

Section A

Introduction to Reading Tactual Maps

INTRODUCING MAPS

Maps are accurate but much-stylised pictures of where places and things are located on the earth's surface.

We need maps to communicate information about where such features are actually located and their spatial relationships with other places and things.

Maps are essentially graphical drawings even though they do sometimes include words, for example place names. Because they are always very small compared to the actual area of the earth's surface they represent, maps have to be much simplified and entirely codified. This need to compress and codify information, by symbolism, on a small area of paper has led to the development of the graphical 'language' of cartography.

We have to learn this 'language' of cartography before we can 'read' a map.

The contents of this section will provide you with an understanding of the cartographic language and principles upon which the maps in this Atlas are based.

Before attempting to read any maps, it will be beneficial if you understand some basic mapping concepts and conventions, and learn to adopt systematic reading strategies. These are described in detail in the companion volume '*A Map User Guide to Reading Tactual and Low Vision Maps*' and summarised later in this section. Initially, however, you should understand that:

- A map is a bird's-eye view depicted on a flat surface.
- Mapped size and distance relates to real world size and distance.
- Mapped shape relates to real world shape.

- Map direction relates to direction in the real world.
- Map symbols usually represent real and tangible features of the earth's surface.
- Lines on a map signify continuity, even through changes in direction and intersection with other symbols.

The cartographer's first problem is that the earth's surface is curved but the paper on which the map is to be drawn is flat. While this is not a great problem for maps covering small areas, it is a paramount concern for maps of large areas and, especially, world maps.

To help overcome this problem, cartographers have devised methods for projecting lines drawn on the surface of a globe onto the flat map surface. These 'map projections', as they are known, are at best compromises between distortions of shape, scale and direction.

For efficient map reading, skills which need to be developed include:

- Systematic scanning and perception of map data

- Use of map scale
- Map and user orientation
- Use of map reference systems
- Symbol recognition and discrimination
- Shape (outline) recognition
- Tracing line symbols

MAP SCALE

Map scale is the ratio between a distance on the map and the corresponding distance between the same two points on the ground. Map scale can be expressed in the following ways:

SCALE STATEMENT

Sometimes a map scale is described in words and numbers. For example, 1 centimetre equals 1000 kilometres or 1 centimetre to 1000 kilometres. This means that 1 centimetre on the map represents 1000 kilometres on the earth's surface.

GRAPHIC OR BAR SCALE

A line or bar marked at regular intervals to enable readers to measure distances between points on the map to be measured directly in the ground distances they represent is known as a graphic or bar scale.

Find the scales in the lower left-hand corner of Maps 1 and 2. These are examples of bar scales.

REPRESENTATIVE FRACTION

Map scale is commonly expressed as a 'representative fraction' (RF for short), in which map distances are expressed as ratios of real distances, for example 1:10 000. This means that 1 mm or 1 cm on the map represents 10 000 mm or 10 000 cm respectively on the earth's surface. Stated another way, a map drawn 1000 times smaller than that part of the earth's surface it represents would have an RF scale of 1:1000.

The representative fractions for most of the maps in this Atlas are 1:17 million and 1:31 million.

You will often encounter the terms 'large scale' map and 'small scale' map. A large scale map is a detailed map of a small area, for example a town map, whereas a small scale map is a map of a large area in less detail, such as the maps of Australia in the Atlas.

MAP DIRECTION

Map direction relates to direction in the real world and is usually described in terms of the four main points of the compass — north (N), south (S), east (E) and west (W). These four points can be subdivided into a further four points half-way between, for example, south-east (SE) which is half-way between south and east, north-east (NE) half-way between north and east and so on. The diagram at the top of Map 1 shows these eight main points of the compass.

It is standard practice to have north at the top of a map. South is therefore towards the bottom, east towards the right-hand edge and west towards the left.

MAP REFERENCE SYSTEMS

These enable the reader to easily describe or find the location of a feature on a map. The best known and most universal geographic reference system is 'latitude and longitude', which is depicted on Map 8 and described in its accompanying text.

For ease of use, map pages in this Atlas have a simple alphanumeric grid represented by ticks labelled with letters and numbers around the edge. The letters start at the top left corner and run across the top of the page. The numbers also start at the top left corner but run down the page.

To find a particular point on the map you should:

- (1) Find the letter at the top of the page and draw an imaginary N-S line down the page.
- (2) Find the number on the left-hand edge of the page and draw an imaginary line E-W line across the page.

- (3) The area you are searching for is where these two lines intersect.

On Map 3 *Australia-Capital Cities* find Sydney, which is located at H5.

MAP SYMBOLS AND LEGENDS

Maps as graphic systems of communication use a variety of symbols to represent data. These symbols are the language of maps and can be divided into three types:

POINT SYMBOLS

Point symbols are used to represent features or data at specific locations. Circles, crosses and squares are examples of point symbols used in this Atlas to locate towns, points of interest, mountain peaks, etc.

LINE SYMBOLS

Lines are used on maps to depict linear features. In this Atlas continuous or broken lines are used to represent features such as coastlines, borders, rivers and roads.

AREA SYMBOLS

Area symbols are used to depict features which cover areas too large to be mapped by point symbols. Distinctive patterns and textures, usually bounded by a continuous line, are used to represent areas in this Atlas, for example parts of the country with a particular type of vegetation or rock type.

Individual maps can include one, two or even all three types of symbols.

A map legend is a list of the symbols used on a map together with simple statements explaining what each symbol represents. It allows you to decode the map. In this Atlas letters or numbers are often used on the map area instead of complete place or feature names to save space and minimise congestion. In these cases a list of letters and numbers and features they represent will also appear in conjunction with the legend.

GENERALISATION OF MAP DETAIL

While map scale is the relationship between distance on a map to the same distance in reality, it also dictates the amount of detail which can be depicted on a map. As the scale becomes smaller, the amount of detail which can be depicted decreases. Maps which include too much detail become cluttered and are difficult to read.

Simplification and selection of features are the techniques used to ensure that maps retain the desired information but remain readable. This process is known as 'generalisation'.

Cartographers simplify data by smoothing out lines and making shapes less complex so they are more easily read; by aggregating data so that a number of small features are represented by a single symbol; and by grouping categories of data to reduce the number of categories shown.

Selection is undertaken by first organising data in order of importance, then omitting or amalgamating the least important as map scale decreases. For example, a large scale map may show six categories of roads whereas a map of the same area at a much smaller scale may show only the two most important categories, or combine all six into only two categories.

The size of braille lettering and the need to leave enough space between features on tactual maps so they can be identified by touch further limits the amount of detail which can be included. In some cases this necessitates shifting the position of features slightly to ensure clarity.

As map scales in this Atlas are very small indeed — mainly 1:17 million and 1:31 million — information is very much generalised. Nevertheless, important relativities are maintained and comparison of data on different maps remains valid.

STANDARD ABBREVIATIONS

Throughout the Atlas you will find the following standard abbreviations used on many of the maps and in the accompanying text.

DIRECTION

N	North
S	South
E	East
W	West
NE	North-east
SE	South-east
NW	North-west
SW	South-west

AUSTRALIAN STATES AND TERRITORIES

- Q Queensland
- NSW New South Wales
- ACT Australian Capital Territory
- V Victoria
- T Tasmania
- SA South Australia
- WA Western Australia
- NT Northern Territory

DISTANCES AND MEASUREMENTS

- mm Millimetre
- cm Centimetre
- m Metre
- km Kilometre
- sq m Square metre
- sq km Square kilometre
- L Litre
- ML Megalitre
- C Celsius

MAP READING STRATEGIES

Maps, like books, should be read systematically. A mental image of a whole tactical map can only be achieved by acquiring map information piece by piece and building it into a complete picture. This will require concentration and practice on your part, but if you adopt a systematic approach the building of such an image will be made easier.

The following is a recommended sequence of reading:

1. Scanning the Map

A preliminary scan of the whole map will provide you with a picture of its general layout and contents. The scan should be done carefully and systematically, covering all parts of the map.

Experience has shown that an effective scan can be achieved by using both hands simultaneously to scan in vertical strips from top to bottom. Using three fingers on each hand gives a six-finger wide perceptual window and covers the whole map in relatively few scans. Using six fingers also helps in the recognition of linear features and their orientation.

Users accustomed to reading braille horizontally will need to adapt to vertical scanning but will find the result rewarding when used on tactual maps.

It may be necessary to repeat the scan to achieve even a broad understanding of the map but having gained a generalised mental picture you can next consider the best strategy for making a more detailed study of the map, (see 'Reading Map Content' below).

2. Reading Map Title

The map title should be the first item of information you read because it provides a brief description of map content and, when read in conjunction with map scale, can indicate the extent of the mapped area. In general, map titles in this Atlas are found at the top left corner of the page.

3. Determining Map Scale

Most of the maps in Sections B and D have a bar scale, which is almost always located in the bottom left corner of the page.

In order to conserve space for legends and other notes, the scale is not given on the single maps of Australia at 1:17 million scale or on the pages with two or more maps of Australia at 1:31 million scale in other sections of the Atlas. It is expected that, having read the general reference maps, you will be familiar with maps at these 'standard' scales.

4. Reading Map Legend

Locate the legend and familiarise yourself with what has been mapped and how it has been depicted. In this Atlas, legends are generally located on the left-hand side of the page but when they are too large, or additional data is in list form, the remainder of the information will appear on the following page.

Knowledge gained from reading the map title, scale and legend is essential for understanding map content.

5. Reading Map Content

Tactual perception of a whole map can only be achieved by exploring small parts of the map and fitting them together into a coherent whole. Map detail, however, comes in a variety of forms and patterns which can be difficult to break into pieces suitable for tactual exploration and memorising.

Furthermore, different map types can lend themselves to different strategies for reading.

The following hints will be helpful when you are reading the maps in this Atlas:

Maps which depict data by the use of lines, for example rivers or roads, may best be explored by tracing the length of individual features and relating them to State borders and/or the coastline.

Area data such as soil types and rainfall distribution may best be explored category by category, again using the familiar shapes of coastal features and perhaps also State borders to establish a mental picture of their distribution.

Successful map reading will depend a great deal on the ingenuity of readers to break data into parts which can be explored, memorised and put together into a meaningful whole.