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CHAPTER 2

CLIMATE AND ENVIRONMENT

Queensland occupies nearly a quarter (22.5%) of Australia and extends from 10°S to 29°S. Its climate and terrain vary widely. Weather conditions ranging from hot and dry in summer in the west to frosty in winter on the Darling Downs, together with frequent natural disasters such as floods and cyclones, made Queensland hazardous for Aboriginal groups and early European settlers and continues to make environmental management difficult.

The environment is constantly changing. Certain species of fauna such as giant herbivores, including a kangaroo, koala and wombat, and the diprotodon, the largest ever marsupial, are now extinct while other species are endangered or vulnerable. The coastline continues to change; for example, in 1898 the sea broke through the 50-metre wide isthmus at Jumpinpin, creating North and South Stradbroke islands. The greenhouse effect is expected to cause temperatures to increase and the sea level to rise in coming decades.

GEOGRAPHY

Area

Queensland occupies the north-eastern part of the continent and has an area of 1,727,200 km² (table 2.1). It is the second largest of the six States of the Commonwealth of Australia, covering 22.5% of the country. It has the largest habitable area of any State, with about one-third of the total occupied area of Australia. The State has a continental coastline of 7,400 km, and 9,800 km including the islands. The greatest distance from north to south is 2,100 km and from east to west 1,450 km.

Queensland is larger than the combined areas of France, Germany, Italy and Spain and nearly five times the size of Japan (table 2.2). However, the State has a population density of two persons per square kilometre, compared with 335 for Japan, 238 for the UK and 278 for India. Situated between 10°S and 29°S, Queensland is in latitudes similar to those of Mexico, Egypt, India and Thailand in the northern hemisphere.

Of the 1,727,200 km² of land in Queensland, 1,564,500 km² (90.6%) is private land, 120,500 km² (7.0%) is public land, and 42,200 km² (2.4%) is Aboriginal and Torres Strait Islander land excluding freehold owned by individuals. Private land comprises 939,300 km² of crown leasehold
Table 2.1 Area and length of coastline by State and Territory, Australia, 1996

<table>
<thead>
<tr>
<th>State/territory</th>
<th>Area km²</th>
<th>Proportion of Australia’s area %</th>
<th>Length of coastline km</th>
</tr>
</thead>
<tbody>
<tr>
<td>New South Wales</td>
<td>801,600</td>
<td>10.4</td>
<td>1,900</td>
</tr>
<tr>
<td>Victoria</td>
<td>227,600</td>
<td>3.0</td>
<td>1,800</td>
</tr>
<tr>
<td>Queensland</td>
<td>1,727,200</td>
<td>22.5</td>
<td>7,400</td>
</tr>
<tr>
<td>South Australia</td>
<td>984,000</td>
<td>12.8</td>
<td>3,700</td>
</tr>
<tr>
<td>Western Australia</td>
<td>2,525,500</td>
<td>32.9</td>
<td>12,500</td>
</tr>
<tr>
<td>Tasmania</td>
<td>67,800</td>
<td>0.9</td>
<td>3,200</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>1,346,200</td>
<td>17.5</td>
<td>6,200</td>
</tr>
<tr>
<td>Australian Capital Territory (a)</td>
<td>2,400</td>
<td>—</td>
<td>35</td>
</tr>
<tr>
<td><strong>Australia</strong></td>
<td><strong>7,682,300</strong></td>
<td><strong>100.0</strong></td>
<td><strong>36,735</strong></td>
</tr>
</tbody>
</table>

(a) Length of coastline refers to Jervis Bay.

Source: ABS, Year Book, Australia, 1996, p. 3.

Table 2.2 Area, population and population density, Queensland and selected countries, 1996

<table>
<thead>
<tr>
<th>Queensland and selected countries</th>
<th>Area '000 km²</th>
<th>Population million</th>
<th>Persons per km² number</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>3,288</td>
<td>913.1</td>
<td>278</td>
</tr>
<tr>
<td>Argentina</td>
<td>2,767</td>
<td>32.6</td>
<td>12</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1,919</td>
<td>191.4</td>
<td>100</td>
</tr>
<tr>
<td>Queensland</td>
<td>1,727</td>
<td>34</td>
<td>2</td>
</tr>
<tr>
<td>France</td>
<td>544</td>
<td>57.8</td>
<td>106</td>
</tr>
<tr>
<td>Spain</td>
<td>505</td>
<td>39.1</td>
<td>78</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>462</td>
<td>3.9</td>
<td>8</td>
</tr>
<tr>
<td>Japan</td>
<td>372</td>
<td>124.8</td>
<td>335</td>
</tr>
<tr>
<td>Germany</td>
<td>357</td>
<td>80.3</td>
<td>225</td>
</tr>
<tr>
<td>Italy</td>
<td>301</td>
<td>57.0</td>
<td>189</td>
</tr>
<tr>
<td>New Zealand</td>
<td>269</td>
<td>3.6</td>
<td>13</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>244</td>
<td>58.0</td>
<td>238</td>
</tr>
</tbody>
</table>


Boundaries

Queensland’s boundaries were fixed between 1859 and 1878 by the British Government. The territorial jurisdiction of the colony was recited in the commissions issued to the successive Governors of Queensland. The State’s current land boundaries are shared in the south with New South Wales for 1,625 km, in the south-west with South Australia for 630 km and in the west with Northern Territory for 1,045 km (figure 2.1).
The southern boundary of Queensland was fixed in Letters Patent of 6 June 1859 separating the northern districts from the remaining areas of New South Wales. The boundary extends from Point Danger on the coast at 28°08'S latitude along the McPherson Range, the Great Dividing Range, the Dumaresq River and the Barwan River to 29°S, and then continues due west until it meets the eastern boundary of South Australia at Cameron Corner at 29°S and 141°E longitude.

The western boundary was fixed in Letters Patent of 6 June 1859 at 141°E, but was extended to 138°E to the north of 26°S when Letters Patent of 13 March 1862 was issued. Thus, from Cameron Corner the boundary follows the 141°E longitude north to meet the 26°S latitude at Haddon Corner. It then follows this parallel of latitude westward along the northern boundary of South Australia to 138°E at Poeppel Corner where the boundaries of Queensland, South Australia and Northern Territory meet. The Queensland–Northern Territory boundary then follows the 138°E longitude north to the Gulf of Carpentaria. From the coast, the boundary extends north through the Gulf of Carpentaria to meet the State's northern boundary in the Torres Strait. The western boundary roughly coincides with the limits of profitable occupation of inland Australia, although useful pastoral country stretches in an intermittent belt from the Barkly Tableland in north-western Queensland across Northern Territory to the Kimberley area in the north of Western Australia.

The eastern or maritime boundary as defined in Letters Patent of 6 June 1859 extended along the Queensland coast from Point Danger in the south to 10°S in the north. The islands of the Great Barrier Reef and Torres Strait were excluded. The extension of the western boundary in 1862 brought the islands in the Gulf of Carpentaria to the east of 138°E within the jurisdiction of Queensland. All islands situated off the colony's eastern coast to a distance of 96 km were annexed to the colony by Letters Patent of 30 May 1872.

To protect the inhabitants of islands in the Torres Strait, these islands were annexed to Queensland by Letters Patent of 11 October 1878. The colony's new maritime boundary extended from Sandy Cape on Fraser Island to the outer edge of the Great Barrier Reef and then followed the reef north to Bramble Bay in Torres Strait. The inclusion of the north-western islands of Torres Strait—Saibai, Kaumag, Dauan, Boigu, Aubusi and Moimi—in the annexation of 1878 placed the Queensland boundary within a short distance of the Papua New Guinea coast. The colony's northern boundary turned south-west from Deliverance Island to meet the western boundary at 138°E.

The establishment of a British administration in Papua in 1884 made the location of the Queensland boundary a matter of concern. Several attempts were made to alter the boundary, such as the introduction of the Northern Boundary of Queensland (Alteration) Bill into the Queensland legislature in 1896. With federation in 1901 and a complex procedure for altering a State's boundaries set out in the Commonwealth of Australia Constitution Act 1901, the alteration of the boundary with Papua did not proceed. The Australian administration in Papua did not support a change in the boundary with Queensland when the constitutional position of the State's boundaries was being discussed between 1923 and 1925 by the Commonwealth and Queensland Governments.²

In 1978 the Torres Strait Border Treaty renegotiated the boundary between Australia and Papua New Guinea. The agreement retained Australian sovereignty over the Torres Strait islands and provided for a Protected Zone that permitted continued contact between
Figure 2.1 Map of Queensland

Source: Queensland Department of Natural Resources.
the Torres Strait islands and New Guinea. The treaty also defined a line for seabed and fisheries resources.

The northern Australia (Queensland) boundary is currently shared with Papua New Guinea on the west to 141°E and from that meridian, with Indonesia in Irian Jaya. In the east Queensland shares the boundary with Papua New Guinea in the Coral Sea where the boundary extends south along the 144°E longitude to 12°S. The eastern maritime boundary along the Great Barrier Reef south of 12°S adjoins the Commonwealth Coral Sea Territory which extends from the outer edge of the reef to 156°06'E and from 12°S to 24°S.

**Time zones**

Three time zones operate in Australia: eastern, central and western time. Queensland follows eastern standard time. Prior to 1895 the official time adopted in each colony was for most purposes the mean solar time of the capital city of that colony. In 1892 an intercolonial conference of surveyors was held in Melbourne to consider, among other things, the advantages of introducing a system of standard time. Under this system it was proposed to make the initial meridian that of Greenwich, and to change local standard time by whole hours according to the longitude east or west of Greenwich. Thus, for every 15° in longitude a change of one hour would be required. The minutes and seconds would then be identical in each time zone.

To give effect to this proposal it was suggested that Australia be divided into three zones. The standard times for these zones would be the mean solar times of the meridians of 120°E, 135°E and 150°E, thereby giving standard times of 8, 9 and 10 hours respectively ahead of Greenwich time. Legislation was enacted in each of the colonies. Queensland passed the *Standard Time Act 1894* which provided for the introduction of standard time on 1 January 1895. In 1899 South Australia amended its legislation and adopted the mean solar time of the meridian of 142°30'E as the standard time for that colony, thereby reducing the difference between the standard time for Adelaide and that for the eastern colonies from one hour to half an hour, and losing the great advantage of the system, namely, that the minutes and seconds should be identical throughout the world.  

Daylight saving was first introduced in Australia during World War I for the summer of 1917–18 as an experiment to save energy, but was discontinued after that summer. During World War II daylight saving was re-introduced and operated for three summers. Daylight saving was trialled again in the eastern States of Australia in the summer of 1971–72. Following this trial Queensland alone decided not to continue with daylight saving. The State conducted another trial in the summers of 1989–90 to 1991–92. A task force was established to monitor the trial and to report its findings to the Government. A statewide referendum was conducted in February 1992 which asked voters: ‘Are you in favour of daylight saving?’ Of the 1,636,805 formal votes, 45.5% were ‘yes’ and 54.5% were ‘no’, with the ‘yes’ vote being concentrated in the south-east of the State.

**Physical features**

Queensland, Northern Territory and Western Australia lie in both the tropical and temperate zones. About 54% of the area of Queensland is situated in the tropical zone north of the Tropic of Capricorn (23°28'S latitude) and 46% in the temperate zone. The temperate south-
east is the most densely populated area of the State, while Cape York in the tropical north, and
the west of the State are the least populated areas.

A coastal plain, about 80 km wide in the north and more than 400 km wide at the Tropic of
Capricorn, runs along the entire Queensland coast. The plain is well watered by coastal rivers.
Much of the eastern coastline consists of long sandy beaches. Beach erosion is greatest in the
south-east—along the Gold Coast, and the Sunshine Coast from Caloundra to Double Island
Point—especially during periods of strong south-easterly winds. Sand dunes are prominent
just north of Noosa and on the sand islands such as Fraser, Moreton and Stradbroke.5

The coastal plain is separated from the wide inland plains by the Great Dividing Range
which begins in the Torres Strait islands and follows the eastern side of the continent to
Victoria. Branches of the Great Dividing Range such as the McIlwraith Range on Cape York
Peninsula and the McPherson Range on the Queensland—New South Wales border form a
watershed.

Mountains in Queensland are not high compared with those in other parts of the world. The
State’s tallest mountains are in the north, with Mt Bartle Frere being the highest at 1,622 m
above sea level. Other peaks above 1,200 m are close to the coast near Mossman, Townsville
and Mackay. In the south Mt Superbus (1,381 m) in the Main Range and Mt Barney (1,362 m)
are the two highest peaks.6 Steep escarpments separate the coastal plain from the tablelands,
especially where the range is close to the coast, for example, Atherton Tableland. Some of the
rivers in the north of the State such as the Tully, Barron and Herbert have cut deep gorges into
the escarpment.

The western plains are a distinctive feature of the Australian continent and occupy about two-
thirds of Queensland. They are underlaid by the Great Artesian Basin. The plains are well
suited to cattle grazing but are prone to flooding.

Most rivers on the eastern coast rise in the coastal ranges rather than the Great Dividing
Range. Their course is short and mainly rapid, and they are not suitable for navigational
purposes for any great distance. Rivers such as the Brisbane, Mary, Burnett and Fitzroy require
continual dredging to allow the passage of larger vessels. The largest rivers on the Queensland
coast are the Fitzroy and the Burdekin. The Fitzroy discharges into Keppel Bay and the
Burdekin into Upstart Bay. Burdekin River tributaries include the Bogie, Bowen, Belyando,
Suttor, Cape, Campaspe, Basalt, Clarke and Star rivers.

The rivers on the western side of the Great Dividing Range are much longer than those on the
coastal side. The inland rivers are useful for water supply but not for navigation. Some of them
form a network of channels in the south-west of the State, an area that has become known as
Channel Country. The inland rivers, from the Condamine and the Macintyre in the east to the
Diamantina in the west, flow south-west into Lake Eyre, Cooper Creek or the Darling River,
although some rivers end in the western Queensland salt lakes. The State’s largest lakes are
Galilee and Buchanan in central Queensland, both of which are salt lakes.

The 2,300 km long Great Barrier Reef was formed by coral and algae on the continental shelf
off Queensland’s eastern coast. The width of the reef varies from 19 km in the north near
Cooktown to 240 km at Rockhampton. The reef is actually a complex system of 2,900 separate
reefs, islands and shoals and is widely recognised as one of the wonders of the world. It covers
a vast area of shallow water and provides many different habitats for a wide variety of fish and
invertebrates. These habitats include sheltered lagoons with sandy floors, isolated patch reefs and coral lumps, reef crests with well-developed coral fauna exposed at low tide, spur and groove formations, shallow seagrass and algal beds in the lagoons or between reefs, and soft sand and live coral bottom areas in the deeper water between the reefs. The Great Barrier Reef Marine Park is the largest marine park in the world, covering 344,000 km\(^2\), or 99\% of the reef's area.\(^7\)

**CLIMATE AND WEATHER**

**Recording the weather**

The Queensland Government appointed a meteorologist in 1866. A colonial weather service was established in 1887, headed by Clement Wragge. Highly influential in the development of weather services in the colony, Wragge held this position until 1903. He was succeeded by J. B. Henderson, a hydraulic engineer, who remained in the position until 1908 when the weather service became a federal responsibility and H. A. Hunt was appointed Commonwealth meteorologist.

The number of weather collection stations in Queensland grew rapidly in the 1880s and 1890s. In 1896 there were 504 stations throughout the colony. By 1901 there were 601 stations, and 803 by 1913.\(^8\) As Thornhill Weedon explained in 1897:

> Queensland is intersected by a comprehensive system of climatic stations supplied with first-class instruments suited to the classification of each. The greater number of the observers are government officials—generally belonging to the Post and Telegraph Department—although some are private citizens. In most cases observations are taken thrice daily, and even more frequently (self-recording instruments being provided), and the results reported to the head office chiefly by wire.\(^9\)

The *Commonwealth of Australia Constitution Act 1901* provided for the federal control of meteorological services. The *Meteorological Act 1906* (Cwlth) empowered the Commonwealth meteorologist to take and record meteorological observations; forecast the weather; issue storm warnings; display weather, flood, frost, and cold wave signals; and distribute weather information. The Act also empowered the Governor-General to enter into an arrangement with the Governor of any State in relation to matters such as the transfer to the Commonwealth of any observatory as well as instruments, books, registers, records and documents used in meteorological services, and the taking and recording of meteorological observations by State officers.\(^10\)

In 1996 the Bureau of Meteorology had a network of about 6,000 weather recorders across Australia, including about 2,000 in Queensland. About a third provide data to the bureau daily. The bureau processes the data and produces weather reports for newspapers, television and radio.\(^11\)

**Variations across the State**

The climate in Queensland varies markedly, ranging from the hot arid south-west bordering on the Simpson Desert in central Australia to the warm wet tropical coastal belt and the more temperate southern inland agricultural areas where rainfall is moderate and occasional winter frost occurs.