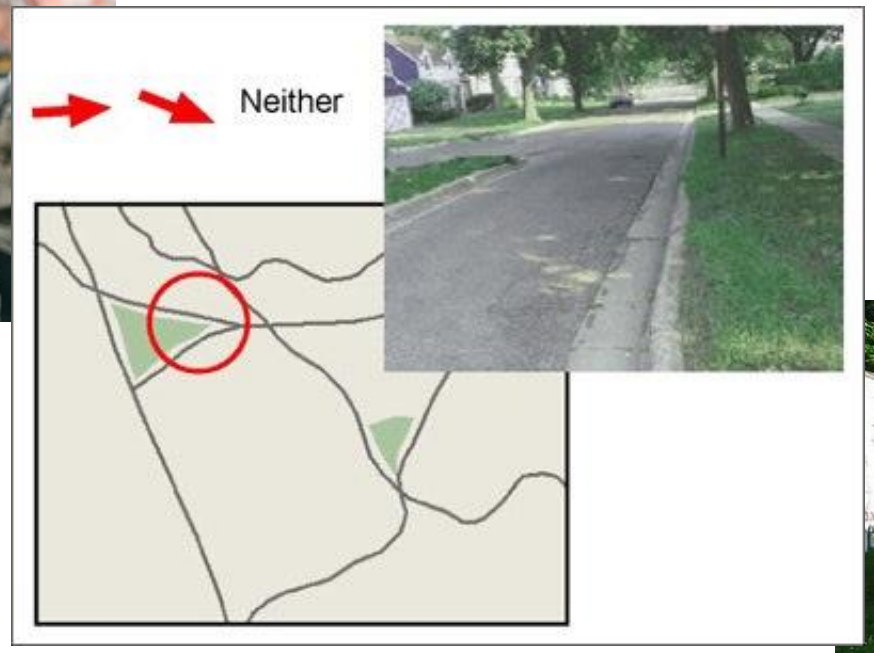
Map Reading



Which arrow, when applied to the map, indicates the perspective seen in the photograph?

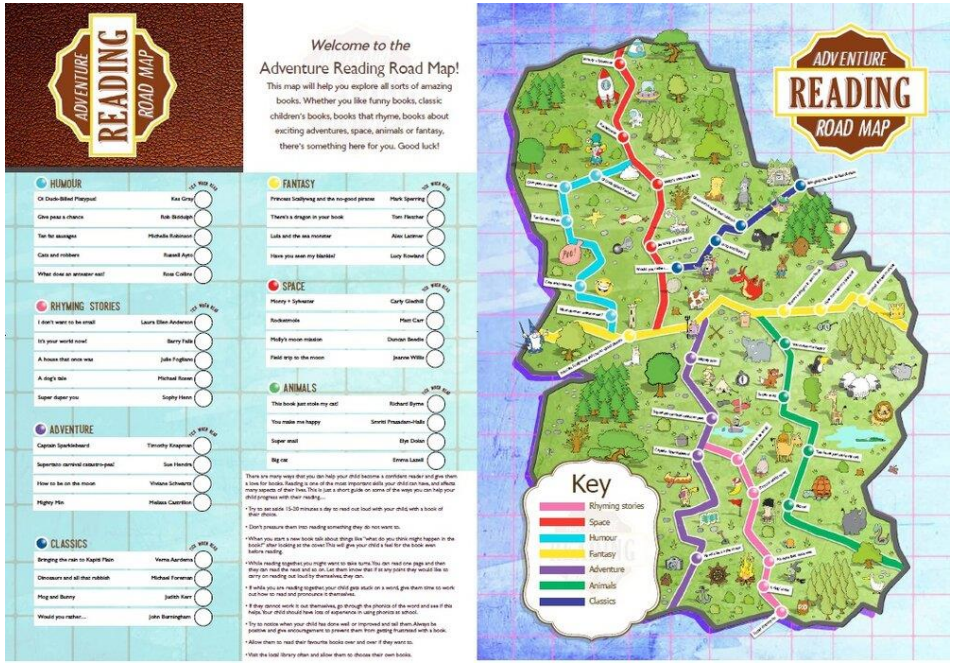
WHAT IS A MAP?

A **map** is a ***drawing or graphical representation of the land, as viewed from the air from a great height.*** This perspective is called the ***"aerial view"*** or ***"map view."*** As land bound creatures who usually walk across the land rather than fly above it, the map view is not the natural perspective for humans; rather, we have more of a "side view" of the land surface. Maps are useful because they illustrate specific and detailed features of a given area, region, or an object. They represent features such as boundaries, topography, physical features, climate, and even economic activities (1).

TYPES OF MAPS

There are different kinds of maps:

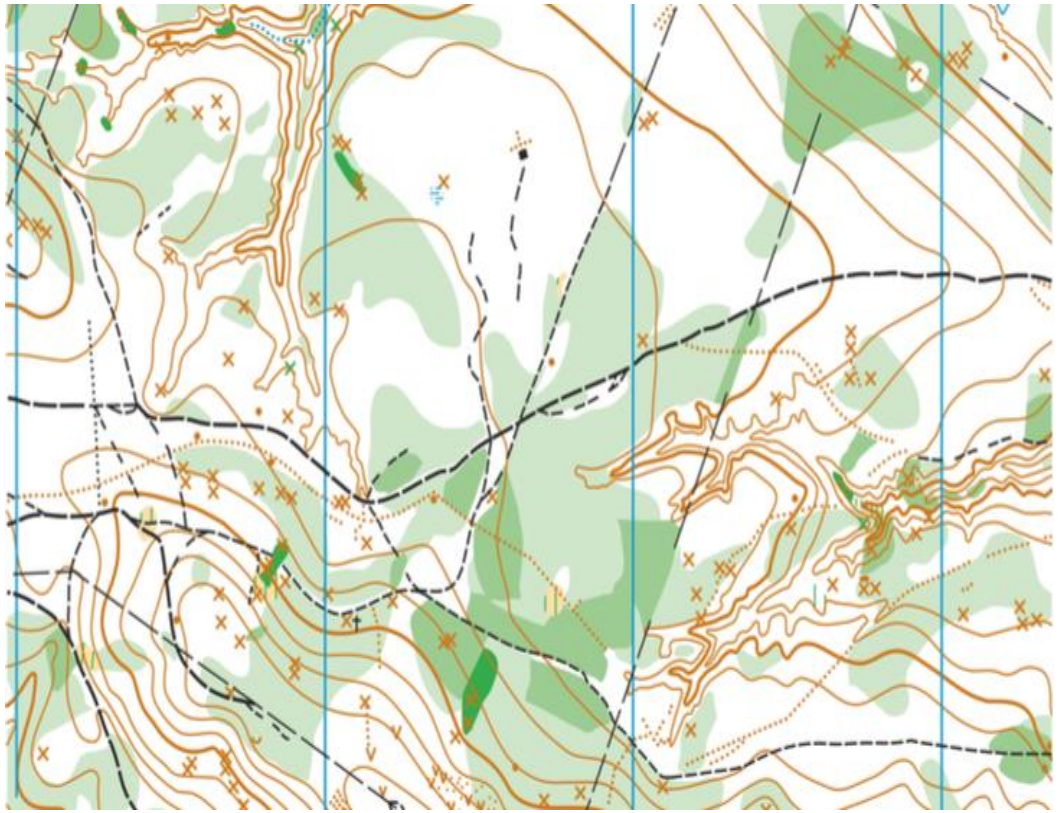
- dimensional,
- static,
- dynamic,
- interactive maps



Maps have been in use since ancient times when they may have been produced and used as necessary tools for identification and navigation. Maps became more and more accurate and factual in the 17th to 19th century with various countries adopting national mapping programs. The widespread use of aerial photography during World War I contributed significantly to the map-making process. Discussed below are some of the different types of maps. (2)

Topographic Map

A topographic map is a type of map that shows large-scale detail and quantitative information of relief by the use of contour lines and various other methods. A topographical map is based on a topographical survey that has been performed on large scale and shows varieties of elevations and landforms. The map shows both human-made and natural topographical features.



Topographic maps have various uses;

- geographical planning,
- civil engineering,
- large-scale architecture,
- recreation such as hiking

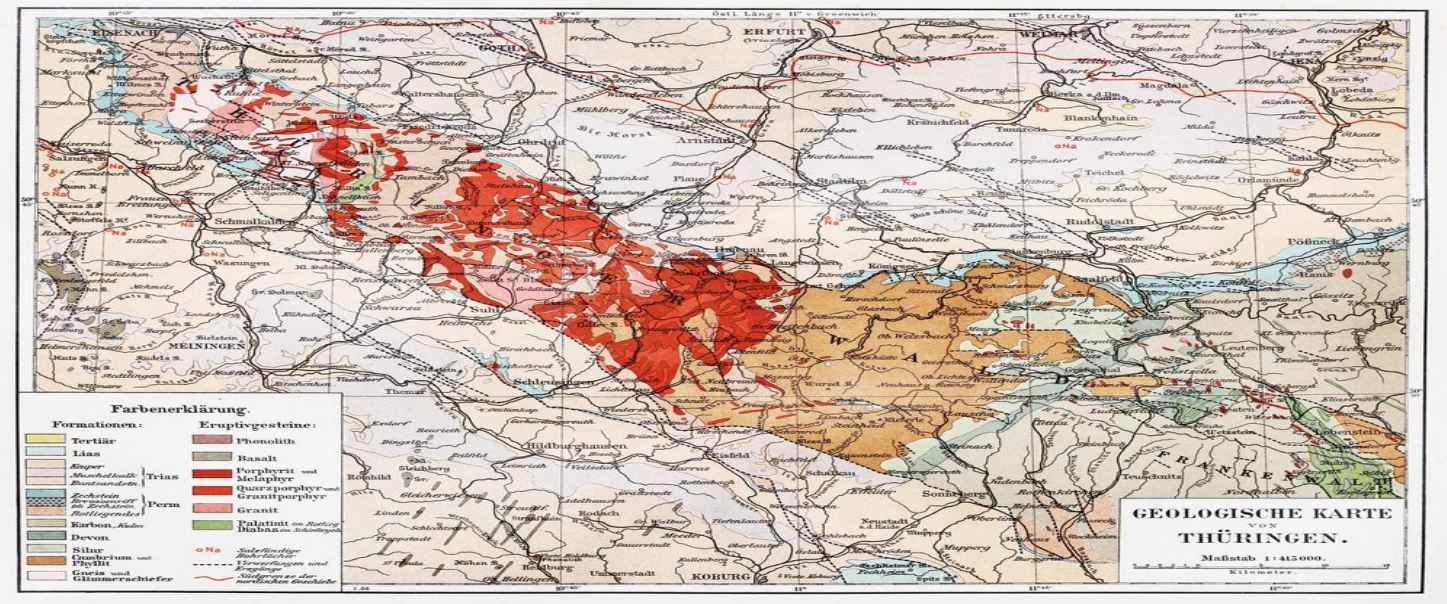
Features on the map are usually represented by conventional signs and symbols. For instance, different colors can be used to indicate the different classifications of roads. The signs are usually explained just below the map or on the margins. **Apart from contour lines, topographic maps also show forest covers, water bodies, and buildings.**

Geological Map

A geological maps;

- Show geological features such as geologic strata and rock units.
- The location of these features underneath the earth's surface are shown by symbols or colors.
- Other features such as fault lines, foliations, and folds are shown with strike and dip symbols which gives them a three-dimensional orientation.

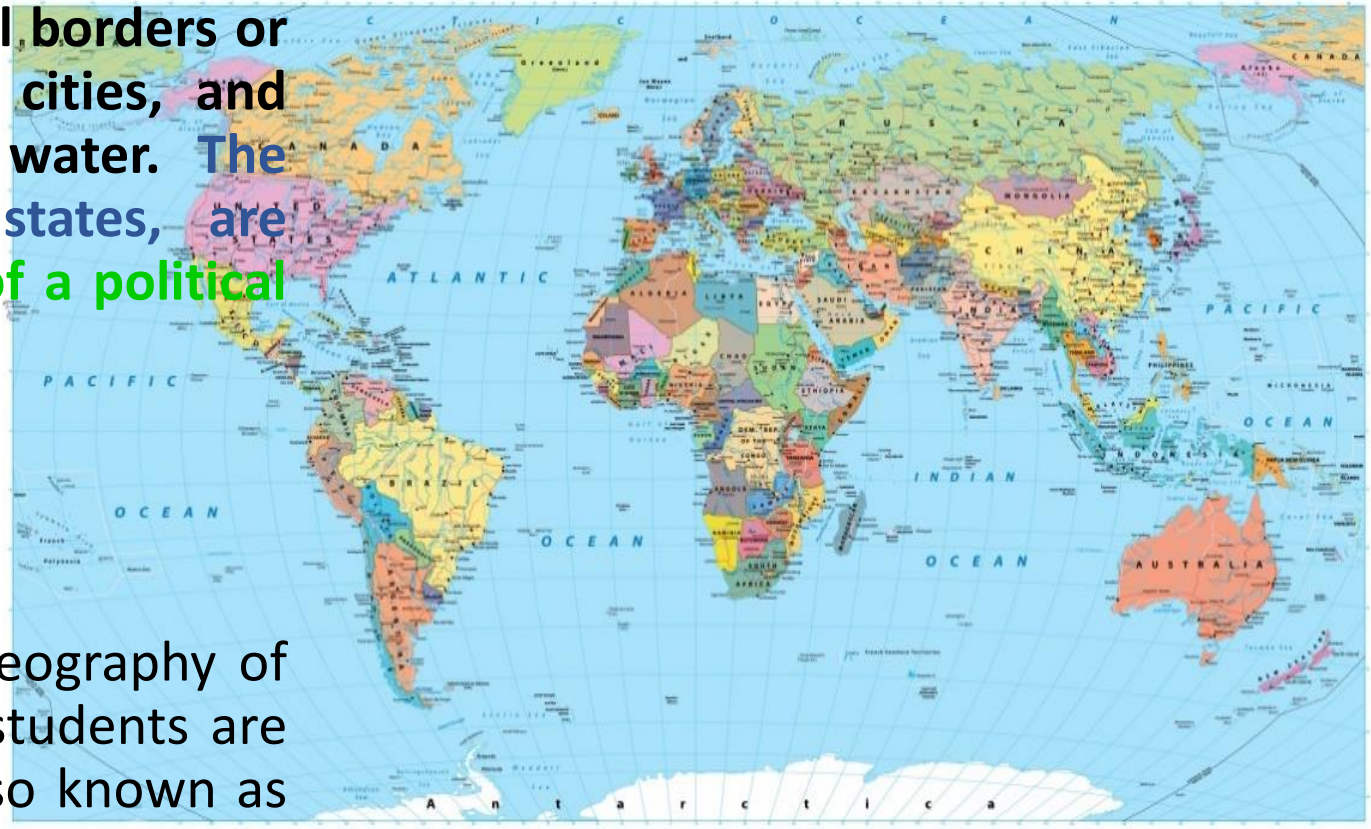
In the US, geologic maps are superimposed over topographic maps with additional color masks with letters to represent a geologic unit. In the UK, the term “geological map” is used instead of “geologic map.”



Political Map

Political maps:

shows a region or country's different territorial borders or boundaries, the location of major areas or cities, and significant land masses such as bodies of water. The boundaries between countries, cities, or states, are indicated by lines. One of the main features of a political map is the geographical boundaries.



There are different sizes of political maps.

Political maps help in the understanding the geography of the world and are usually the first maps that students are introduced to in school. This type of map is also known as "reference map" and are either printed on a physical medium or paper. It can also be produced in digital form for online use.

Physical Map

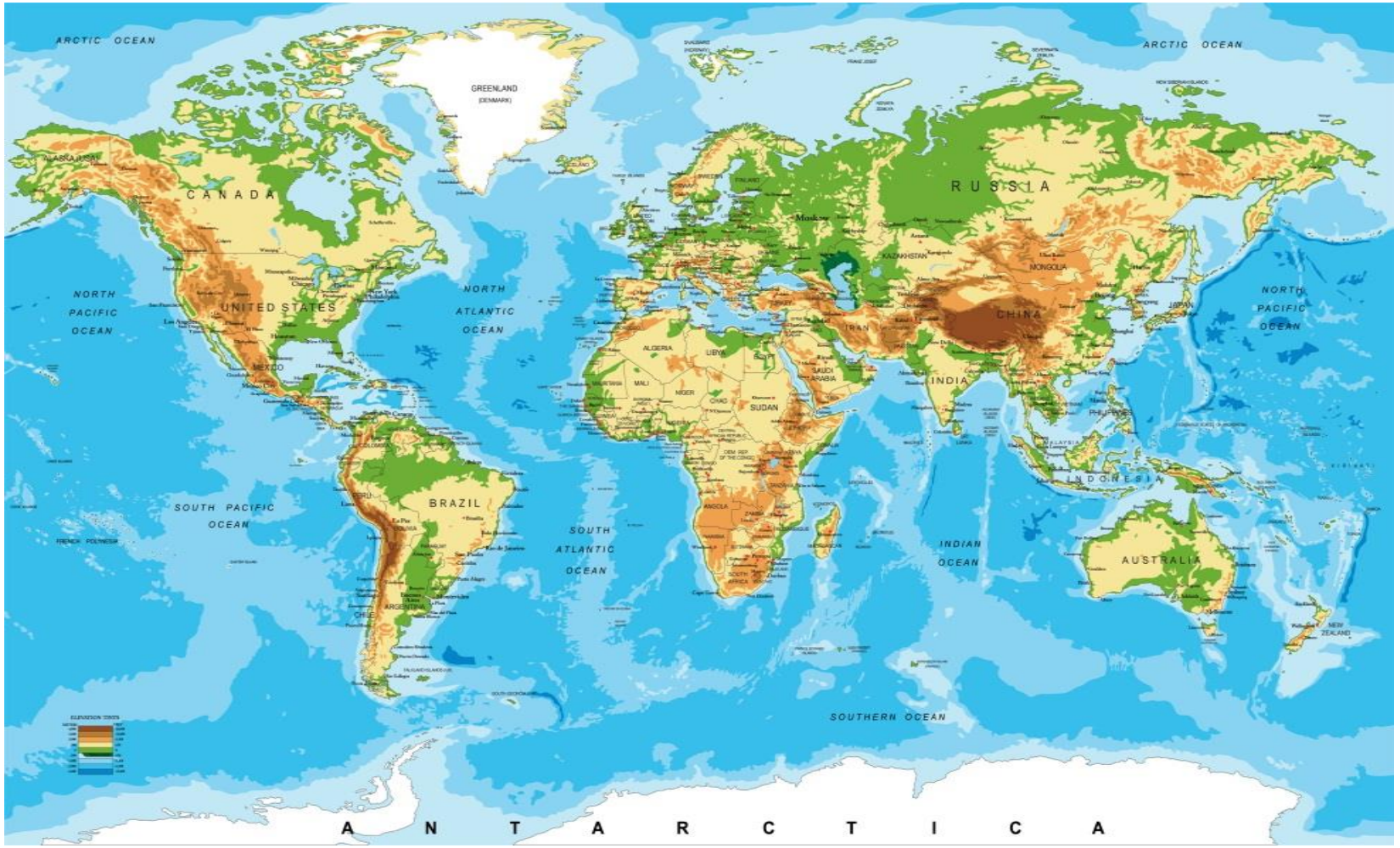
As the name suggests, physical maps are maps that have been designed to show the physical or natural landscape features of the Earth. **The maps are best known to show several geographical features such as soil type, mountains, and land use including infrastructural developments such as roads and buildings**.

Physical maps are some of the most colorful maps with a different color used to indicate different physical features:

- Most maps use green to brown to gray color scheme to show elevation.
- A dark green color is used to indicate near-sea level elevations and brown for higher elevations.
- Water bodies such as lakes, rivers, and oceans are often indicated by a blue color (light blue for shallow areas and dark blue for deeper waters).
- Ice and glacier are shown in white color.

Cultural information is not a focus of physical maps but may be included on the map for geographic reference.

Physical Map



Road Map

Road maps, also known as route maps, indicate roads and other transport links. They are navigational maps that also include political boundaries, making them part of political maps.

Apart from road and boundaries, road maps also show certain points of interests such as tourism sites, prominent buildings, recreational facilities like parks and restaurants, train station, and airports.

The maps are of different sizes, shapes, and scales:

*Small maps are used to show the overview of region's major roads or routes

*Large maps give greater details and cover a large area

Highway maps give the overview of major routes within a region. Street maps mainly cover areas within a city or metropolitan area. A collection of road maps bound together in a book is referred to as road atlas. Road maps often use thin lines to indicate minor roads and thicker or bolder colors to indicate major roads.

Cadaster Map

A cadaster map is a map showing the real estate of a country.

It includes the:

- location,
- area
- ownership,
- value, and tenure of an individual parcel of land

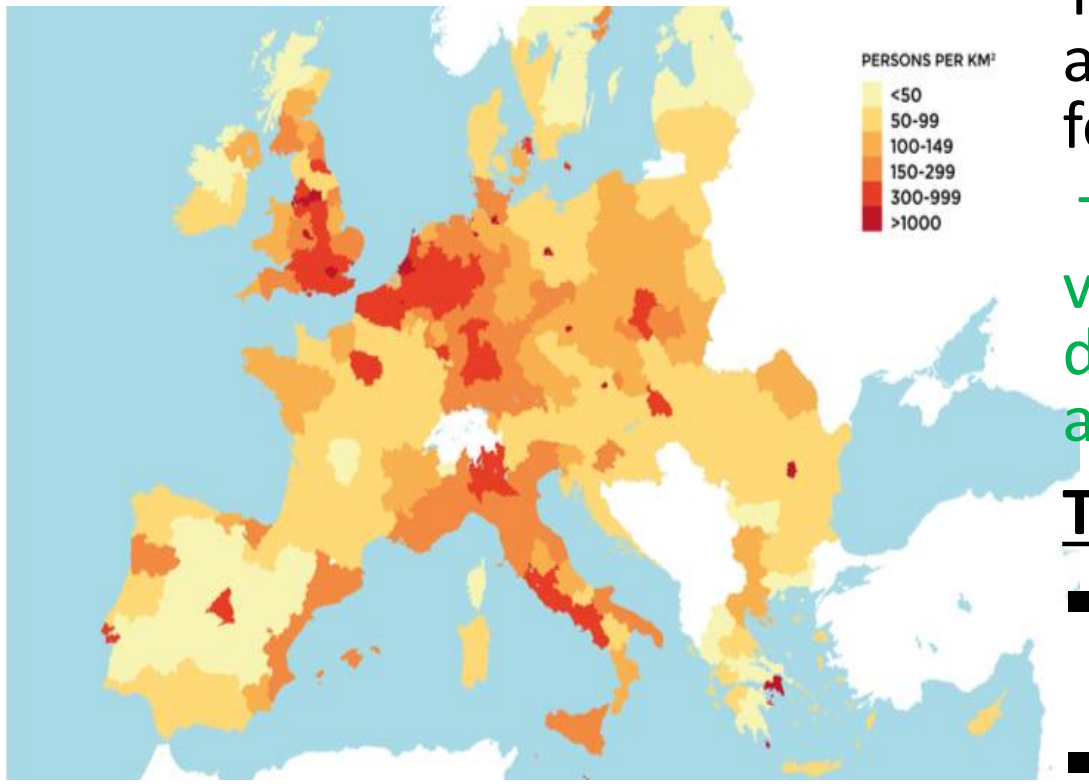
A cadaster is an up-to-date land information system that contains records of interest of lands such as restrictions, rights, and responsibilities.

It includes the geometric description of the land and used alongside other records that describe the nature of the interest, controls of such interest, and the value of the parcel of land.

Some maps also show additional information such as parcel's identification number, survey district name, certificate of title number, adjacent street names, and position of existing structures.

Cadaster Map

Thematic Map**



A thematic map is a map designed to highlight a theme connected with a specific geographic area.

Thematic map focuses on a specific subject area and uses base data only as a point of reference for the feature being mapped.

Thematic maps also put emphasis on a spatial variation on a number of geographical distributions such as climate, population density, and health.

The map serves three main purposes:

- to provide information about a piece of specific information,
- to provide general information about the spatial pattern,
- to compare patterns on different maps.

How to read a map?

Map reading is the act of interpreting or understanding the geographic information portrayed on a map.

- **To do this, the reader will need to derive essential information presented by the map:**

- such as distance,
- direction,
- natural and man-made features, topographical features

BASICS FOR MAP READING (3)

Step 1 – Choose The Correct Type Of Map and Scale

The right scale of a map very much depends on what your purpose is.

1:50,000

The most common scale to use cover large area is 1:50,000. This means that for every centimetre on the map, there are 50,000 centimetres (or 500 metres) in real life.

Maps are broken up into grids, with each box of the grid measuring 2 centimetres. That means for every full box on the map, it covers 1 kilometre in real life. This is useful for quick estimation of distances at a glance.

1:25,000

More detailed maps have a scale of 1:25,000 (1 centimetre = 250 metres). Therefore, each box grid on a map covers 500 metres in real life.

These more detailed maps show features such as group of trees , forest, rivers, rocky sides, etc and other landuse featuers on the ground.

1:10,000-1:1000

More more detailed maps mostly to use in urban environment

These more detailed maps show features such as buildings, streets, walls, etc… on the ground.

Step 2 – Understand The Features Of The Map

Legend

Gives a description and guide of the different features and markings on the map.

Title

Tells you what area the map is of.

Grid References

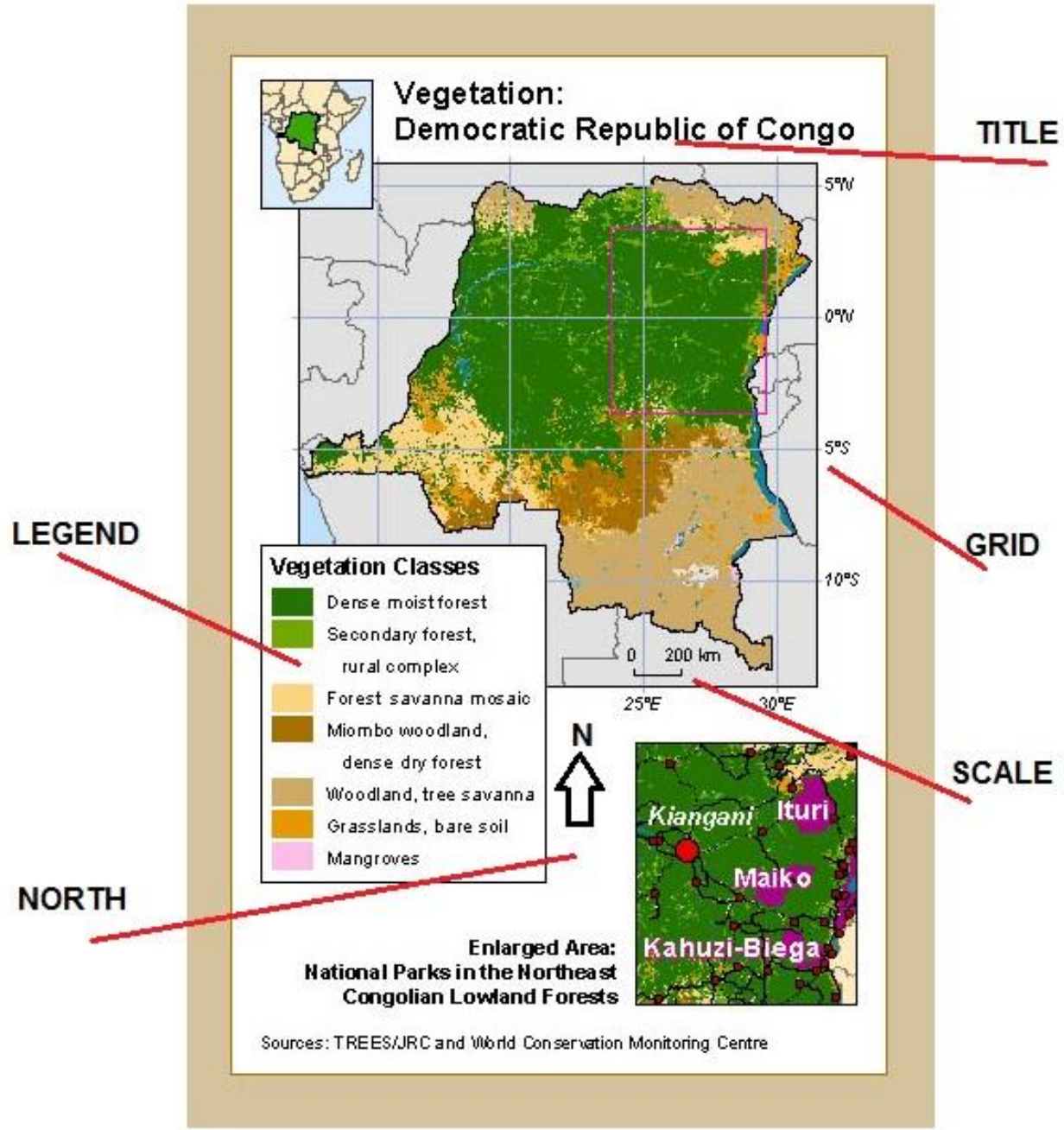
A map is broken up into grid boxes, with the first 2 (or 3, depending on accuracy) digits being the x-value, and the last 2 (or again, 3) digits being the y-value. Each grid reference starts with the letter assigned to the map.

The North Arrow

This arrow tells you which way is north – it always points to the top of the map.

Scale

The scale will tell you what scale your map is whether it's 1:25,000 or 1:50,000.



Step 3 – Put The Map Into Practice

3.1. Point Your Map North

To point your map north, place your compass flat on your map, pointing towards the top, and rotate yourself until the compass' needle points north. Simple!

3.2. Find Your Location On The Map

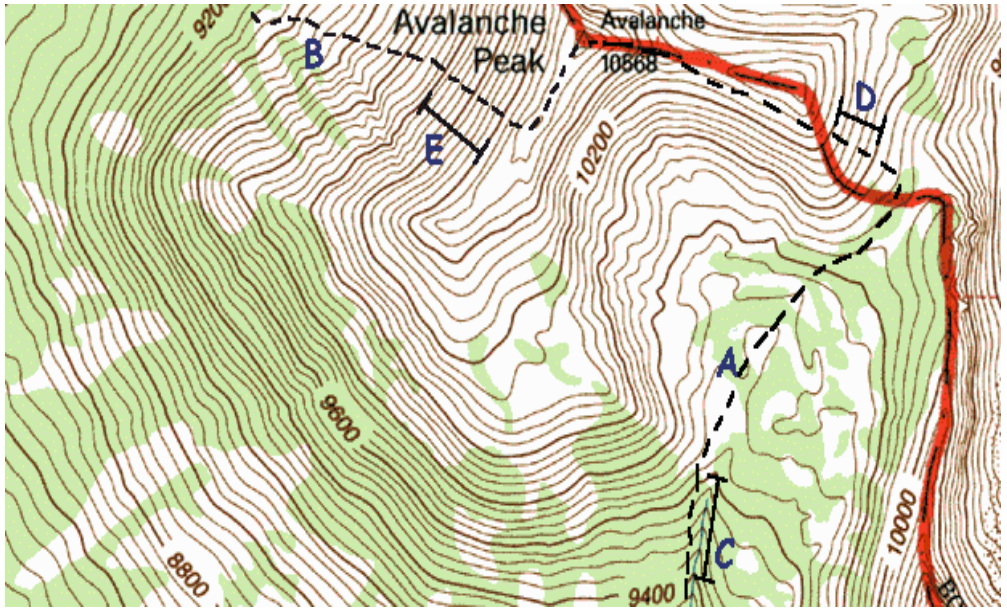
Identifying your surroundings and relating them back to your map is the most important thing when trying to locate your position. You usually won't know your exact grid reference starting out, so a good idea is to start at a grid reference that you do know.

If you began in a town or village and drove to the start of the hike, then start there on your map and re-trace your steps. Once you're confident that you're in the correct general area, you can begin to look around for landscape features.

These can be mountains, rivers, walls, spurs, saddles, roads – the list goes on. If you can identify 3 surrounding features in real-life and pinpoint them on your map, you can be quite confident that you have located yourself.

3.3. Reading Contour Lines

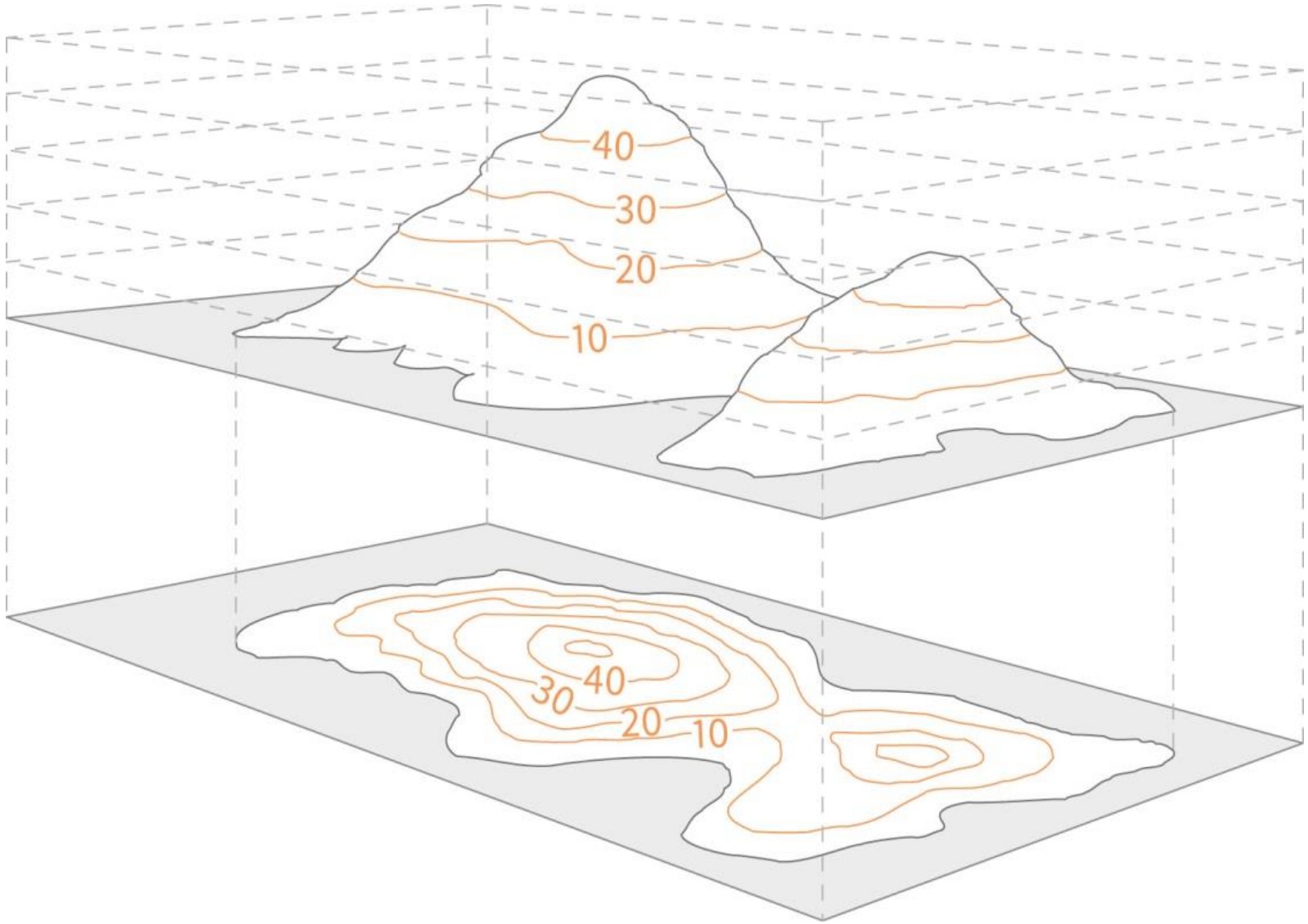
Contour lines are the small black lines that wave around the whole map.



Each contour line on a 1:50,000 scale map represents a rise of 10 metres above sea level. Every 5th contour line will be slightly bolder, to make it easily countable when you're counting many contours at a time.

The closer the contour lines are together, the steeper the gradient.

The ability to understand the shape of the ground from a map is a useful skill to learn, particularly in mountainous landscapes and when you are out .

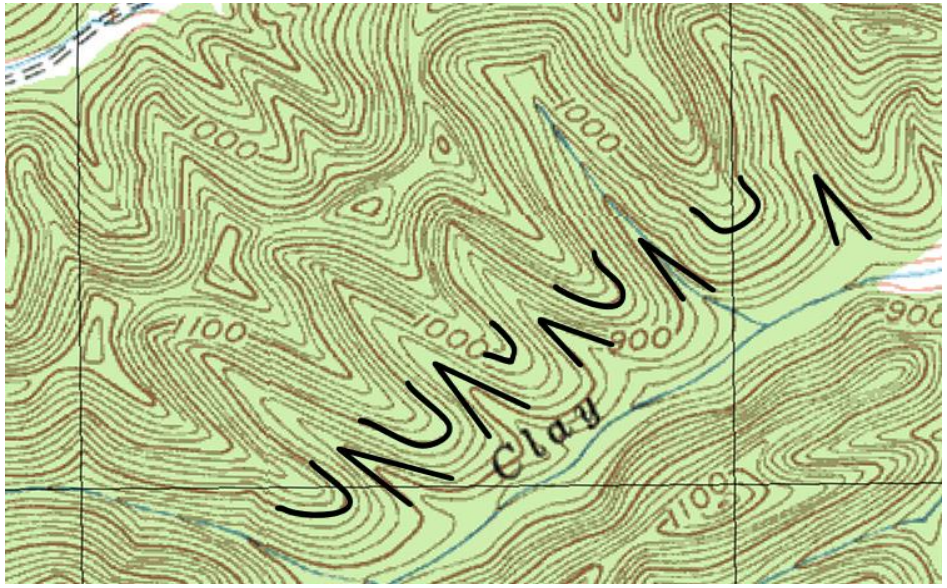


How contour lines show a pair of small hills

3.4. Identify Features Of The Landscape

Spur

A spur is recognisable in real-life as a feature that slopes downwards on three sides, and slopes upwards on one. On a map, it looks like this:



The contour lines will point away from the summit of the mountain/hill, indicating a spur.

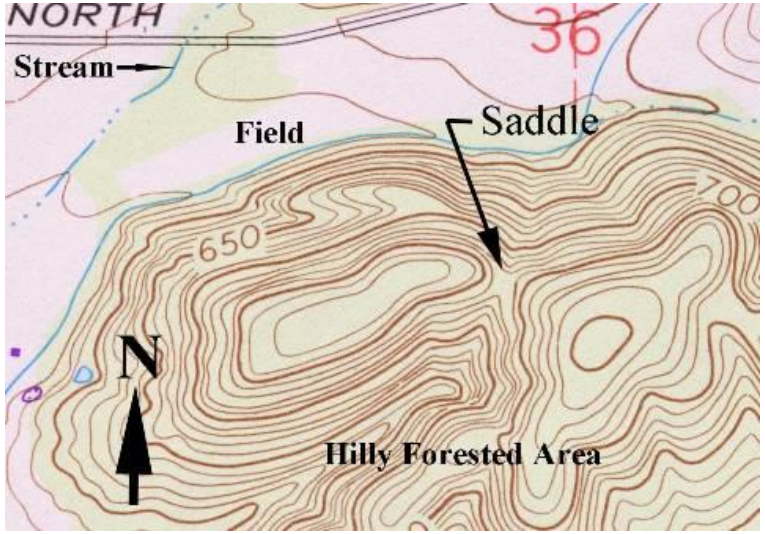
3.4. Identify Features Of The Landscape

Re-Entrant

A re-entrant is an ‘indentation’ in the side of a mountain and can be identified on a map as contour lines pointing against the natural slope of a mountain. These can also be seen in the above example.

Saddle

A saddle can be seen in real-life as a feature that slopes down on two sides, and slopes up on two sides.



3.4. Identify Features Of The Landscape

Summit

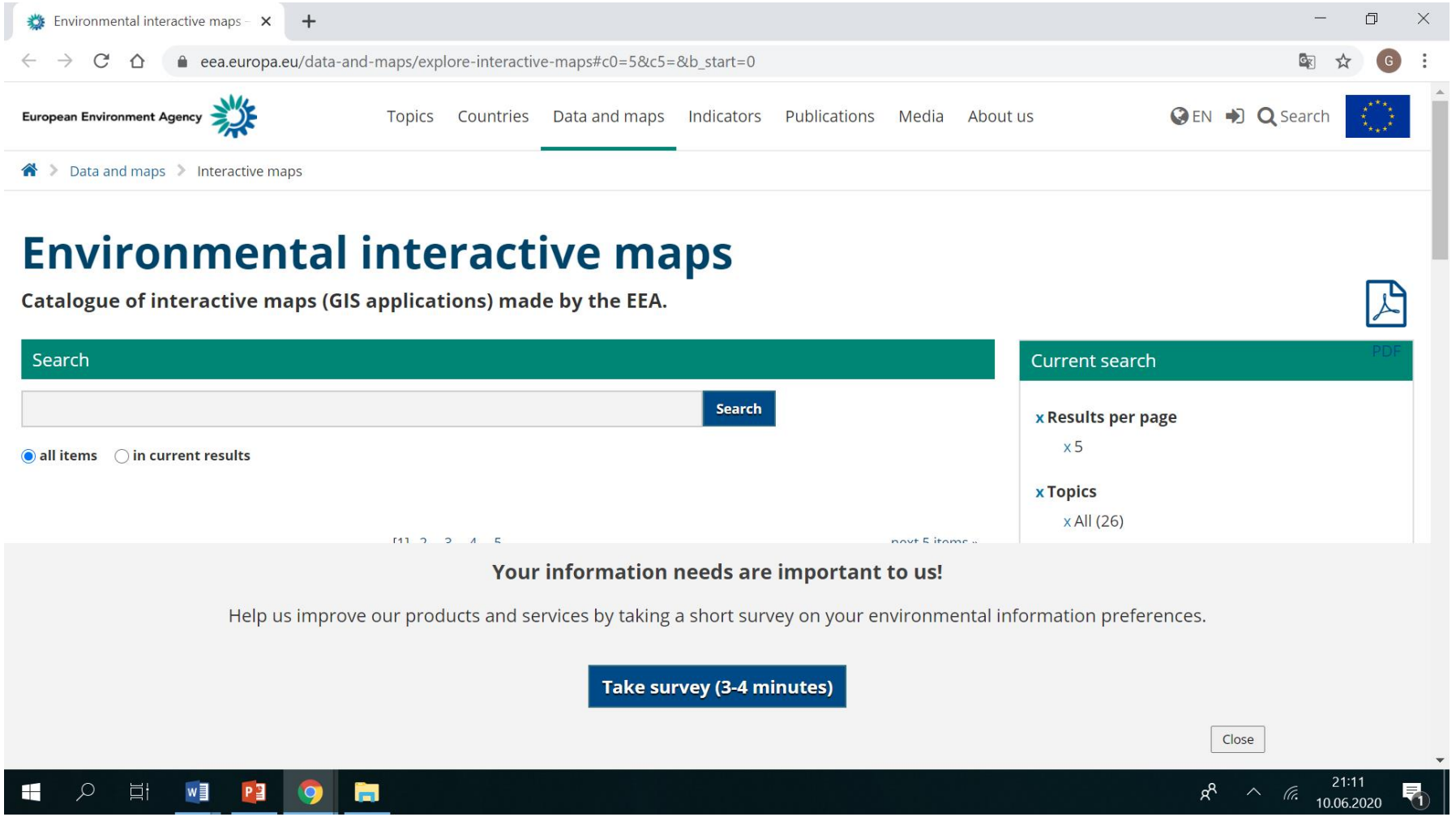
The summit of the mountain is the very top and can be identified on a map by a ‘ring contour, seem in the above example.

Thumbing

It’s a useful idea to keep note of your last known location on the map. This is so you can re-trace your steps should you lose your bearings while walking. To do this, place your thumb on your current location on the map, drop it to your side and forget about it.

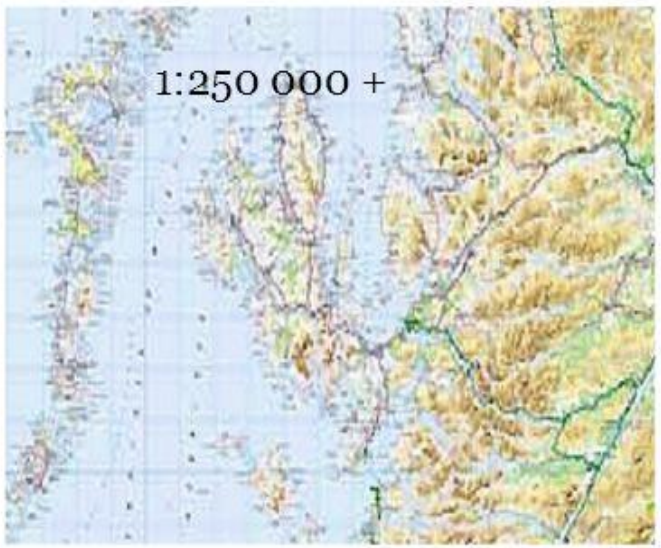
Next time you look at your map, your thumb will still be on your last location and you can then work out where you are currently.

MAP READING for ECOLITERACY



Map Scale

- Maps can either be **small** scale or **large** scale
- The difference is the amount of detail illustrated



SMALL SCALE
-small amount detail with a large area

LARGE SCALE
-large amount of detail of a small area

https://slideplayer.com/slide/1587328/

BASICS FOR ECOLITREACY MAP READING

A. Selection of right type and scale of map

- Topographical maps telling campers how to reach campsites and lodging areas, and even tourist maps highlighting famous landmarks for sightseers.

- For the environmental purposes topographical and physical maps are the most suitable ones.
- Explorer/nature map (used for hiking, cycling, kayaking, and similar short-range activities) will have a scale around 1 : 25,000, while the average driving map will be closer to 1 : 50,000.

For the environmental purposes map scale should be between 1:25.000-1:5000 to better reading map physical /environmental legends and to compare with real world.

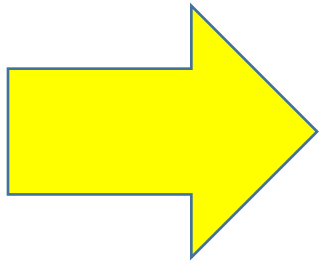
B-Envıronmental legends on maps

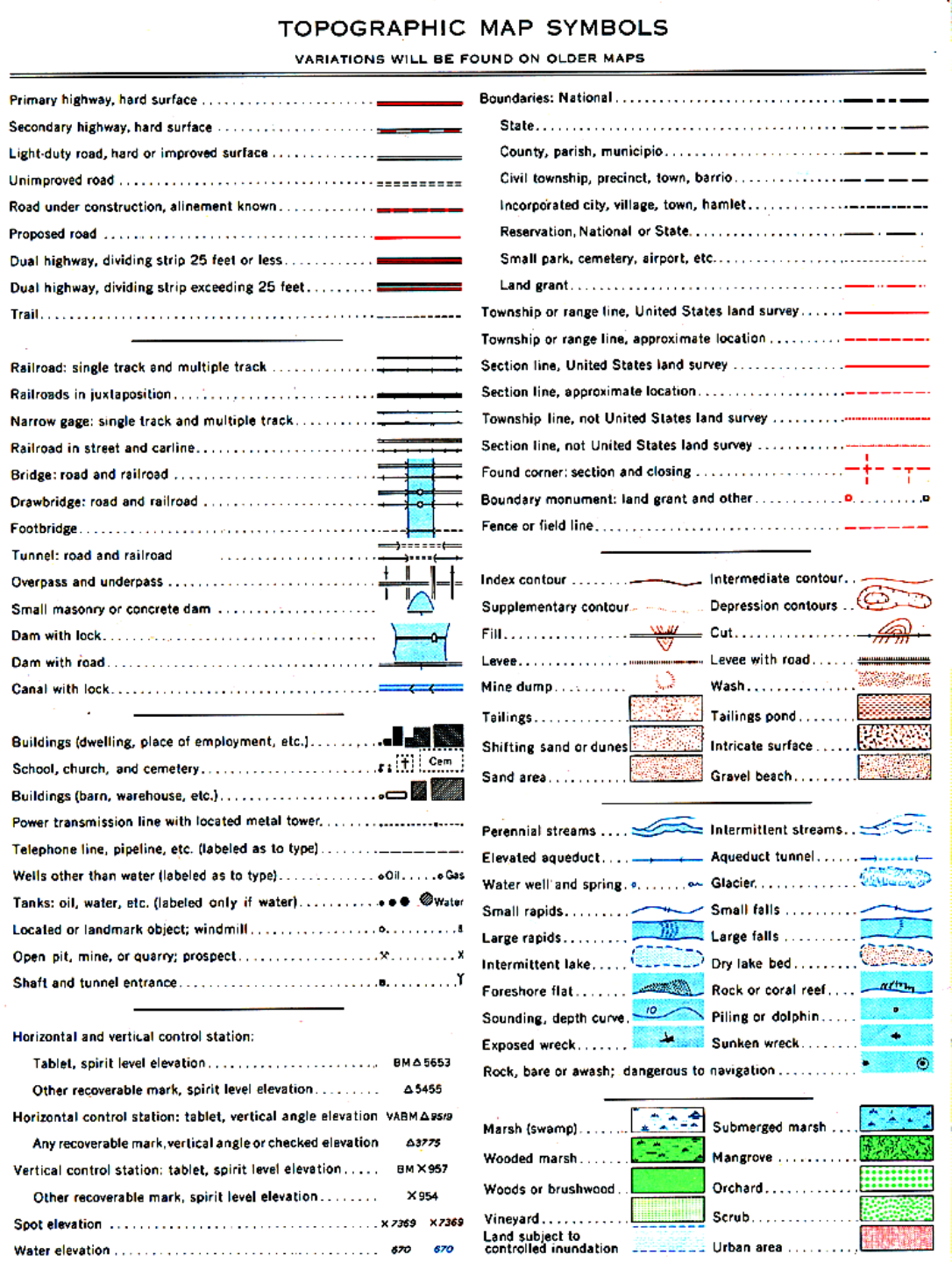
Maps symbols are representing;

- roadways,
- town and city limits,
- prominent landmarks,
- color-coded environmental features like mountains, forests, and bodies of water depending on its type and the scale.

All maps represent some component of the reality of the earth. These elements are designed to educate users on how to interpret and safely traverse their surroundings.

Most common topographical and physical map symbols





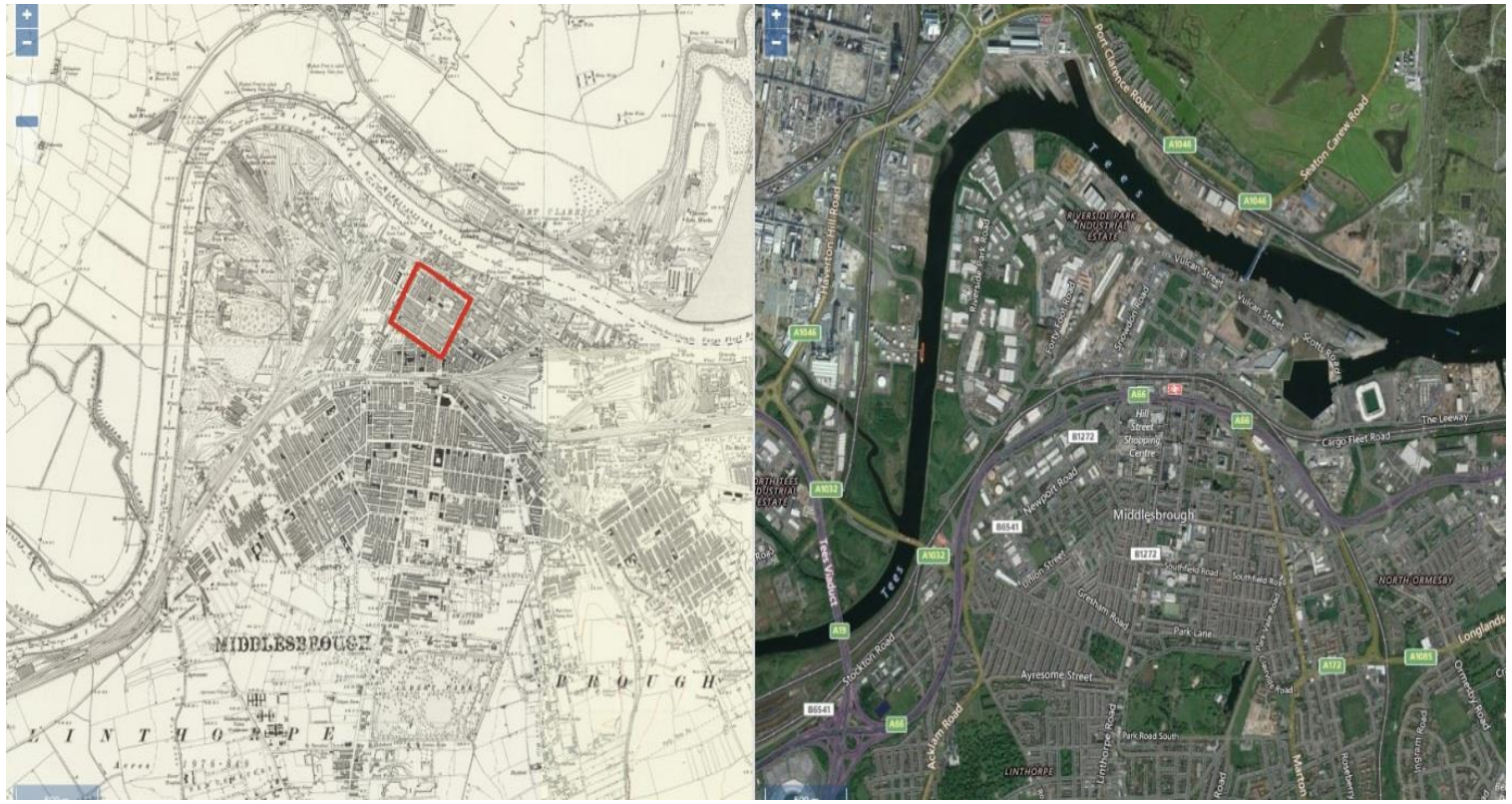
C-Environmental readings using the maps

C1-Using old maps to read impacts on environment

By comparing an old map of the same area with an updated map, it is possible to identify in which areas, what kind of physical / spatial changes and environmental degradation has occurred.

We can evaluate environmental degradations, losses, new developments, etc…

For example;

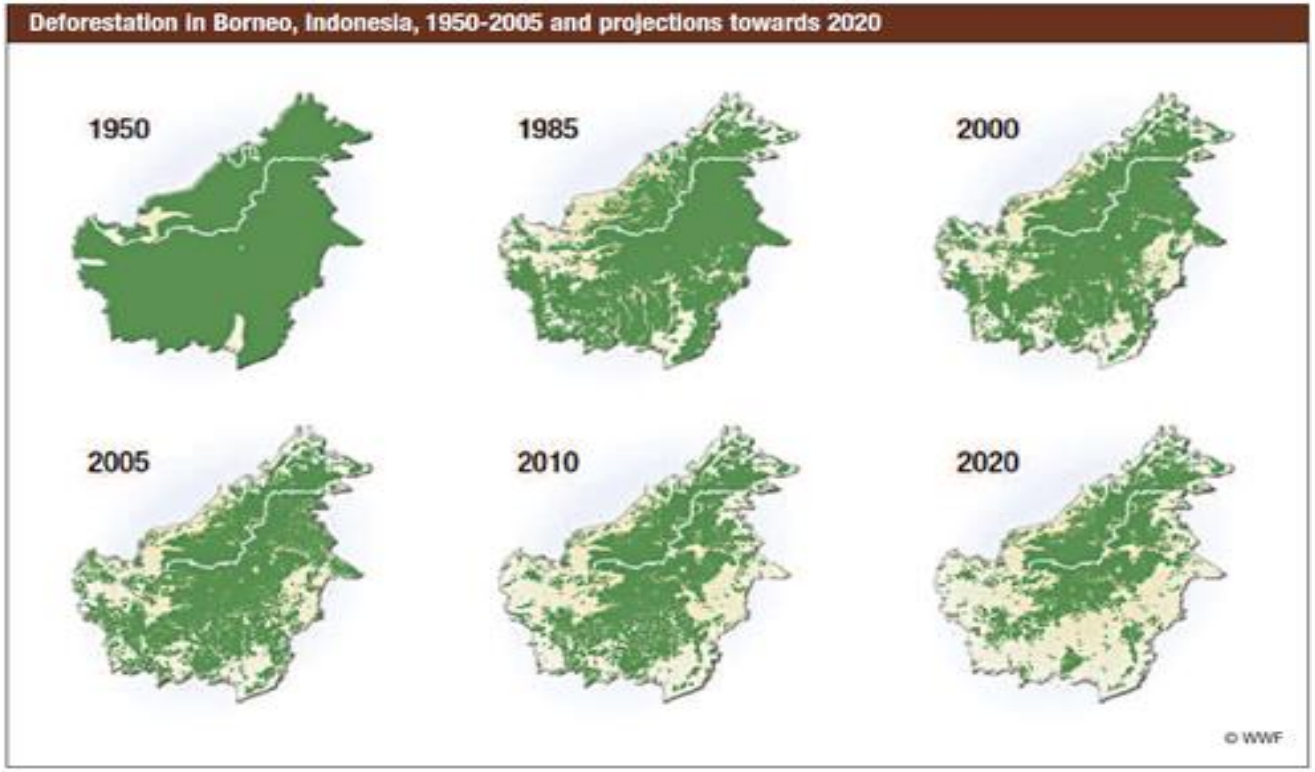


Maps showing Middlesbrough in the late 19th century and Middlesbrough today. The red highlighted area is the original planned town that developed from the 1830s.

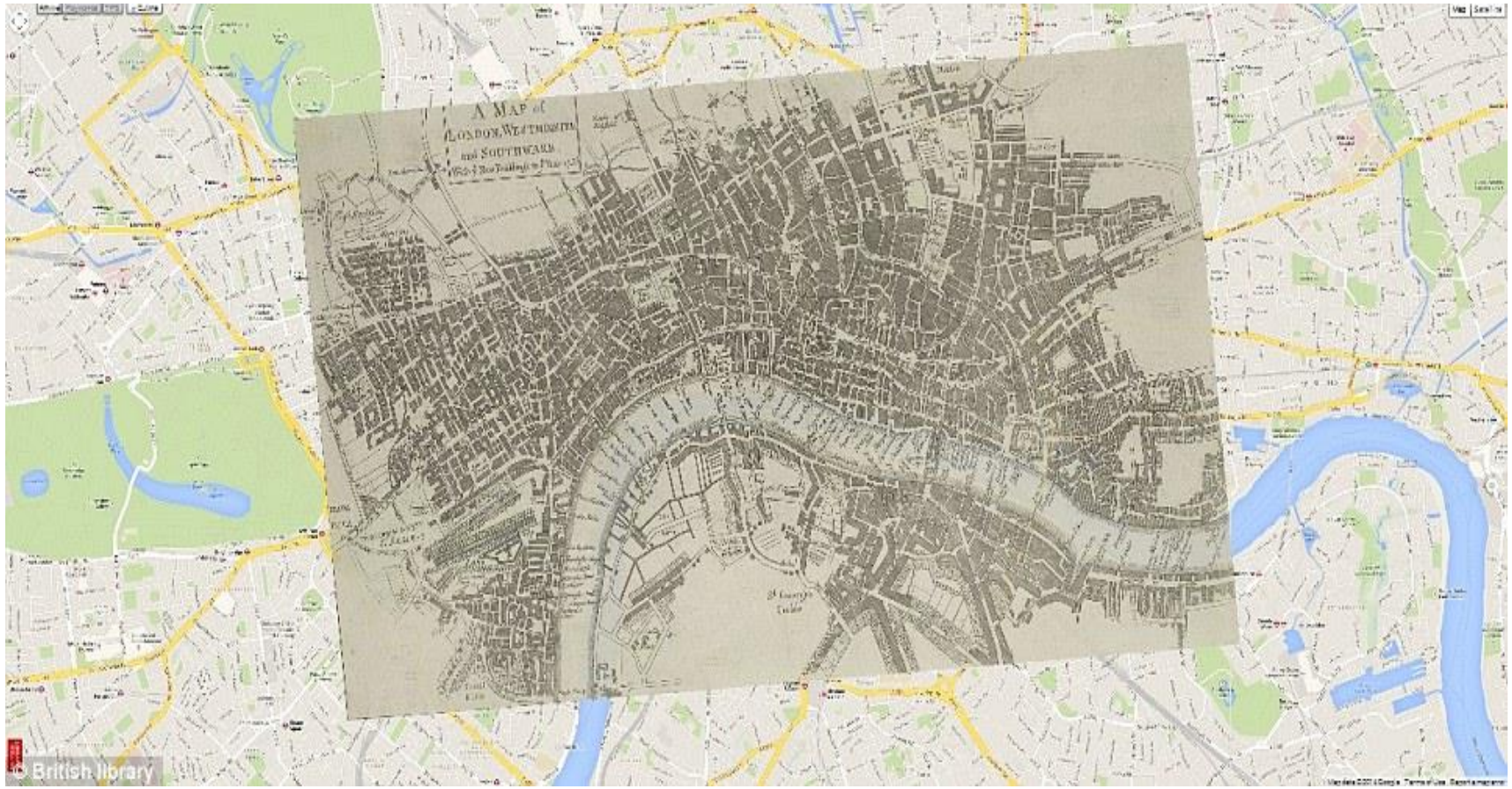
Map from the National Library of Scotland website's side by side feature at https://maps.nls.uk/geo/explore/side-by-side/

C2-using series of maps (time-line) to read impacts on environment

A series of map reading (tematic, topographical, physical) on a time line could create a good evironmental awareness in different scales.



https://www.nrdc.org/experts/jake-schmidt

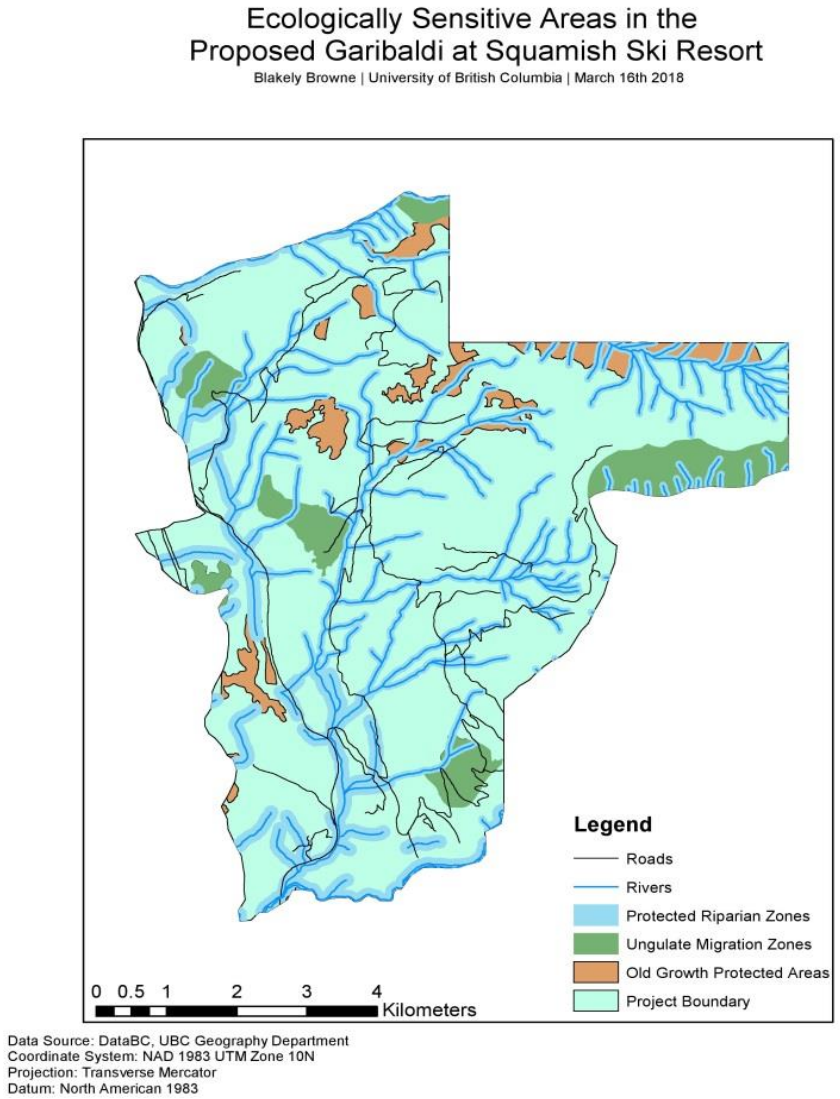


Old and new: **The above map shows the City of London** and the boroughs of Westminster and Southwark as they were in 1733. The street layouts are in many cases the same - though there is more open space and no evidence of railways .

https://www.dailymail.co.uk/news/article-2742399

C3- Using the maps to read environmental features/zones

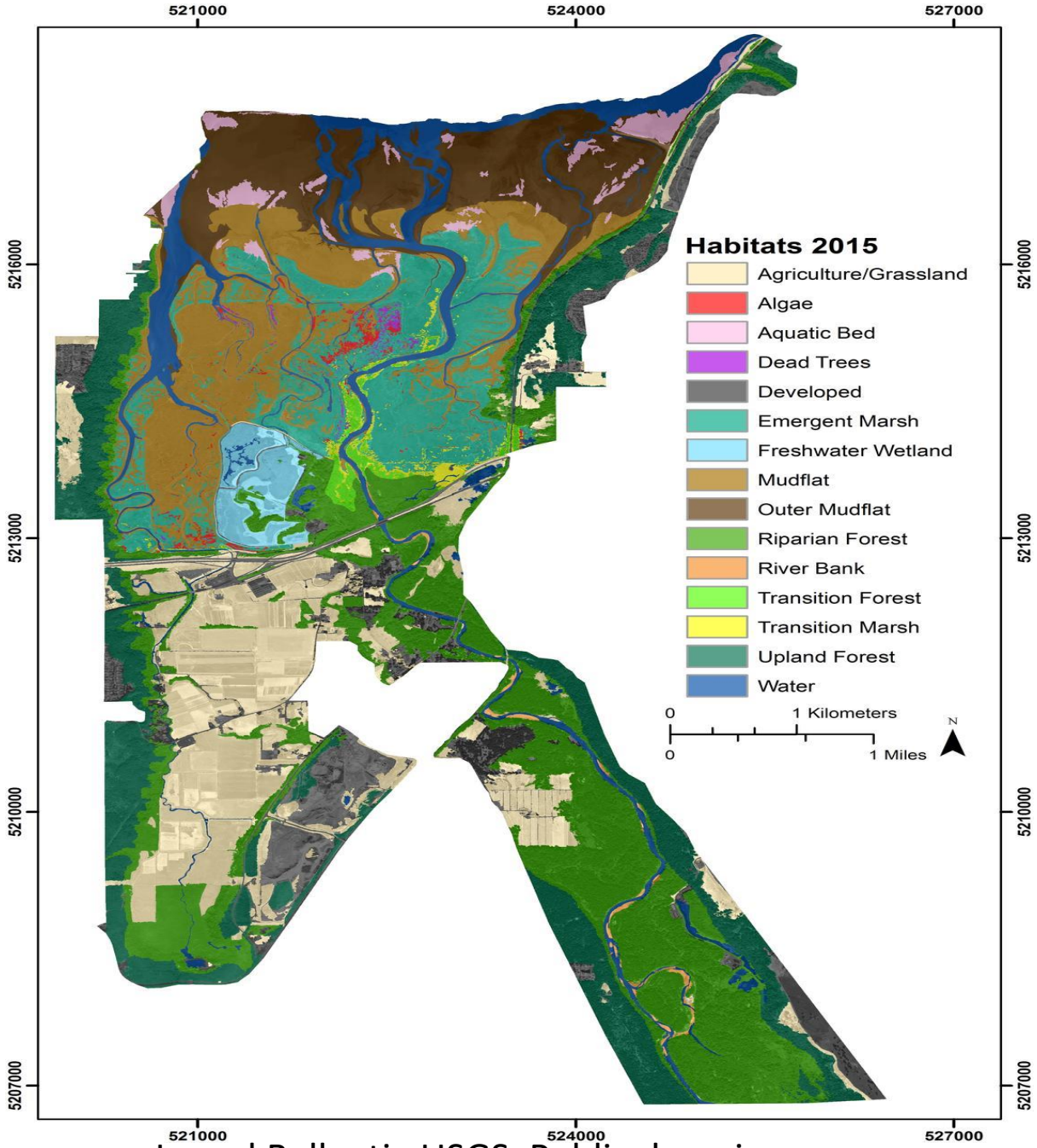
If we have a certain level of ecological information background, we can identify locations and regions, such as habitats, basins, settlements,etc directly from maps of the appropriate type and scale or we could produce the thematic maps by transferring information we have obtained from the field to the maps we have.



http://blogs.ubc.ca/blakelygeography

For example;

A habitat map of the Billy Frank Jr. Nisqually National Wildlife Refuge 2015 habitat classification



Laurel Ballanti , USGS. Public domain

C4- Using the maps for environmental modeling & monitoring

Maps are important communication, navigation and decision support tools. They also serve as mechanisms for both storage and communication of spatial data and information.

Maps also provide the opportunity to model the reflections of the possible effects of the projects being carried out on the space. Especially emission, noise, pollution etc. can be tested for possible outputs spread in the space and affect the sensitive areas.

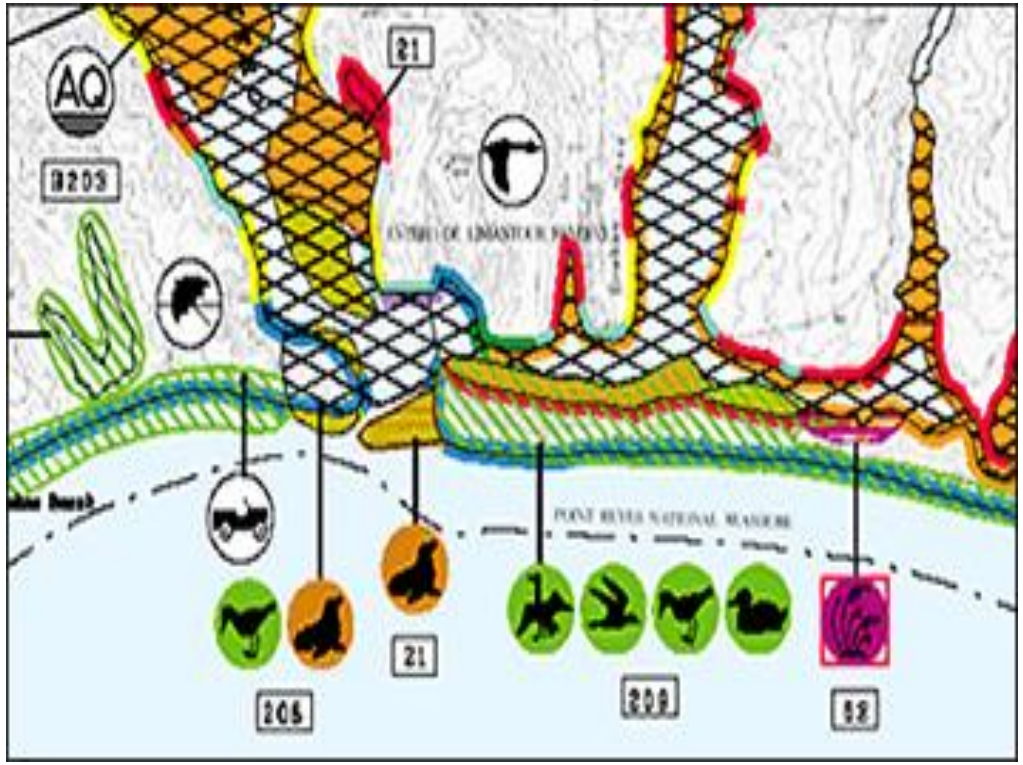
Examples:

Modeling

noise impact and modeling on maps

https://www.dbc-ltd.co.uk/

Monitoring



- *Shorelines on ESI maps are color-coded by sensitivity to oil. Symbols mark localized areas for biological and human-use resources.* https://response.restoration.noaa.gov/resources/environmental-sensitivity

Environmental Sensitivity Index (ESI) maps provide a concise summary of coastal resources that are at risk if an oil spill occurs nearby. Examples of at-risk resources include biological resources (such as birds and shellfish beds), sensitive shorelines (such as marshes and tidal flats), and human-use resources (such as public beaches and parks).

When an oil spill occurs, ESI maps can help responders meet one of the main response objectives: reducing the environmental consequences of the spill and the cleanup efforts. Additionally, ESI maps can be used by planners—before a spill happens—to identify vulnerable locations, establish protection priorities, and identify cleanup strategies.

ESI maps and data are created by NOAA OR&R researchers, working with colleagues in state government agencies, federal government agencies, and industry.