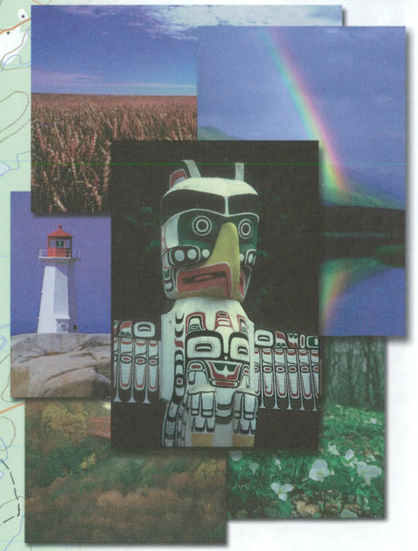
Natural Resources Canada | Ressources naturelles Canada

Canadian Topographic Maps
Cartes topographiques du Canada

TOPOGRAPHIC MAPS:
the basics



CITO-CTIO ISO 9001

What is a topographic map?

A topographic map is a detailed and accurate graphic representation of cultural and natural features on the ground.

Topographic maps produced by the Centre for Topographic Information of Natural Resources Canada are used for a wide variety of applications, from camping, canoeing, hunting and fishing, to urban planning, resource development and surveying. Why? Because they represent the earth's features accurately and to scale, on a two-dimensional surface.

National Topographic System (NTS) map sheets offer detailed information on any particular area. They are an excellent planning tool and guide and, at the same time, help make outdoor adventures enjoyable and safe.

This pamphlet will help you understand ***the basics*** of topographic maps. We have provided an overview of mapping concepts, along with tips on how to use a topographic map more effectively, explanations of technical terminology, and examples of symbols used to depict topographic features on NTS maps.

What information can I find on a topographic map?

A topographic map identifies numerous cultural and natural ground features, which can be grouped into the following categories:

culture: roads, buildings, urban development, boundaries, railways, power transmission lines;
water: lakes, rivers, streams, swamps, rapids;
relief: mountains, valleys, slopes, depressions;
vegetation: wooded and cleared areas, vineyards and orchards;
toponymy: place names, water feature names, highway names.

Refer to the legend on the back of a topographic map for a complete listing of all features and their corresponding symbols.

Information along the map borders and on the back of the map provides valuable details to help you understand and use a topographic map. For example, here you will find the map scale and scale conversion, the legend, and the year the information on the map was last updated.

Canada

http://maps.NRCan.gc.ca/maps101/

What do the colours mean?

Seven colours can be found on a map, each relating to different types of features. Northern areas of Canada are mapped in black and white (monochrome).

Black shows cultural features such as buildings, railways and power transmission lines. It is also used to show geographical names (toponymy), certain symbols, geographic coordinates, precise elevations, border information and surround information.

Red is used for paved roads, highway numbers, interchange exit numbers, certain symbols as well as for names of major transportation routes. A red tint is used to show urban development.

Orange indicates unpaved roads and unclassified roads and streets.

Brown shows contour lines, contour elevations, spot elevations, sand and eskers.

Blue represents water features, such as lakes, rivers, falls, rapids, swamps and marshes. The names of water bodies and water courses are also shown in blue, as are magnetic declination and Universal Transverse Mercator (UTM) grid information.

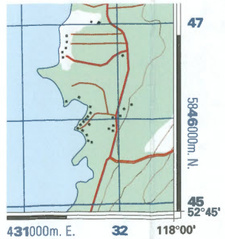
Green indicates wooded areas and vineyards.

Grey is used on the back of the map where the different symbols and a glossary of terms and abbreviations can be found.

(**Purple** can be used to show updated information added over the original map detail.)

What is a grid?

A grid is a pattern of parallel lines intersecting at right angles and forming squares or rectangles; it is used to identify precise positions. To help you locate your position accurately on the surface of the earth (or map sheet), topographic maps have two kinds of referencing systems: 1• Universal Transverse Mercator (UTM) 2• Geographic: degrees and minutes (latitude/longitude)



Is a topographic map similar to a road map?

They both show roads, water features, cities and parks, but that's where the similarity ends. Topographic maps also show relief, forest cover, marsh, pipelines, transmission lines, buildings, various types of boundary lines, and many more features. Topographic maps show both a geographic grid (latitude/longitude) and a UTM grid (kilometres), allowing the user to determine precise positions.

What is scale?

Maps are made to scale. In each case, the scale represents the ratio of a distance on the map to the actual distance on the ground. For example, if 2 cm on a map represents 1 km on the ground, the scale would be 2 cm = 1 km, or:

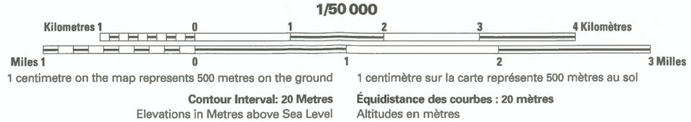
$$\frac{\text{MAP DISTANCE}}{\text{GROUND DISTANCE}} = \frac{2\text{ cm}}{1\text{ km}} = \frac{2\text{ cm}}{100\,000\text{ cm}} = \frac{1}{50\,000} \qquad \text{SCALE} \Rightarrow 1/50\,000$$

Medium-scale maps (e.g. 1/50 000) cover smaller areas in greater detail, whereas smaller-scale maps (e.g. 1/250 000) cover large areas in less detail. Note: A 1/250 000 scale NTS map covers the same area as sixteen 1/50 000 NTS maps.

Reading distances on a map

Use the Scale Bar found at the bottom of every NRCan topographic map to determine distances between points or along lines on the map sheet.

Use the secondary division on the left of the Scale Bar for measuring fractions of a kilometre. (See the scale bar below.)

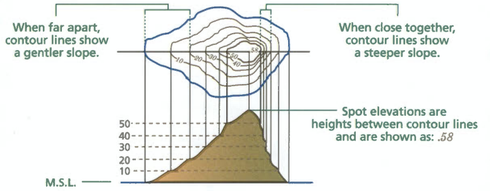


How can I determine where I am on a map? Can GPS be used with a topographic map?

Identify as many features around you as you can, whether cultural or natural, and locate those same features on your map. Then orient the map so that it corresponds to the ground features that you have identified. If you have a Global Positioning System (GPS) coordinate, you can use the geographic or UTM grid reference system on the map to determine where you are.

Location can be obtained very quickly with a GPS receiver. This satellite receiving system displays a position in terms of latitude, longitude, and height, providing you with exact coordinates for map reference. (Some receivers also provide a direct conversion of position to a selected map grid such as UTM.)

What are contour lines?



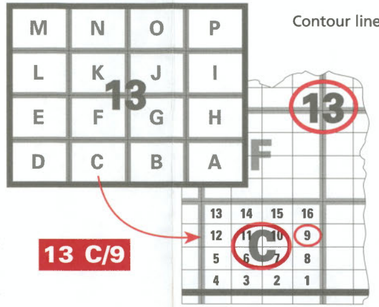
Contour lines connect a series of points of equal elevation and are used to illustrate relief on a map. They show the height of ground above Mean Sea Level (M.S.L.) in either feet or metres and can be drawn at any desired interval. For example, numerous contour lines that are close to one another show hilly or mountainous terrain; when far apart, they indicate a gentler slope.

For additional information please visit the "MAPS 101" section of our Web site:
http://maps.NRCan.gc.ca/maps101/

How are map sheet areas defined?

Topographic maps produced by Natural Resources Canada conform to the National Topographic System (NTS) of Canada. They are available in two standard scales: 1/50 000 and 1/250 000. The area covered by a given map sheet is determined by its latitude and longitude.

The 1/250 000 scale maps are identified by a combination of numbers and letters, from "A" through "P" (e.g. 13C). The 1/250 000 blocks are divided into sixteen segments (1 to 16), forming blocks used for 1/50 000 scale mapping (e.g. 13C/9 identifies Little Drunken River, Newfoundland).



How do I know which map sheet I need?

To order an NTS topographic map, you must know either the location (latitude/longitude) or the name of your area of interest (e.g. a major city, or a large body of water). You may also order by map sheet number. Index maps are available from local map dealers, at Map Libraries across Canada, or Natural Resources Canada.

Where can I purchase topographic maps?

We recommend the purchase of NTS maps from any of over 900 map dealers across Canada and the USA. To find map dealers in your area, please consult the Yellow Pages under "MAPS". If there are no local dealers accessible to you, or if your local dealer does not carry the maps you require, please contact any of our Regional Distribution Centres listed on our Web Site at **http://maps.NRCan.gc.ca/cmo/**

Your Local Dealer

Topographic terms often used

Bearing: The horizontal angle at a given point, measured clockwise from magnetic north or true north to a second point.

Classified roads: Roads for which surface type, width and use are identified.

Contour lines: Lines on a map connecting points of equal elevation above Mean Sea Level; using contour lines, relief features can be profiled into a three-dimensional perspective.

Elevation: Vertical distance from a datum (usually mean sea level) to a point or object on the earth's surface.

Horizontal datum: The positional reference or basis for the geographic location of features on a map.

Magnetic north: Direction to which a compass needle points.

Mean Sea Level: The average height of the surface of the sea for all stages of tide, used as a reference surface from which elevations are measured.

Projection: Geometric representation of the curved surface of the earth on a flat sheet of paper.

Relief: The physical configuration of the earth's surface, depicted on a topographic map by contour lines and spot heights.

Spot elevation: A point on a map where height above Mean Sea Level is noted, usually by a dot and elevation value; it is shown wherever practical (road intersections, summits, lakes, large flat areas and depressions).

Topography: Surface features both natural and cultural, collectively depicted on topographic maps.

Unclassified roads: Roads for which the surface is unidentified.

Universal Transverse Mercator (UTM) Grid: A square grid system based on the Transverse Mercator projection, depicted on maps. It can be used to accurately locate the position of features on the map by distance or direction.

Vertical datum: The reference or basis for elevations (usually Mean Sea Level).

Tips for using NTS maps

• Know what map scale you're using in order to measure distance. Refer to the scale bar at the bottom of the map.

1/50 000 ⇨ 1 cm = ½ km	1/250 000 ⇨ 1 cm = 2½ km

• A legend explaining the symbols used is provided on the back of an NTS map for easy reference.

• Using a compass along with a topographic map ensures an exact direction for locating features. An approximate but quick way to orient your map is to align the compass needle (when it is pointing north) with the top of the map. Remember that north is always at the top of an NTS map.

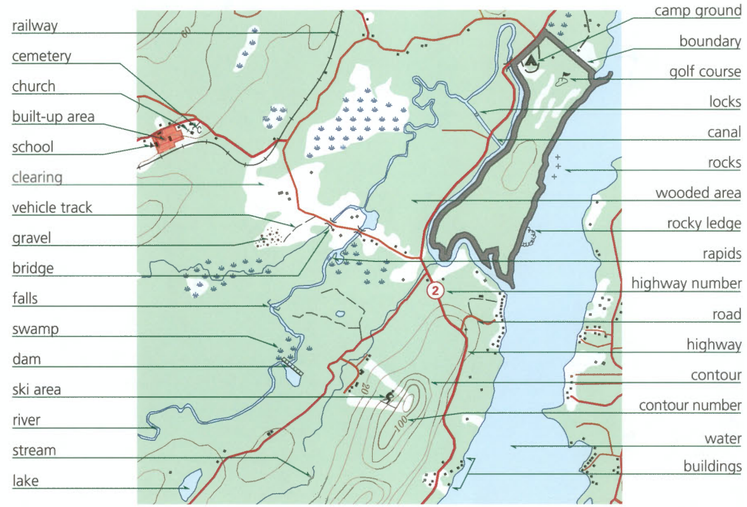
• A map is oriented when it is made to correspond to the ground features it represents. If you know your location and can also identify the position of a distant object, you can orient your map by turning it so it corresponds to the ground features.

• Use contour lines to determine elevations of mountains and flat areas. The closer together the lines are, the steeper the slope.

• Note that contour numbers are often positioned differently, since they indicate the direction of elevation by always reading (pointing) uphill.

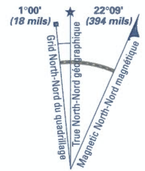
• Some water feature symbols also reveal water flow direction (e.g. direction of flow arrow in rivers, falls symbols pointing downstream).

Common 1/50 000 map symbols



Navigating with a compass and a topographic map

• Navigating by compass requires determining bearings with respect to true or grid north from a map sheet and converting them to magnetic bearings for use with a compass. One way of doing this is given in the following steps.



1• Place the compass on the map with the direction-of-travel arrow pointing along the desired line of travel.

2• Rotate the compass dial so that the parallel lines within the capsule line up with the grid lines on the map. Convert the grid bearing to a magnetic bearing using the information given (as in the accompanying diagram) on the map sheet. If declination is west, add it to the grid bearing; if declination is east, subtract it from the grid bearing. Adjust the dial to read the value of the magnetic bearing opposite the direction of travel arrow. Make certain to account for the difference between grid north and true north.

3• Now pick up and rotate the whole compass until the red end of the needle points to the north marker on the dial. The direction-of-travel arrow on the compass card will point to your destination. Choose a landmark in that direction and walk towards it.

Material provided courtesy of the National Geomagnetism Program, Geological Survey of Canada. **http://www.geolab.NRCan.gc.ca/**