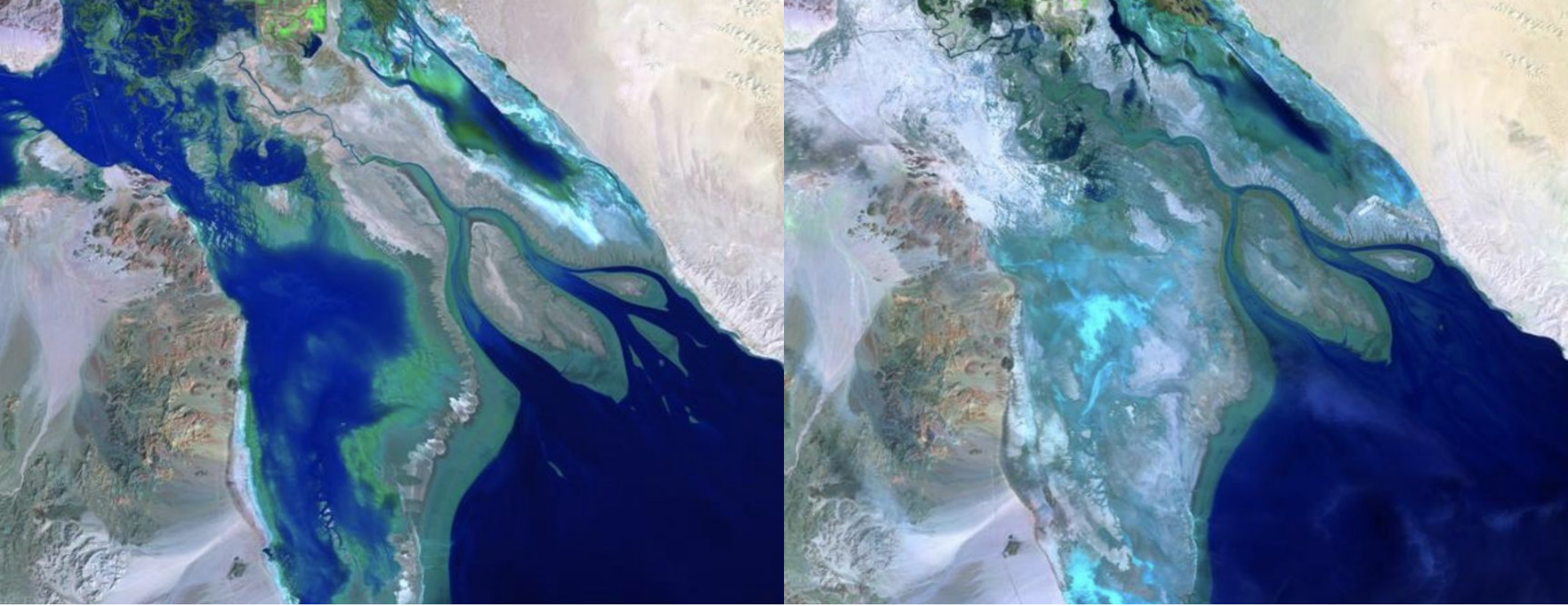


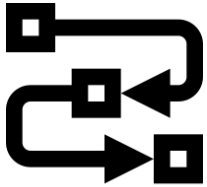
THE PHYSICAL CHANGE OF THE COLORADO RIVER USING NDWI AND SUPERVISED CLASSIFICATION

Mahnoor Naeem 2022

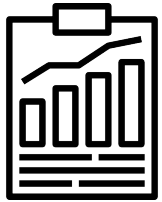
OUTLINE

INTRODUCTION

RESEARCH OBJECTIVE



METHODODOLOGY



RESULTS

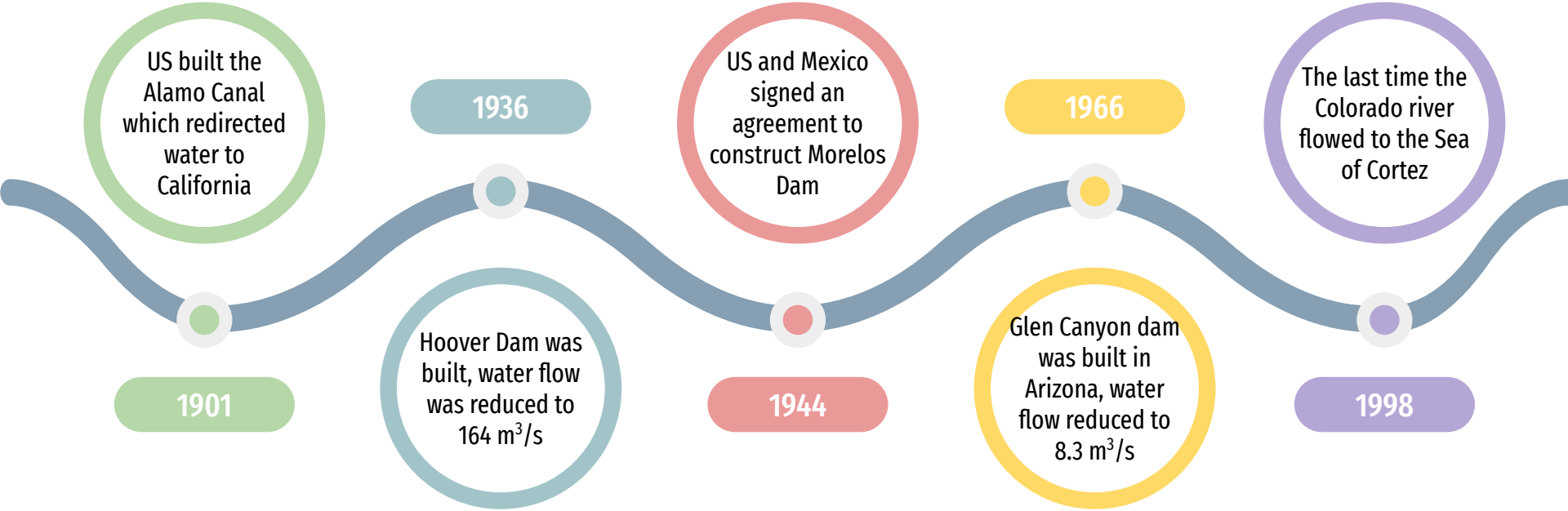
CONCLUSION

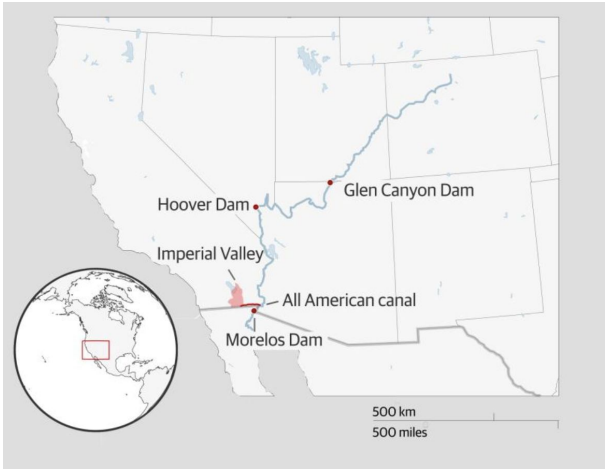
19th century - 1200 cubic metres per second

Today - 0.5 cubic metres per second

Study Area

What happened?





Throughout the 20th century, the US built dams to redirect the flow of the Colorado river from Mexico into the states. This decreased the water flow in Mexico by 99% from 1200 m^3/s to the current 0.5 m^3/s. Our objective is to track the physical change that occurred in the Colorado river from 1984 to 2021.

RESEARCH OBJECTIVE

TOOLS

METHODS

Visual Verification:
This is a traditional method of collecting information from aerial photographs or satellite photos depending on target criteria.

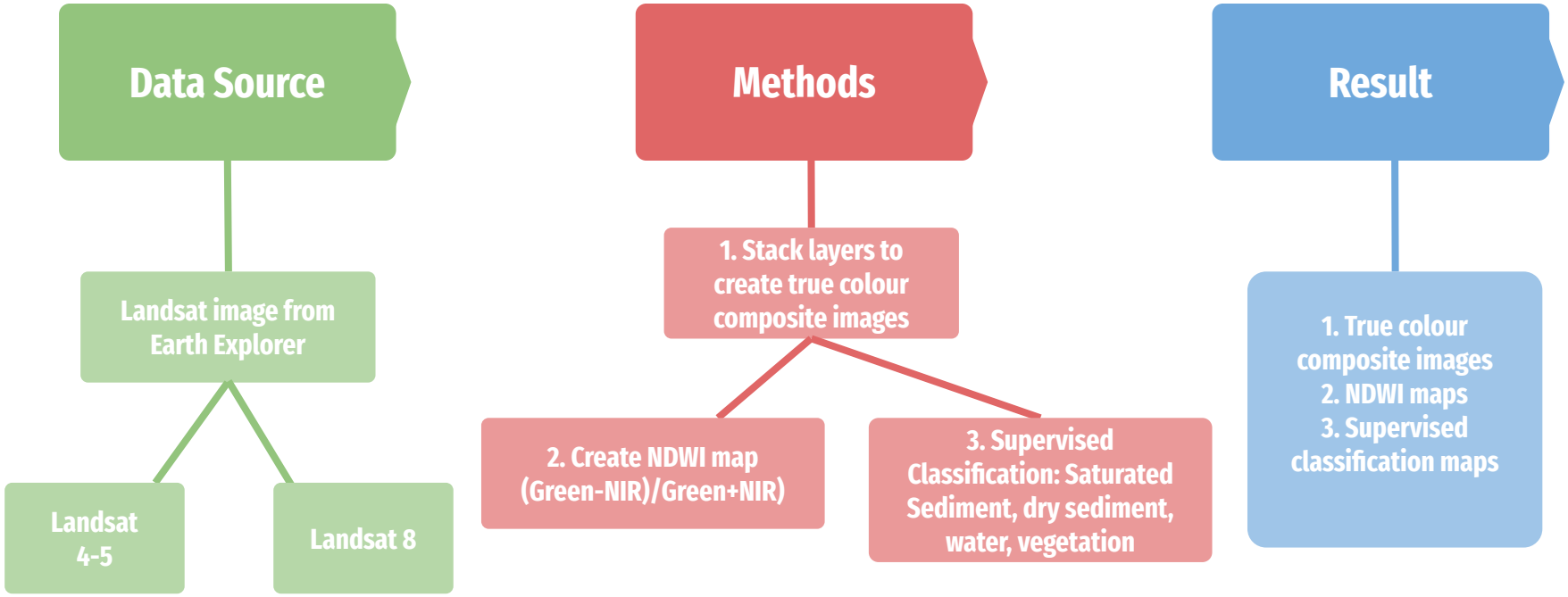
A human interpreter uses numerous object recognition characteristics to interpret spatial and spectral patterns.

The Normalized Difference Water Index (NDWI) is used to highlight open water features in a satellite image, allowing a water body to "stand out" against the soil and vegetation.

True colour composite:
This is an image that shows the three primary colours of light - red blue and green.

Supervised classification:
In supervised classification, you select training samples and classify your image based on your chosen samples.

METHODOLOGY



METHODOLOGY

1. True colour composite images

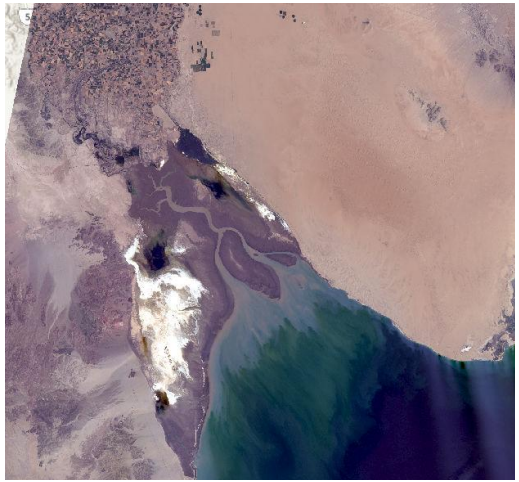
1984

Landsat 4-5
Bands 3,2,1

1997

Landsat 4-5
Bands 3,2,1

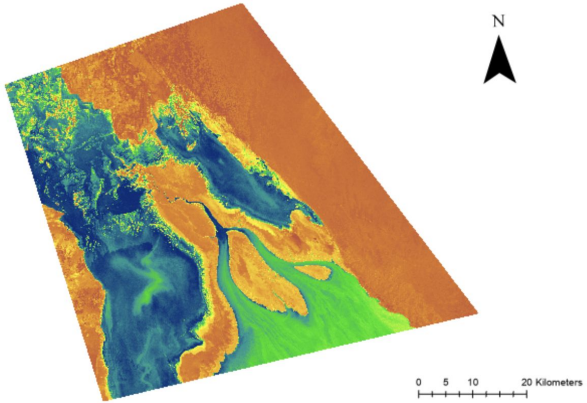
2021



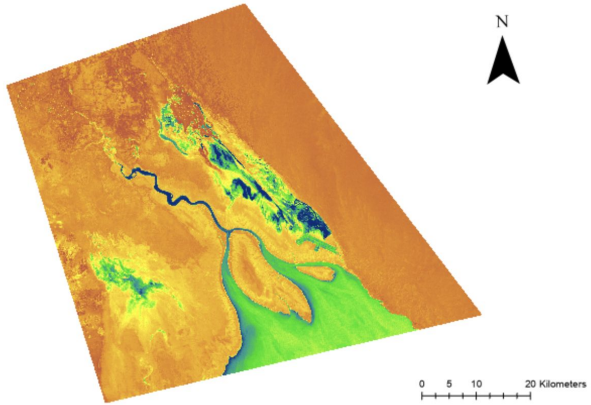
Landsat 8
Bands 4,3,2

2. NDWI maps

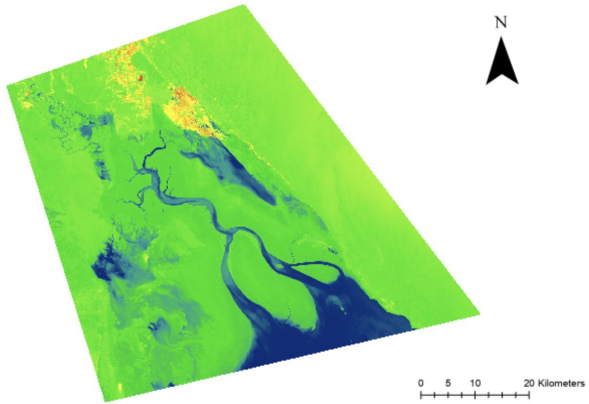
1984



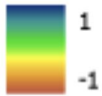
1997



2021



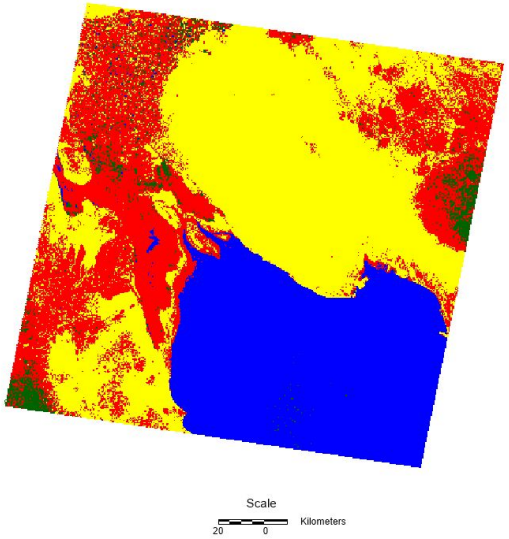
NDWI Values



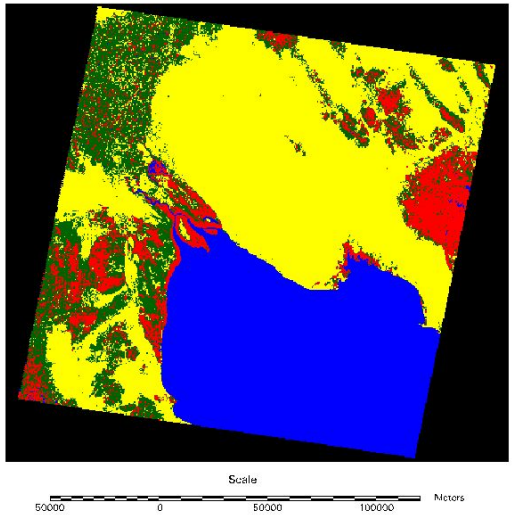
RESULTS

3. Supervised classification maps

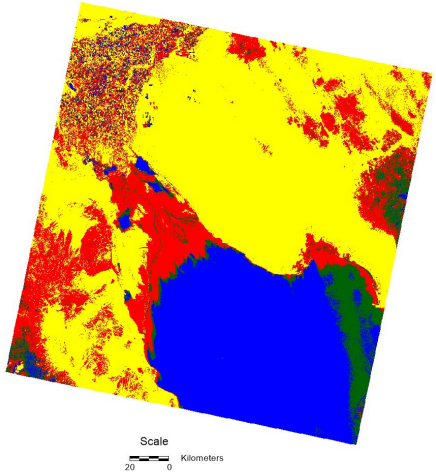
1984

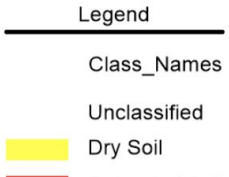


1997



2021





RESULTS

True Colour

- ➔ More water in 1984
- ➔ River area and surrounding land looks dried up in 2021
- ➔ Gradual decrease of river flow shown throughout the years

NDWI

- ➔ The index shows a lot higher presence of the water class in 1984
- ➔ 1997 index shows the study area to have dried up more.
- ➔ The index for 2021 shows that there is less water and more land cover with an index closer to 0.

Supervised Classification

- ➔ We are able to see changes in landcover
- ➔ There is a visible change between the prevalence of saturated soil from 1984 to 2021

CONCLUSION

What caused the water to deplete?

Environmental Injustice
The US built many dams in the 20th century and redirected the water flow to the states

Climate Change
Global warming and climate change have raised average temperatures worldwide which has contributed to the river drying up

CONCLUSION