

→ EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT

Climate Resilience



Webinar Series for Greater Monrovia:
Managing Current and future risks using earth
observation

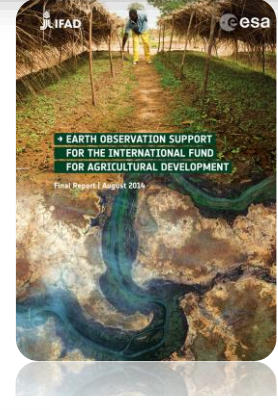
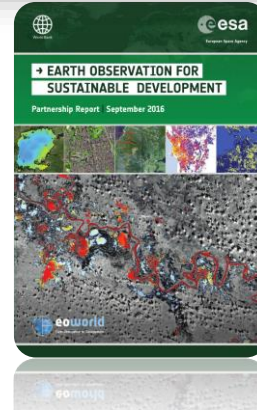
*Webinar 3: How does Earth Observation
contribute to Climate Resilience?*

Welcome



A photograph of two men in business suits shaking hands. The man on the left is of Asian descent, wearing a dark suit and a patterned tie. The man on the right is of European descent, wearing a dark suit, a red tie, and glasses. They are standing in an office with wood-paneled walls. In the background, there is a framed picture of a ship and a blue folder or book with a crest on it.

The image shows the front cover of a report titled "EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT". At the top left is the ESA logo with the text "European Space Agency". The title is in large, bold, white letters on a dark background. Below the title, it says "Partnership Report June 2013". The central part of the cover is a collage of various satellite images, including a city, a landscape, and a close-up of a tree. At the bottom left is the "eoworld" logo with the tagline "Earth Observation for Sustainable Development". At the bottom right, there is a partially visible logo for "rhinos" with the tagline "Sustainable Development".



European Space Agency

Climate Resilient Monrovia: Managing current and future risks using earth observation



Webinar 03: 22 April 2021 / 14:00 GMT

How does earth observation contribute to climate resilience?

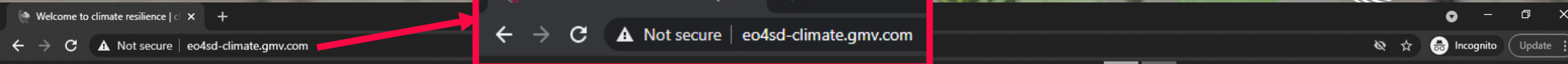
Understand how earth observation can inform and facilitate climate resilient development, using tangible examples relating to the City of Monrovia.

Webinar 04: 8 May 2021 / 14:00 GMT

Guided tutorial

Build technical capacity to use existing platforms, software and tools, and EO climate data sources (including the EO4SD Platform).

Available Material on EO4SD CR website



EUROPEAN SPACE AGENCY ABOUT EO4SD OVERVIEW TEAM PORTFOLIO CAPACITY PUBL NEWS PLATFORMS CONTACT



climate resilience
earth observation for sustainable development



Home

Capacity Building for Monrovia

Webinar Series for Monrovia city

Aim of Webinar Series

The purpose of this webinar series is to build local capacities in Monrovia City to Climate Change. This will be achieved through:

- Awareness raising of Climate Change through tangible examples, covering basic definitions, the importance of CC and how to interpret/evaluate the change on the climate;
- Introducing climate screening tools and how participants can use them and identify risks;
- Earth Observation data, as an additional source that participants can benefit from;
- Technical session in which participants will have hands-on activities (e.g. Web platform: QGIS etc.)

You can download the webinar flyer's [here](#)

Background

Since 2008, the European Space Agency (ESA) has worked closely with International Financial Institutions (IFIs) and their clients to harness the benefits of EO in their operations and resource management. EO4SD is an ESA initiative, which aims at increasing the uptake of EO-based information in both corporate tools and processes, and investment projects. Hence, EO4SD Climate Resilience cluster has the mandate to provide EO-based data and services, accompanied with Capacity Building activities, allowing to autonomously make use of EO-based information for climate resilience decision making.

Strategy

Material

Capacity Building for ADB

Capacity Building for AGRHYMET

Capacity Building for IFAD

Capacity Building for Monrovia

climate resilience

earth observation for sustainable development



Earth
urban

Webinar Series Plan

The Modules proposed for local stakeholders in Greater Monrovia is listed below and will be hosted bi-weekly every Thursday at 14:00 GMT, starting 25th March 2020:

- Webinar 1: Introduction to Climate Change (Date: 25/3/2021; Duration: 30-45 minutes)
- Webinar 2: How easy is to assess Climate change? (Date: 8/4/2021; Duration: 30-45 minutes)
- Webinar 3: How does Earth Observation contribute to Climate Resilience? (Date: 22/4/2021; Duration: 30-45 minutes)
- Webinar 4: Hands-on Session (Date: 6/5/2021; Duration: 30-45 minutes)

Webinar 1: Introduction to Climate Change (Date: 25/3/2021; Duration: 30-45 minutes)

Introductory webinar, as a starting point, to make a clear understanding of Climate Change fundamentals such as:

- What Climate risk is?
- What is an exposure and vulnerability?
- How Climate change will affect citizens of Monrovia?
- Introducing some key Climate Indicators.

Key take away will be a basic idea of how to interpret the climate and evaluate the change on the climate.

Presentation material

Please download all presentations from the following [Link](#).

Recording of the webinar

Earth Observation for sustainable Development (EO4SD) is a new ESA initiative for sustainable development operations at national and international level.

Climate Resilient Monrovia: Managing current and future risks using earth observation

Webinar 01: Introduction

Understand the importance of earth observation in climate resilience, and learn how to analyse and use earth observation data.

Webinar 02: 8 April 2021 / 14:00 GMT Assessing the risks of a changing climate

Understand key climate risk screening tools to assess current policy and guidelines.



Webinar 03: 22 April 2021 / 14:00 GMT

How does earth observation contribute to climate resilience?

Understand how earth observation can inform and facilitate climate resilient development, using tangible examples relating to the City of Monrovia.

Webinar 04: 8 May 2021 / 14:00 GMT

Guided tutorial

Build technical capacity to use existing platforms, software and tools, and EO climate data sources (including the EO4SD Platform).

Webinar - Housekeeping



- Webinars will be recorded & executed through Zoom Webinar
- Webinar Recordings and Content will be made available ([EO4SD CR website](#));
- Interaction with participants (Q&A function of Zoom)
- Able to speak during the Q&A

For any further questions please contact us: atrypitsidis@noa.gr

ATLANTIC OCEAN

Outline & Agenda

Introduction to the Webinar Series for Greater Monrovia

How does Earth Observation contribute to Climate Resilience?

Q&A



→ EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT

Climate Resilience



Webinar Series for Greater Monrovia:
Managing Current and future risks using earth
observation

*How does Earth Observation contribute to
Climate Resilience?*

- Introducing to Climate risks in Monrovia
- EO4SD CR Products developed:
 1. Shoreline Monitoring
 2. Projected Flood Risks
 3. CI and Residential Area

Climate risks in Monrovia

Employing a mix of EO, climate projections and socioeconomic data can help integrate climate resilience into investments.

- Increase urban population to high vulnerable areas (Flood, SLR, etc.);
- Tropical Climate;
- 4000 mm on average annually;
- >10% of roads impacted by frequent Floods;
- 0,13-0,56 m by 2050;
- 1 meter SLR -> 95km² inundated land;
- Av. Daily max/min temperature increase;
- Av. Daily rainfall (-14.6% April, +59,2% December)

EO4SD CR Products

- Shoreline Monitoring
- Projected Flood Risks
- Critical Infrastructure & Residential Area

A community's approach to mobility



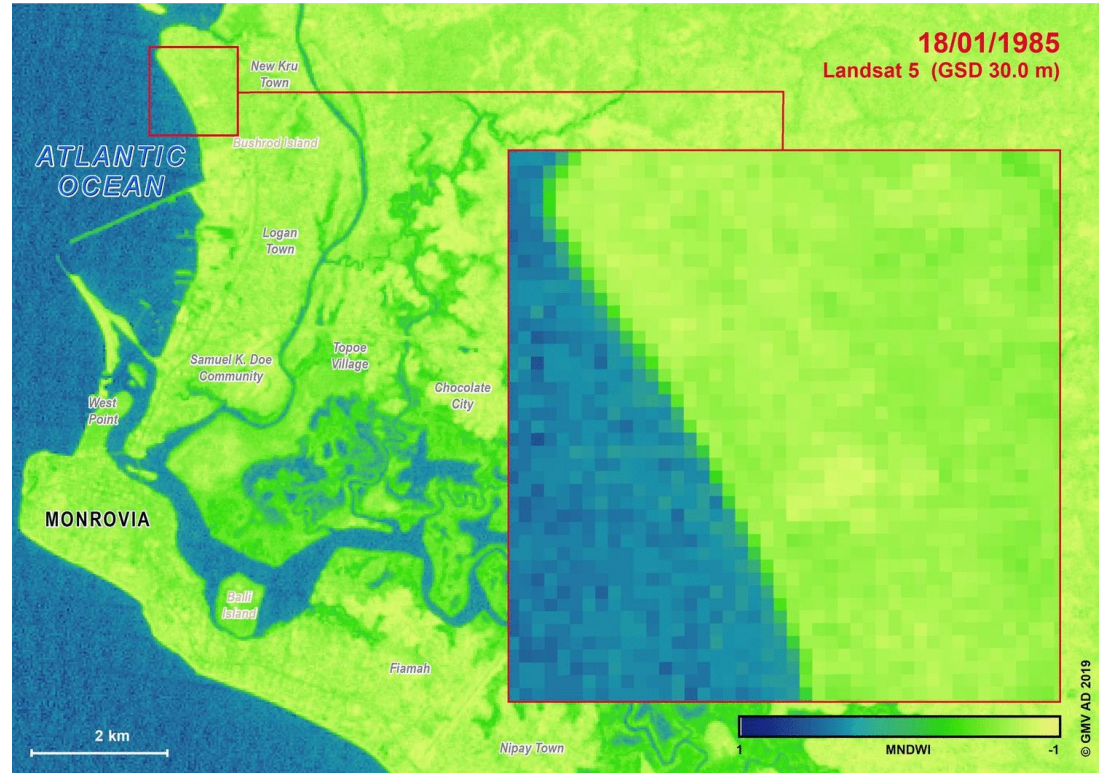
Source: OpenDRI.org

1. Shoreline Monitoring

- Shoreline changes
- High Resolution optical imagery
- Thresholding methodology of spectral indices and biophysical variables

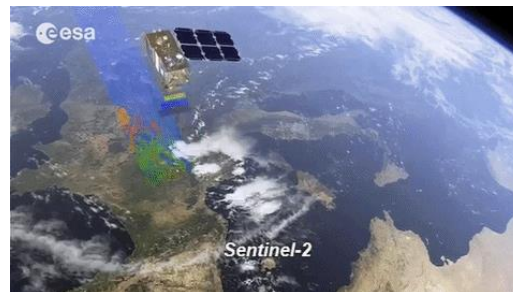
Periods:

1984-1994, 1995-2004,
2005-2014, 2015-2018
and 2019



EO Data used

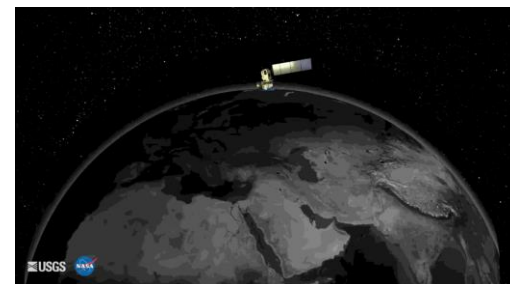
- Sentinel 2A/2B x 4 images
- Landsat 5/7/8 x 27 images
- WorldView 3 x 2 images



Sentinel 2 – Optical data



WorldView - 3

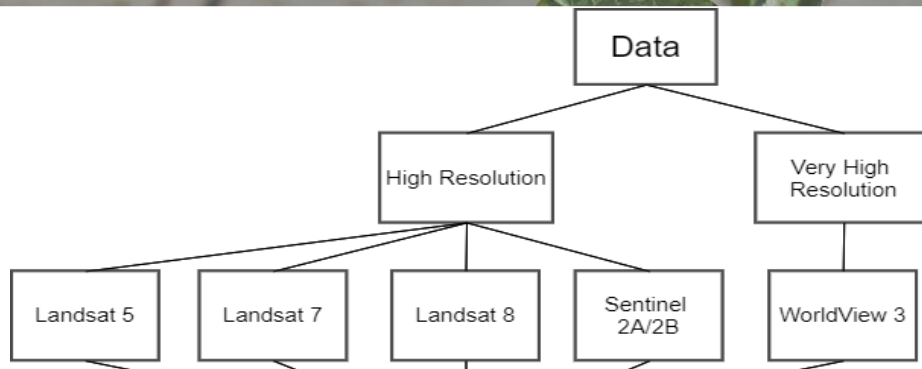


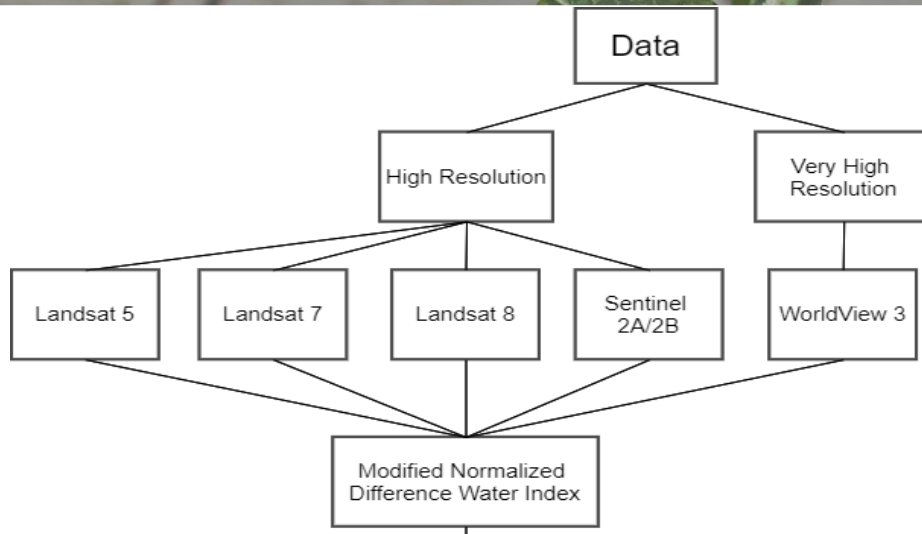
Landsat 8 – Optical data

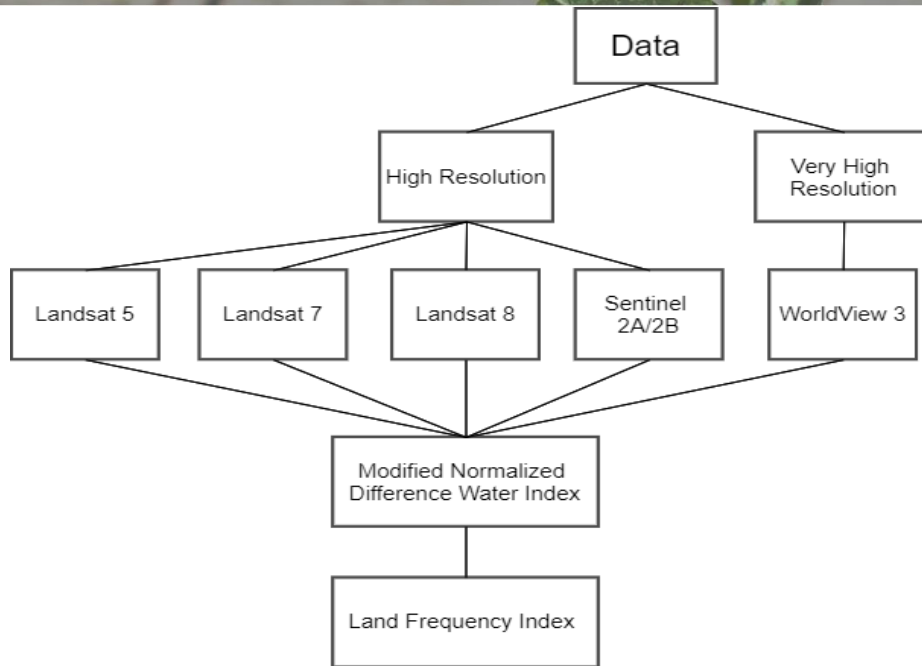
- Modified Normalized Difference Water Index (**MNDWI**)
- Land Frequency Index (**LFI**)



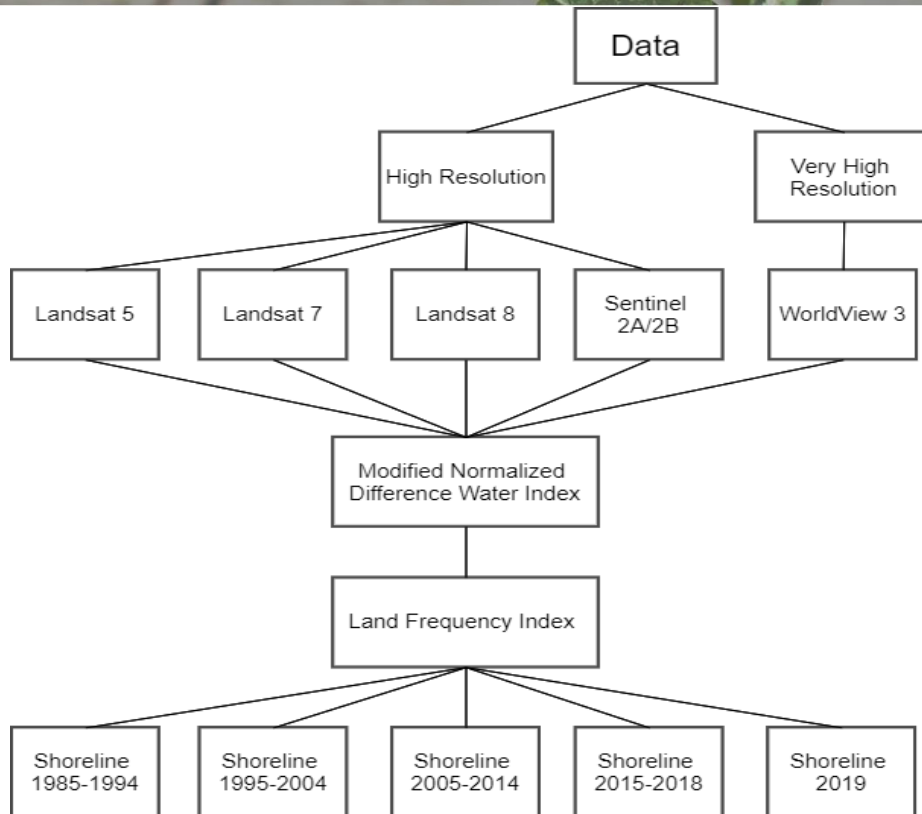




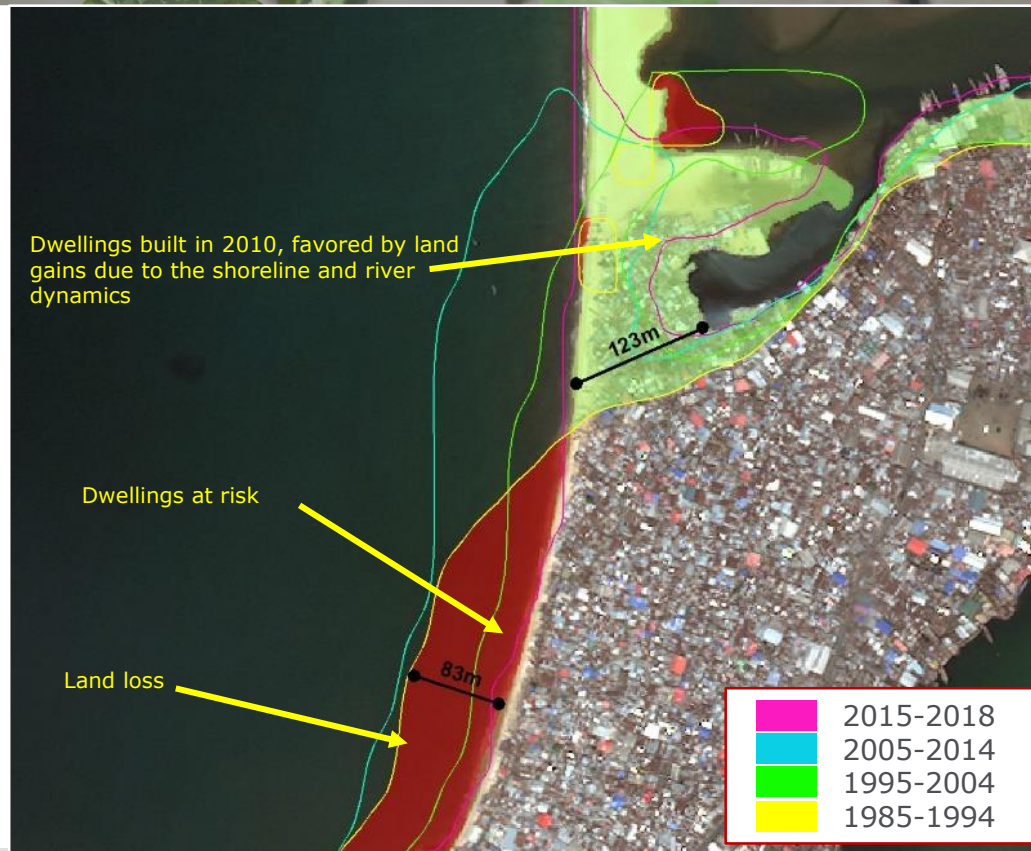




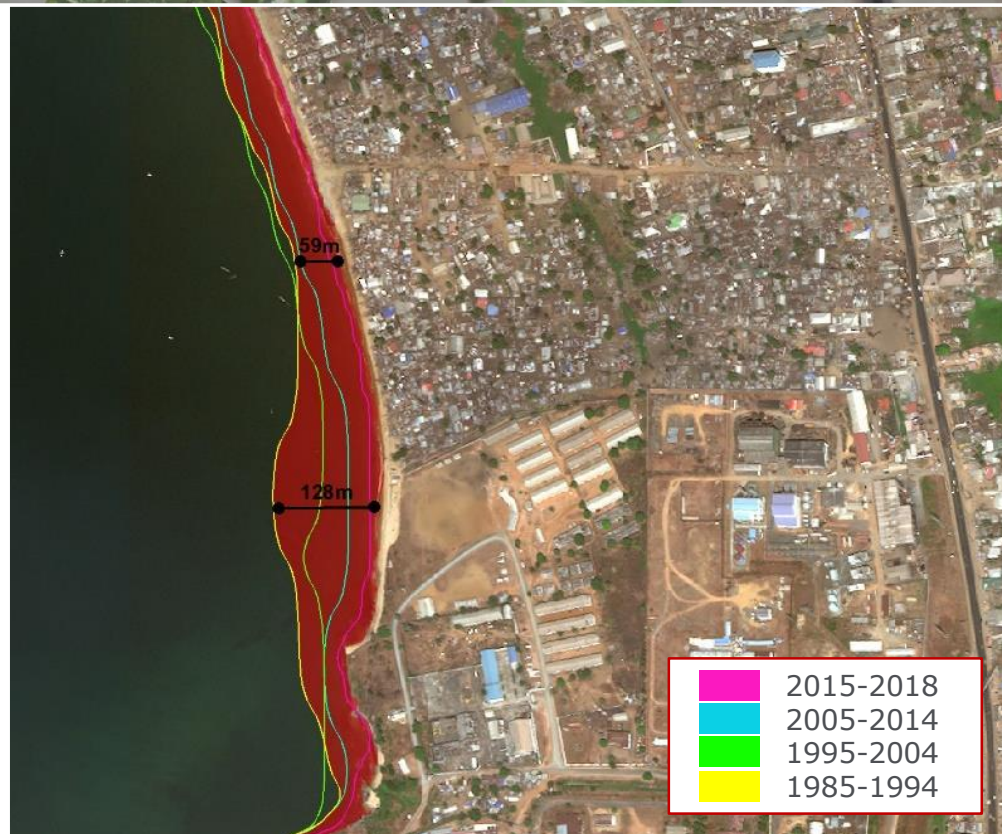
Shoreline Monitoring – Methodology



Shoreline retreat from
1984 until 2019 in
West Point



Shoreline retreat from
1984 until 2019 in
New Kru Town



ESA UNCLASSIFIED - For Official Use

Limitations of this service delivery are:

- Data availability
- Southern beaches should be interpreted with caution





2. Flood Risk

- Sea level rise values
- Coastal & inland flood risk areas



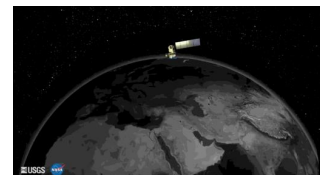
Projected Flood Risks – Data used

EO Data used

- Sentinel 2A/2B
- Landsat 5/7/8
- WorldView 3



Sentinel 2



Landsat

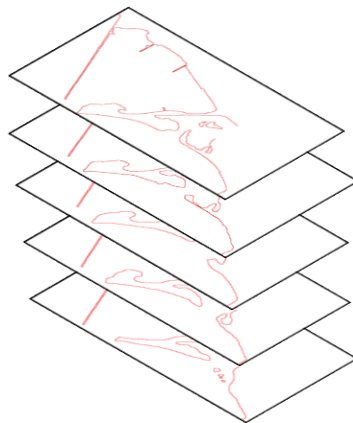


WorldView - 3



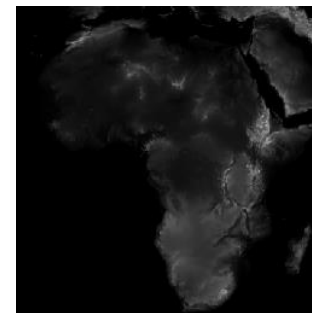
Other data used

- Shoreline 1985-1994
- Shoreline 1995-2004
- Shoreline 2005-2014
- Shoreline 2015-2018
- Shoreline 2019
- SRTM-30m
- Population Density (Greater Monrovia census 2007)

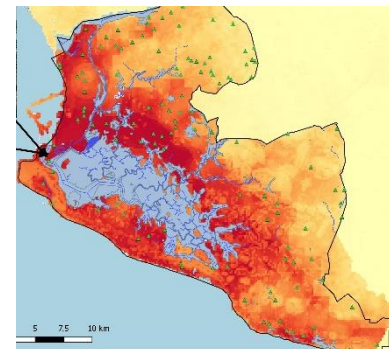


Shoreline Layer

2019
2015-2018
2005-2014
1995-2004
1984-1994

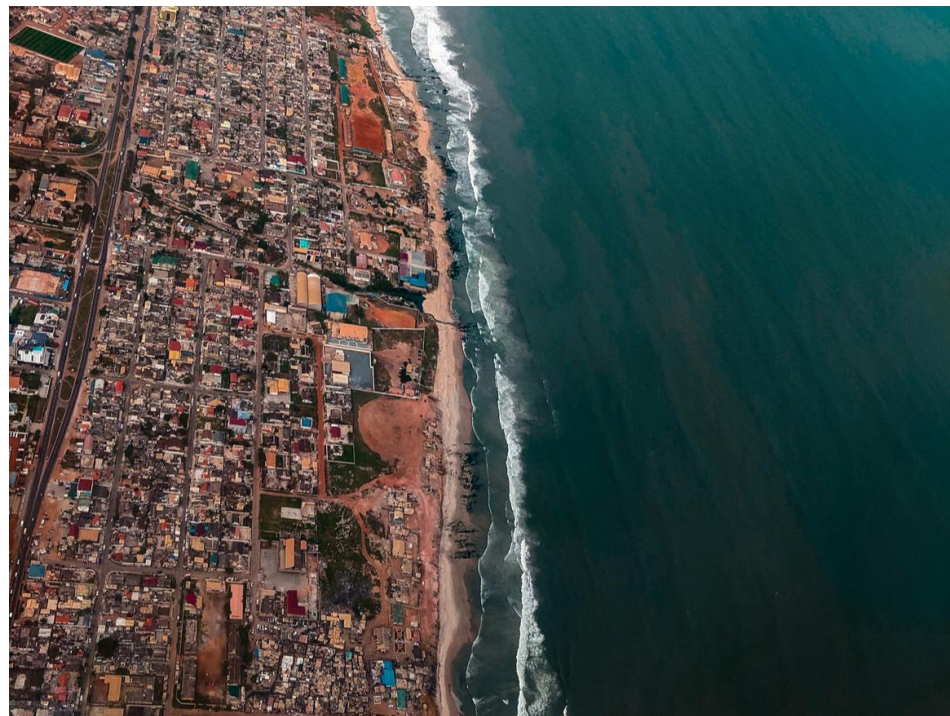


SRTM-30m

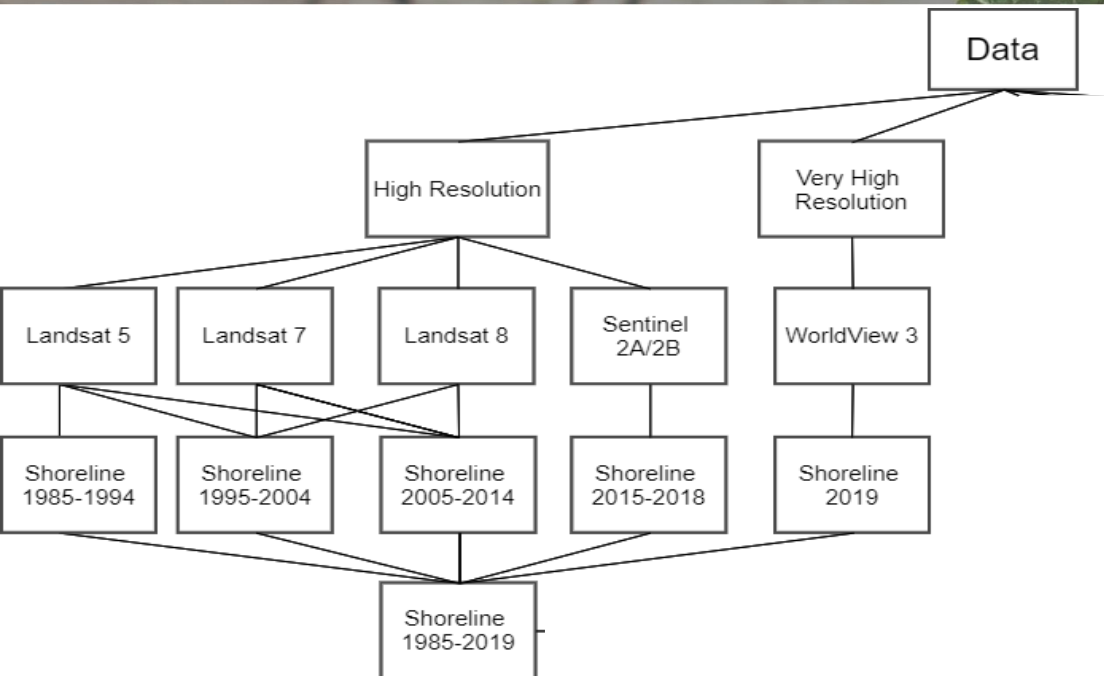


Population Density

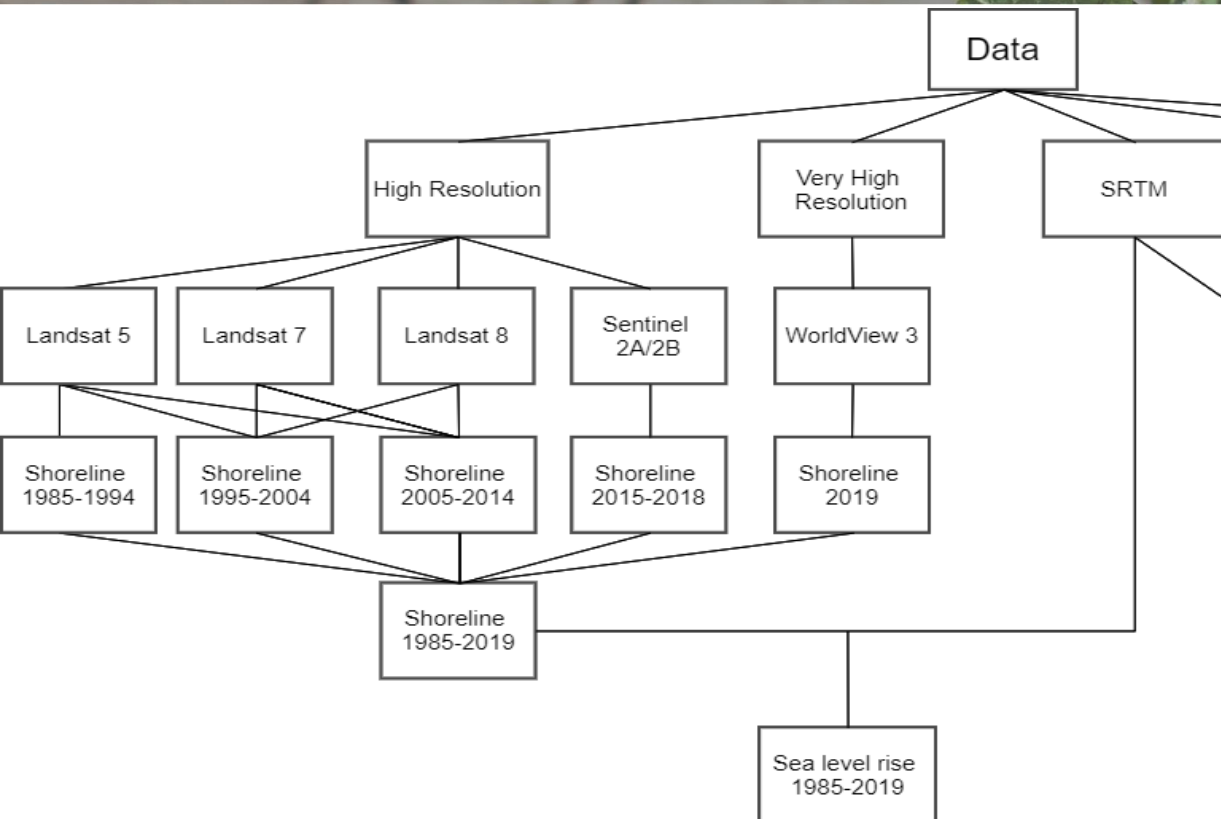
- Sea level rise leads to erosion
- Last 34 years indicated a sea level rise of 9 cm
- Year 2030 yielding a peak of 16 cm



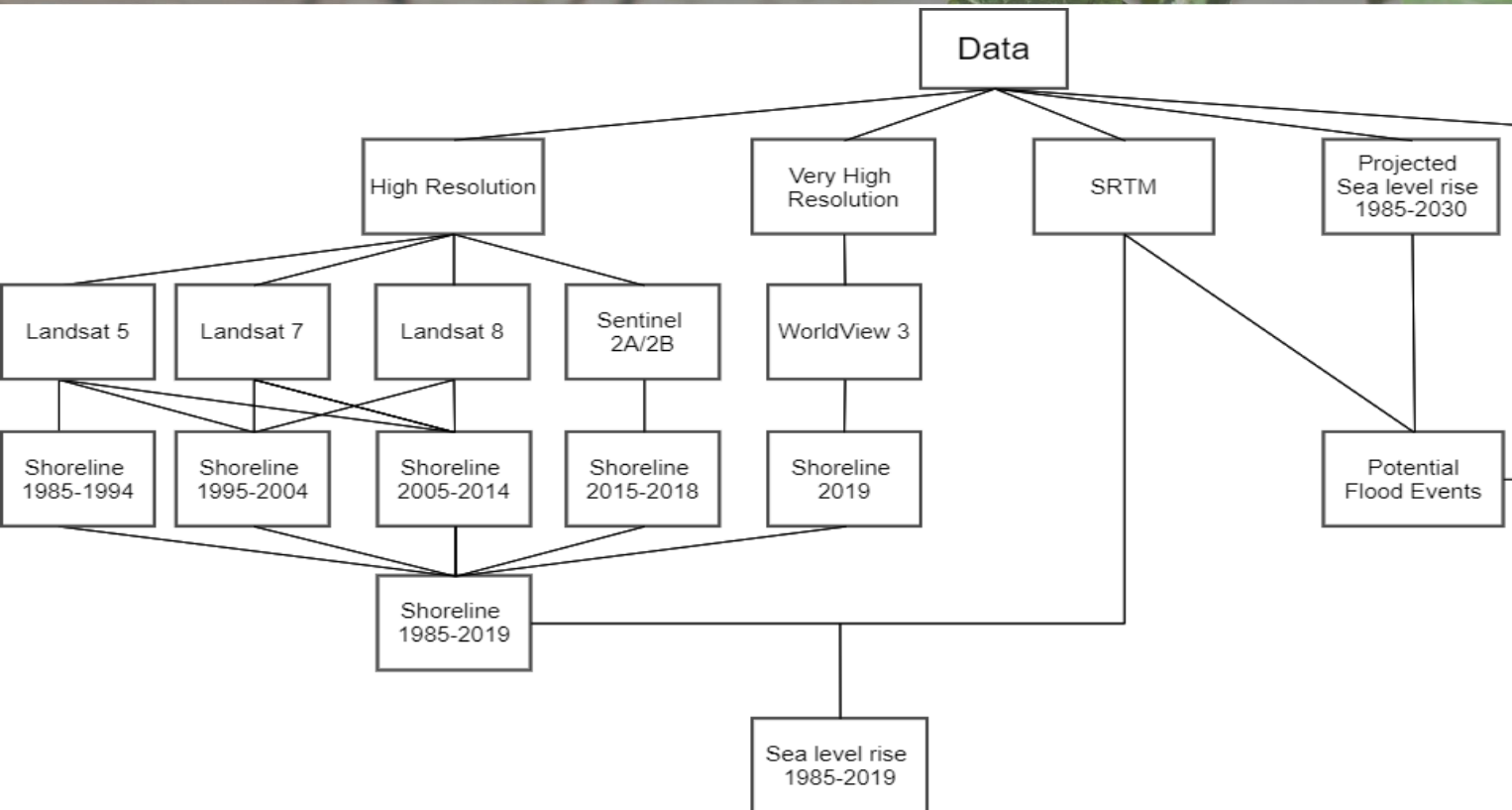
Projected Flood Risks – Methodology



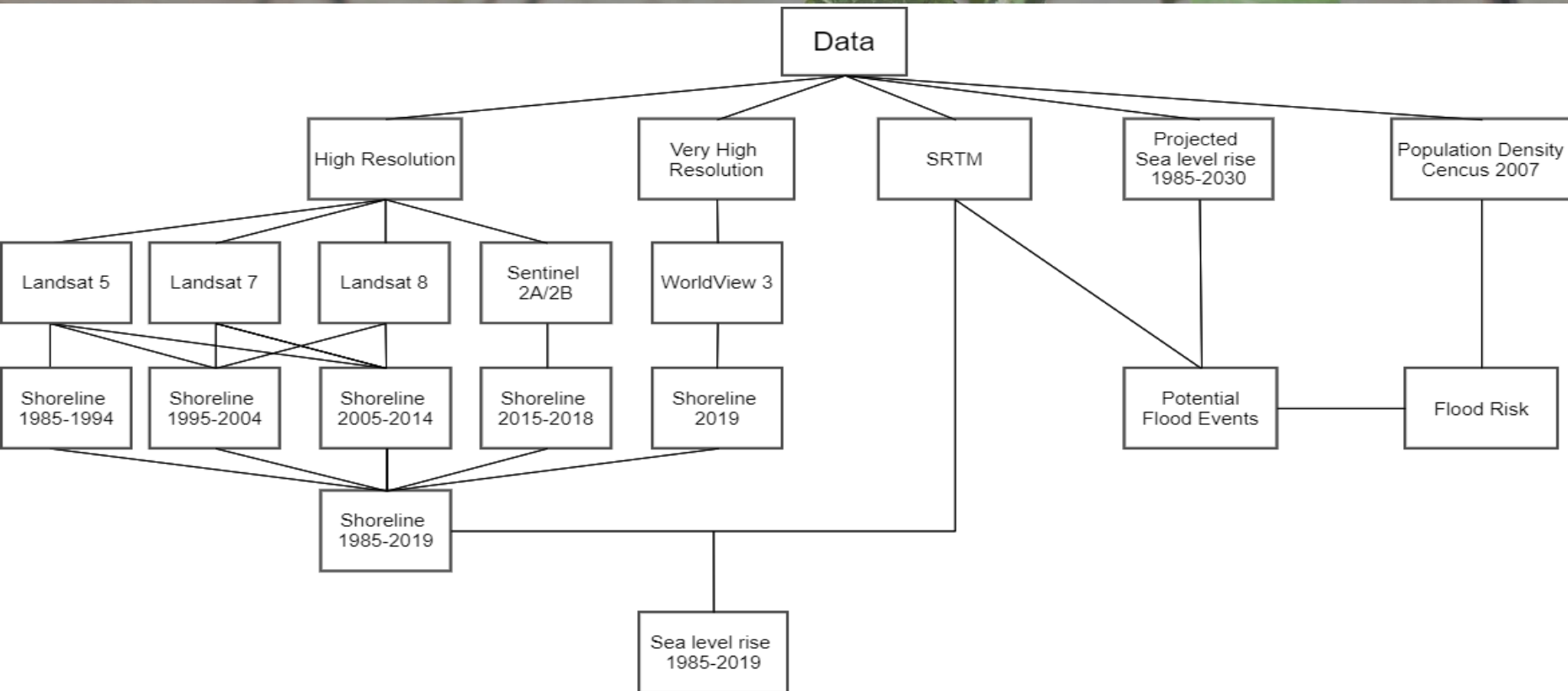
Projected Flood Risks – Methodology



Projected Flood Risks – Methodology

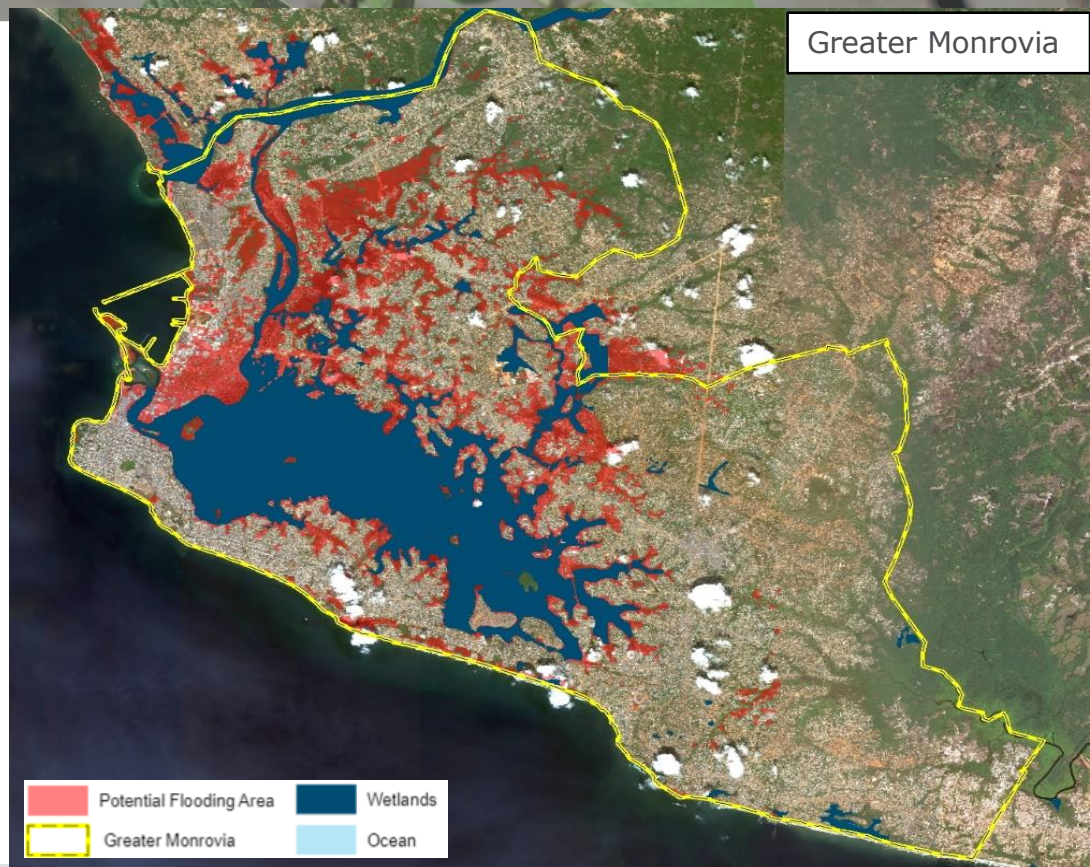


Projected Flood Risks – Methodology



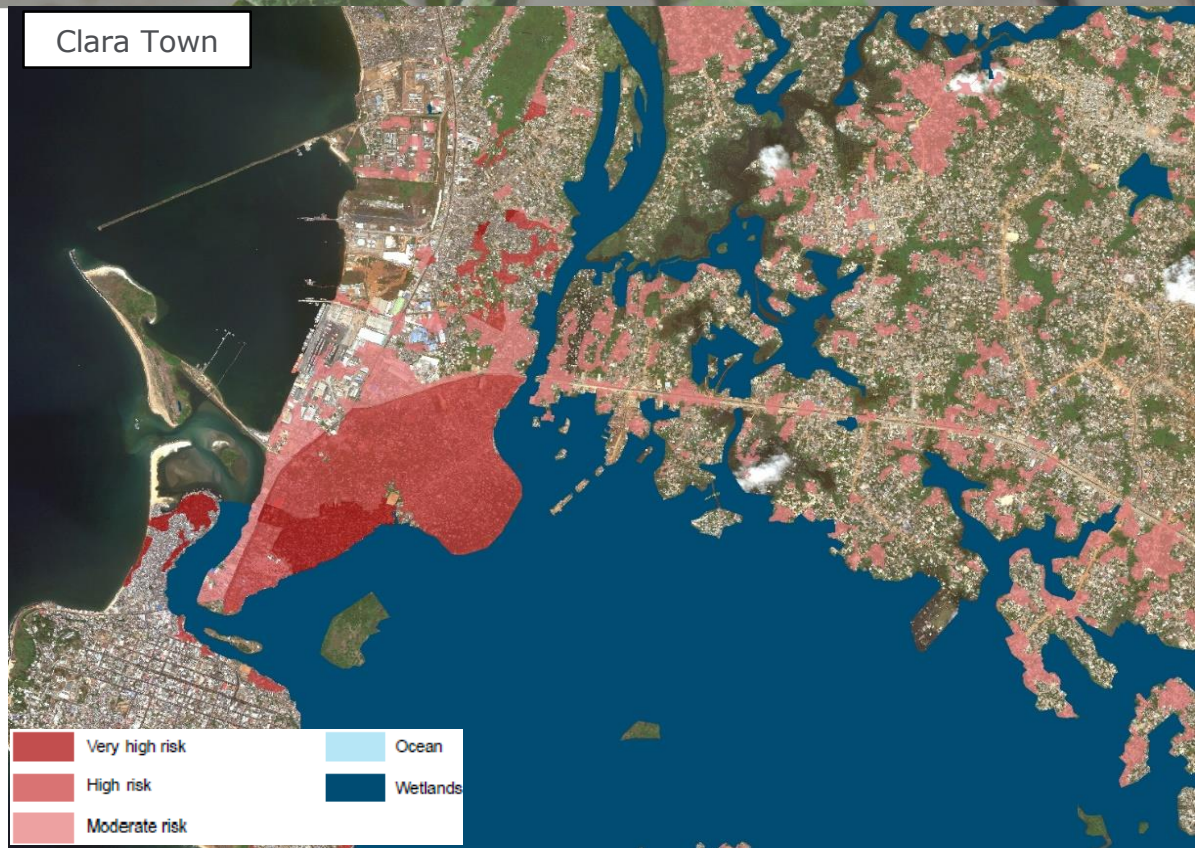
Projected Flood Risks – Results

Initial flood risk analysis of inland and coastal areas has been completed (year 2030) in a defined area of 245 km²



Projected Flood Risks – Results

The flood risk map has been intersected with the population density map from Greater Monrovia census from 2007.



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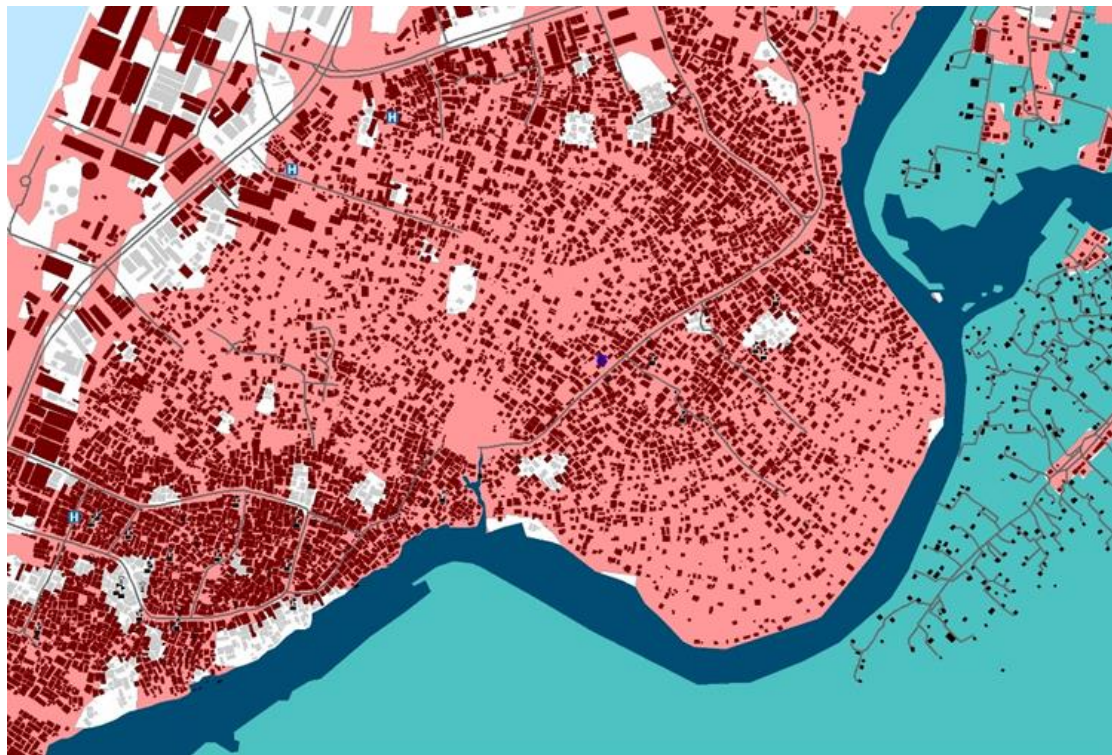
Limitations of this prototyping are:

- SRTM 30m pixel size is not most adequate.
- Evolution of shoreline retreat from 2019 to 2030 is not considered
- Hydrological processes of the catchment areas involved are necessary



3. Critical Infrastructure

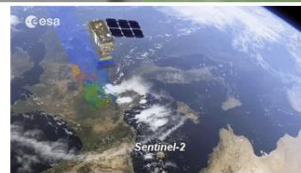
- Identification of critical/important urban elements
- Map urban against wetlands & projected flood risk



Critical Infrastructure – Data used

EO Data used

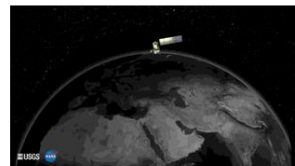
- Sentinel 2A/2B
- Landsat 5/7/8
- WorldView 3



Sentinel 2 – Optical data



WorldView - 3

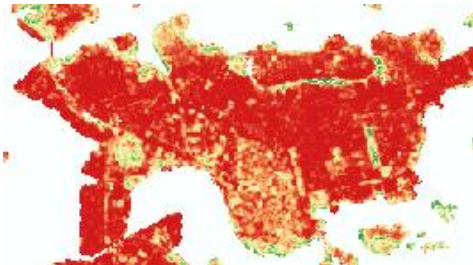


Landsat 8 – Optical data



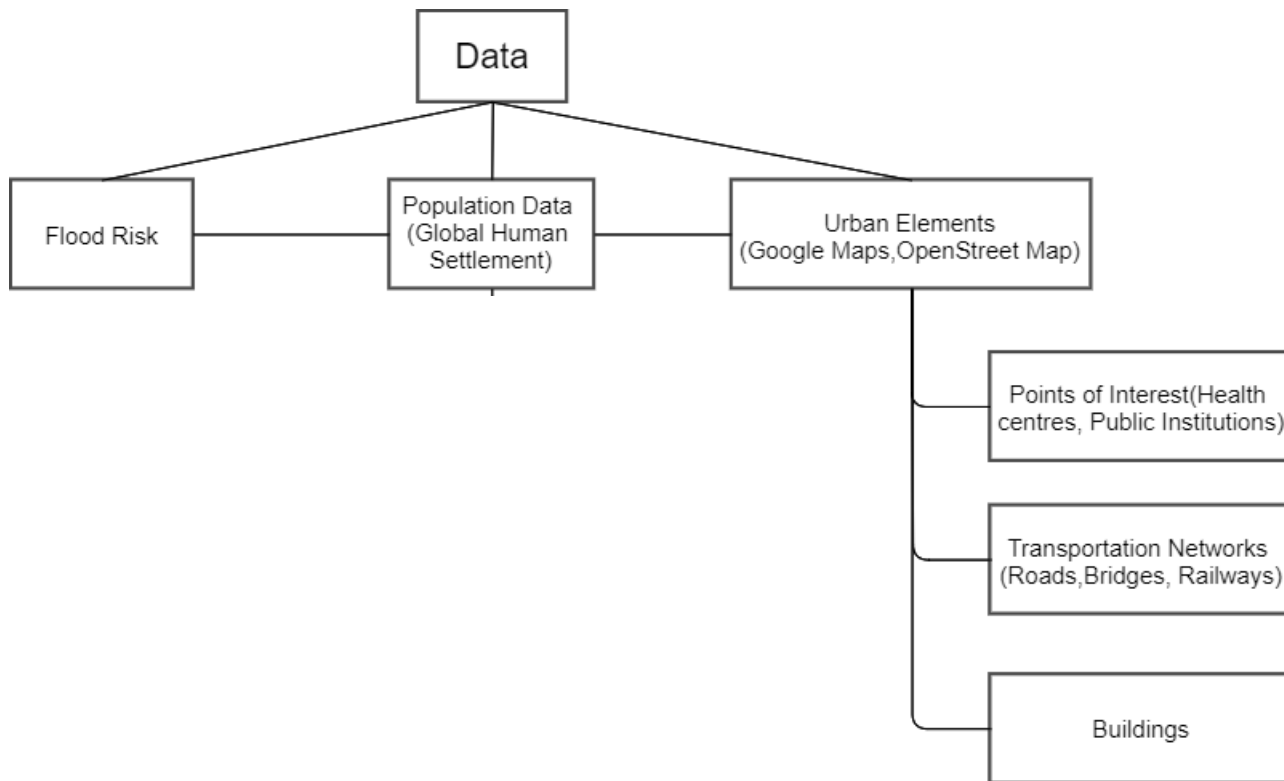
EO products used

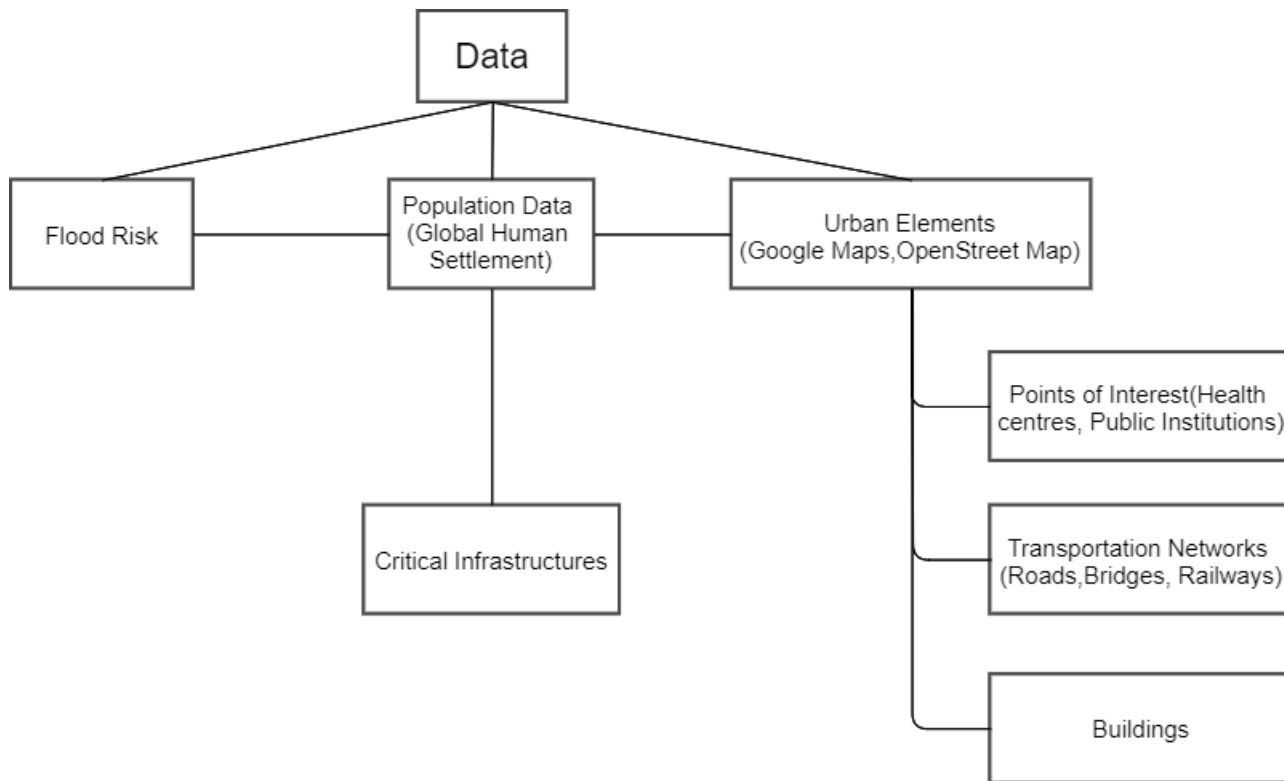
- Flood risk layer
- Global Human Settlements



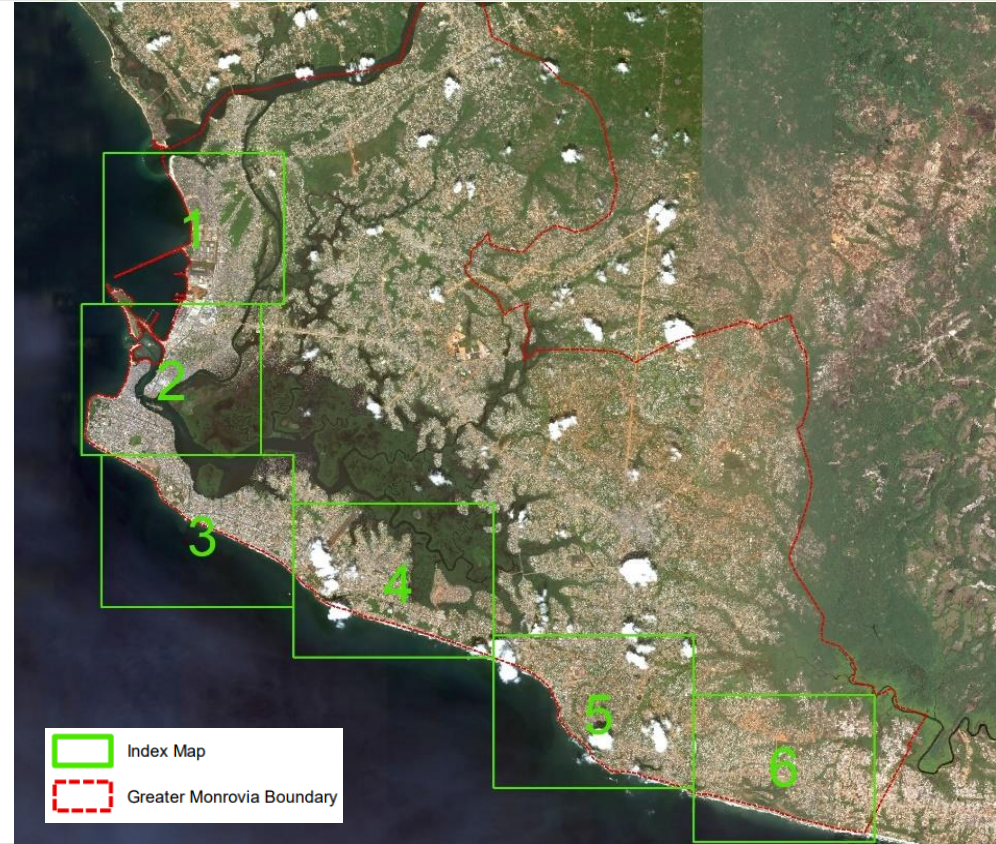
Non - EO Data used

- Open source data
- Urban elements (OpenStreetMap and GoogleMaps)

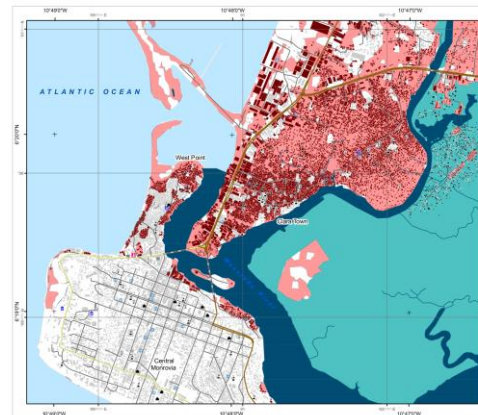
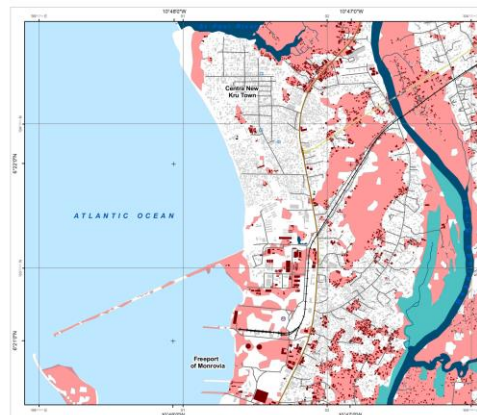




- The coastal area of Greater Monrovia is divided into six areas.
- These areas are outlined as green squares in the index map, the first map of the series
- Green squares are shown in 1:15000 scale

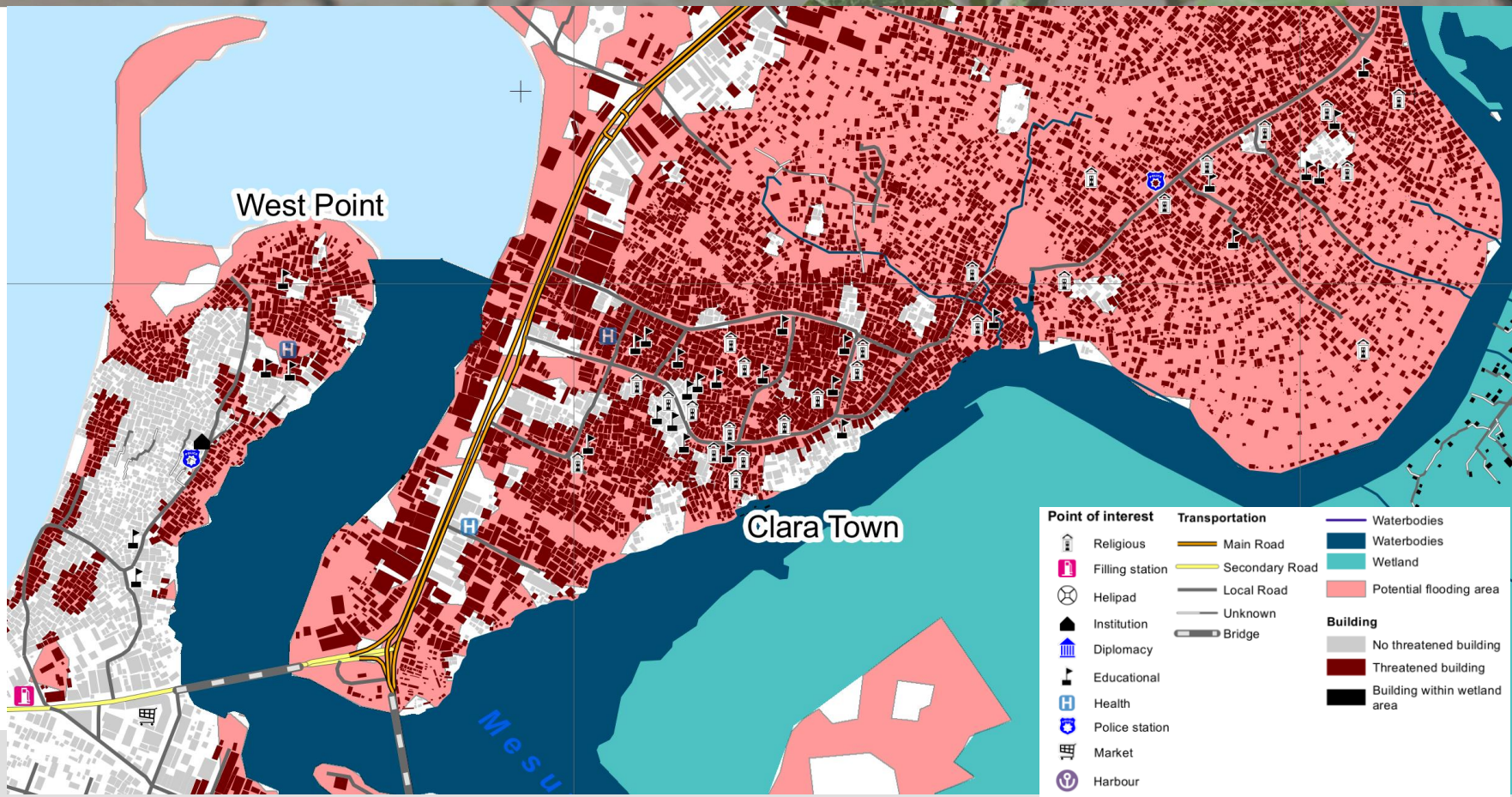


Critical Infrastructure - Results



European Space Agency

Critical Infrastructure - Results



Unit of measurement			Threatened	Within wetlands	Total in AoI
Estimated population		No.	288,434	N/A	1,357,007
Facilities of interest		No.	66	0	335
Settlements		No.	27,566	797	133,787
Transportation	Roads	Km	185	26	1,641
	Railways	Km	2	0	12

Threatened buildings, points of interest, transportation and population

Limitations of this prototyping are:

- Urban elements have been optimised to the best of the producer's ability.
- 1m DTM is desirable
- hydrological processes of the catchment areas

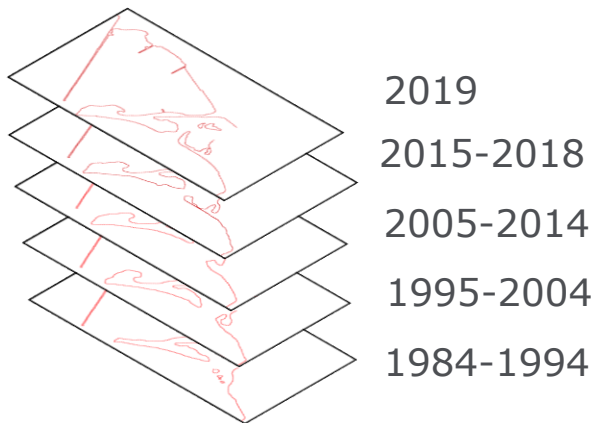


4. Products

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Shapefiles available:

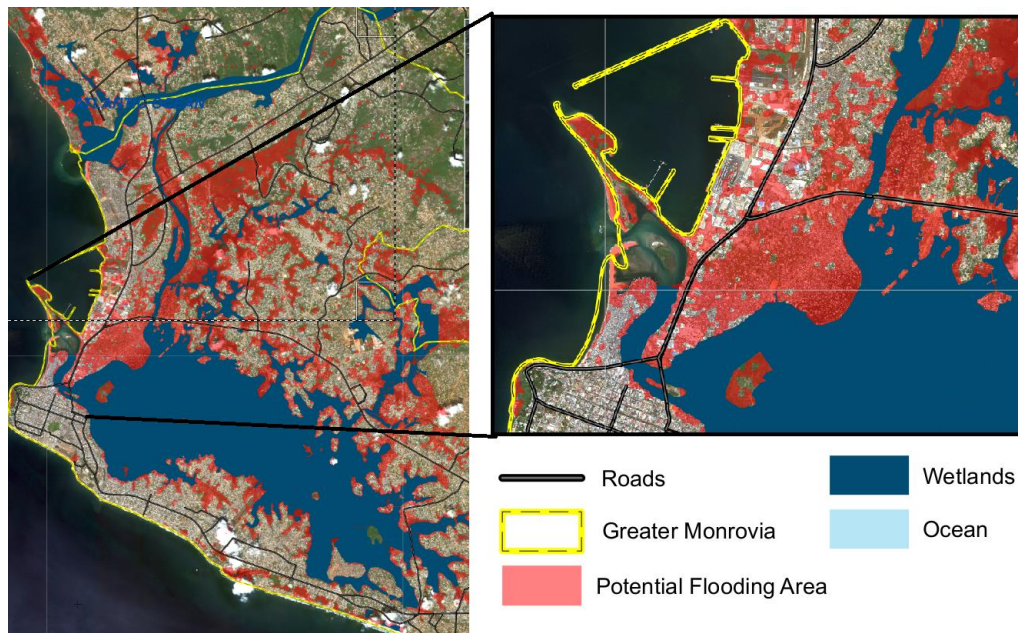
- Shoreline_changes
- Shoreline_1985_1994
- Shoreline_1995_2004
- Shoreline_2005_2014
- Shoreline_2015_2018
- Shoreline_20190125



File name: 2_1-eo4sd_analysis_of_projected_flood_risk
->Hotspot_Analysis_of_Flood_Risk_Estimation_for_2030.zip

Shapefiles available:

- flooding_on_habited_areas
- wetlands



File name: 3-eo4sd_analysis_of_critical_infrastructures_and_residential_areas
->critical_infrastructures_and_residential_areas.zip

Shapefiles available:

- Buildings
- Point_of_interest
- Transportation_network



ATLANTIC OCEAN

Outline & Agenda

Introduction to the Webinar Series for Greater Monrovia

How does Earth Observation contribute to Climate Resilience?

Q&A



tack så mycket 谢谢
 tusind tak
 obrigado
 감사합니다
 danke
 gracias
 baie dankie
 mahalo
 شكراً
 धन्यवाद
 baie dankie
 taak
 dank u
 teşekkür ederim
 tänan
 suksenma
 molte grazie
merci
thank you
 gràcies

For more information, please contact:

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