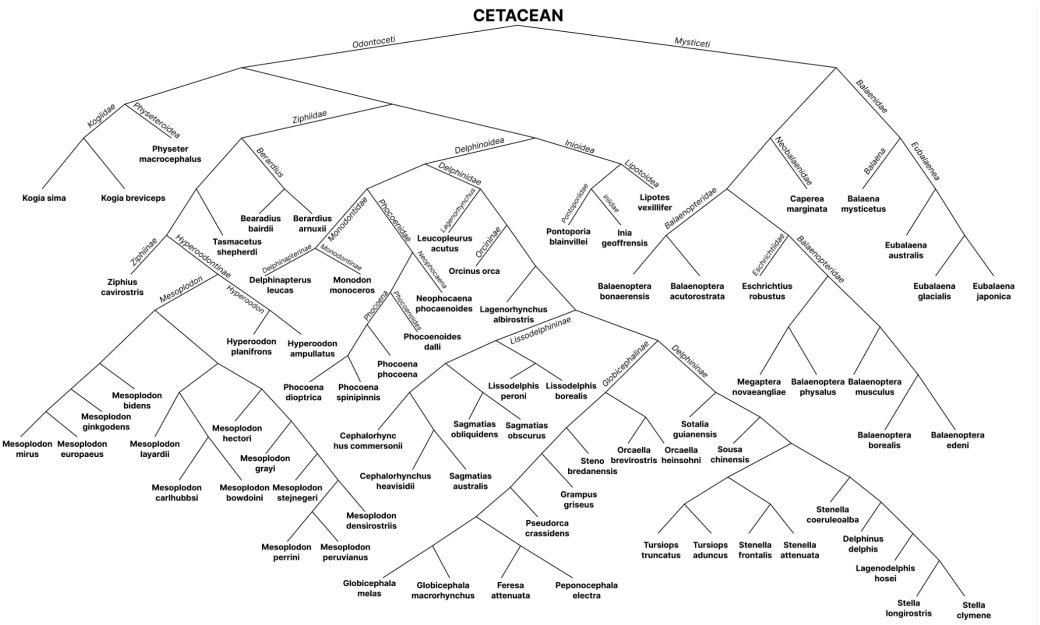


Figure 3: Phylogenetic tree of cetaceans. This page might later be augmented with colors and images to make it more appealing and highlight the different families.

Species Profiles Pages

The cetacean profile pages as seen in figure 5 are intended to provide more information on a single species when the user is interested while exploring the sightings map and the tree of life. For the moment, we include data from the Wikipedia page of the corresponding species (summary, photographs, range map, size comparison, and endangerment status). This information is directly accessed via the Wikipedia API. Furthermore, there is a search bar to directly search for a species of interest, instead of finding it with the tree of life or sightings map.

Tools used for this visualization: Wikipedia API: https://en.wikipedia.org/w/api.php
Lectures: 1-3 (basic HTML, CSS, JavaScript)

Additional optional idea: In both the phylogenetic tree and the map of sightings we would like to allow a display of a preview of the species profile page when the user clicks on a specific species. (See Figure 4)

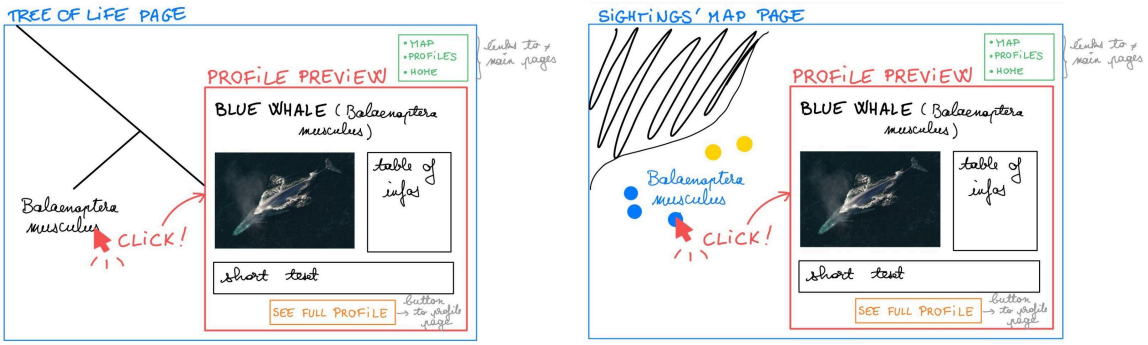
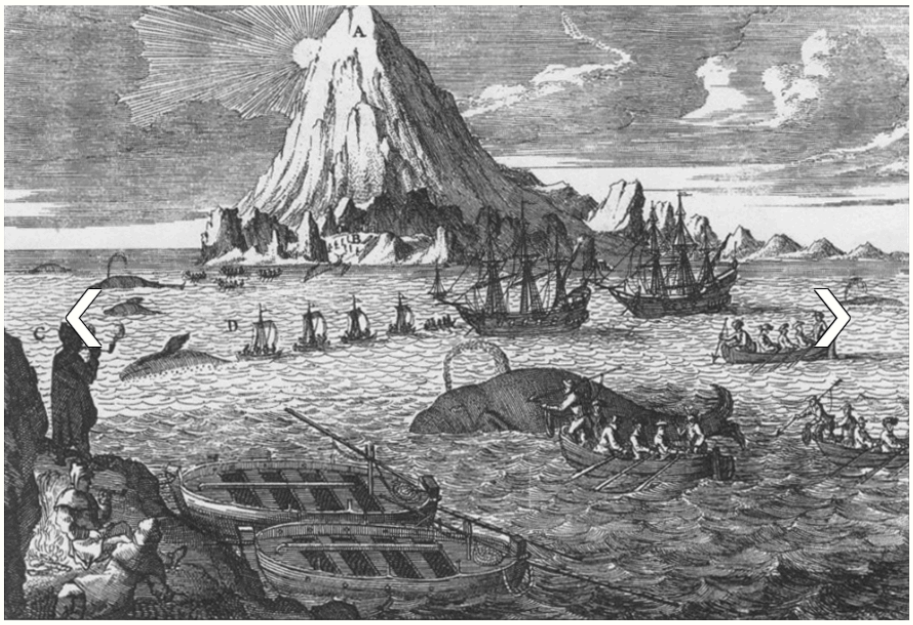


Figure 4: Schema of the profile preview flow in the map and the tree pages. Clicking on a species name displays a preview of its species profile.

CETACEAN PROFILE

e.g. blue whale Search

Bowhead whale



The bowhead whale (Balaena mysticetus), sometimes called the Greenland right whale, Arctic whale, and polar whale, is a species of baleen whale belonging to the family Balaenidae and is the only living representative of the genus Balaena. It is the only baleen whale endemic to the Arctic and subarctic waters, and is named after its characteristic massive triangular skull, which it uses to break through Arctic ice.

Bowheads have the largest mouth of any animal representing almost one-third of the length of the body, the longest baleen plates with a maximum length of 4 m (13 ft), and may be the longest-lived mammals, with the ability to reach an age of more than 200 years.

The bowhead was an early whaling target. Their population was severely reduced before a 1966 moratorium was passed to protect the species. Of the five stocks of bowhead populations, three are listed as "endangered", one as "vulnerable", and one as "lower risk, conservation dependent" according to the IUCN Red List. The global population is assessed as of least concern.

Make sound

Figure 5: First version of the cetacean profile page.
(https://github.com/eglantine-vialaneix/WhereWereWhalesLFS/tree/main/profiles)

Cetacean table

To facilitate the implementation of all three parts and ensure robustness, data from all utilized sources will be combined into a table. The table will ensure that there is no inconsistency with species names and serve as a basis for filtering functions of the sightings map. It will not be directly accessible by the user.

Multiple Threats

Finally we want to raise awareness about the multiple threats cetaceans are exposed to. (See Figure 5) The first plot will address whaling activities with a dynamic stacked bar chart, showing the top countries involved in whaling and segmented by whale type by years. We aim to make this bar chart a “race bar chart”, to dynamically track the evolution of whaling practices over time, providing a clear view of the shifting trends in global whaling efforts. The second will focus on maritime traffic, displaying a line chart that tracks the number of ship strikes through the years, highlighting the impact of maritime traffic on cetacean populations. The third will be a line plot showing the average sea temperature over the years. This last chart may be put into perspective with the sightings map to investigate whether migration paths shift over time, potentially due to climate-related changes such as rising ocean temperatures.

Tools used for this visualization: d3.js
Lectures: 4.-D3.js, 5.-Interactions

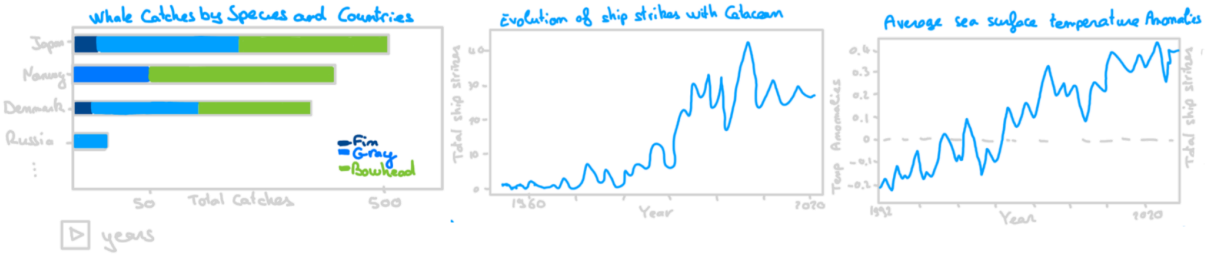


Figure 5: Charts about dangers and challenges faced by cetaceans. From left to right: 1) a racing barchart displaying the whaling number of activities by countries and segmented by cetacean species, 2) a line chart about the evolution of ship strikes with cetaceans, 3) a line chart about the number of surface temperature anomalies over time.