

Chapter 2: A description of the Gold Coast area

This chapter presents a general description of the Gold Coast. This provides a background against which the data that are presented in the following chapters can be viewed. The following information summarise the unique position the City of Gold Coast holds in Southeast Queensland and highlights the responsibilities the Council and Community have as they manage the City's development.

2.1 A brief history of human settlement and land use on the Gold Coast

Today, the Gold Coast is a city of some 350,000 people and occupies 145,100 ha (1,451km²) of Southeast Queensland; from the QLD-NSW border in the south, to the Logan River and Southern Moreton bay in the north, and from the coastal beaches in the east to the crest of the McPherson and Darlington Ranges in the west. Figure 2.1 shows the area of the City of Gold Coast and its population centres.

For many thousands of years the Gold Coast area has been the traditional home to some 4000 Aboriginals (Jones 1988 p.18) of the Yugambeh language group. The group was represented in the Gold Coast mainly by the Wangerriburra (Albert Tribe), the Kombumerri (Nerang), the Bullongin (Coomera), Minjunbal (Tweed), Birinburra (Numinbah), and the Gugingin (Logan) family groups (Jones 1988). The population of Aboriginals on the Gold Coast had declined from these earlier times to a present population of around 1600 in 1991 (Taylor 1996).

Since the 1820s timber getters were moving into the area from northern NSW seeking red cedar (*Toona ciliata*). However, by the 1860s settled agriculture was emerging along the rivers. The major crop was sugar but cotton was also grown. The failure of cotton production and the crash of the world sugar price in the 1890s saw both of these land uses decline and dairying increase. This brought a need for more pasture which led to extensive clearing of the native bush. Consequently by the turn of the century significant areas of the vegetation in the hinterland had been cleared with the exception of more remote or inaccessible areas.

During this period of development the waterways of the coast were considered vital transport links for the local economy. They were used to transport the timber and produce to markets in Sydney and Brisbane. Townships began to grow at key junctions of the river and local roads, such as Nerang and Beenleigh, and with the ocean, Southport and Coolangatta).

In this agrarian society the coastal beaches and coastal heath (wallum) were considered unproductive and of little value. However, from around the 1890s to the early part of the 1900s the Gold Coast was emerging as a tourist destination. This was partly due to the patronage of the area by the Governor of Queensland and an increasing recognition of the natural assets of the area for bushwalking and surfing. Popular resort areas were Burleigh Heads, Coolangatta, Southport and emerging was the settlement of Elston, later renamed Surfers Paradise.

Land was advertised for sale in the Surfers Paradise Estate in 1917, some blocks with ocean frontage and others with deep-water frontage onto the Nerang River. From around this point in time, water-based recreation in particular, and the environment in general, appear as key elements to the economy of the area.

2.2 Landscapes and soils (geology and geomorphology): Some very ancient history

2.2.1 Landscapes

The topography of the Gold Coast consists of a coastal plain that includes beaches and dunes, river deltas, bays, estuaries and wetlands, rolling foothills and low mountain ranges. Much of the eastern portion of the City is coastal plain (less than 10m above sea level). The topography rises through rolling foothills to the scarps of the ranges to the west (up to 1010 m above sea level at Springbrook). This range of altitudes and range of soil types on the coast combine to produce a diverse range of habitats which underpin a unique environment.

The geological history of the Gold Coast describes the formation of the landscapes and the soils of the area. This soil is the medium upon which plants grow and habitats form. Over the last 300-400 million years before present (MYBP) the area went through five phases including periods of volcanic activity (c. 400 MYBP) followed by changes in the crust of the earth at the edge of Australia (folding and uplift of -shore sedimentary beds - c. 300 MYBP), a stable sedimentary period followed by more volcanic activity (c.225 MYBP), and finally a second sedimentary phase. This last phase has persisted to date.

Three to four hundred million years ago (toward the end of the Devonian period) the area of the Gold Coast lay in the deep ocean off Australia's continental shelf. Sediments, eroding from the volcanic mountain chain along the east coast (now the area west of Dalby), were being deposited into the deep ocean and transformed into meta-sedimentary rock.

Around 300 million years ago these rocks were uplifted to form the "Neranleigh-Fernvale beds" which are now exposed over most of the eastern hilly part of the Gold Coast (Willmott 1992). Similar rocks are reported as far north as Yeppoon in central Queensland and as far south as Ballina in New South Wales (Willmott 1992). These sedimentary beds consist of hard metamorphosed sedimentary rocks such as argillite, greywacke, quartzite, greenstone, chert, shale, and conglomerate. These rocks have weathered to form moderately fertile soils.

After a period of relative stability a second series of eruptions occurred (the Chillingham volcanics) some 225 million years ago. This activity covered parts of the Neranleigh-Fernvale beds. These volcanic rocks are now exposed on the western fringe of the Neranleigh-Fernvale beds between Mt. Tamborine, Canungra and the Numinbah valley. However, they extend far to the west, buried deep below sediments that were laid down subsequently (Willmott 1992).

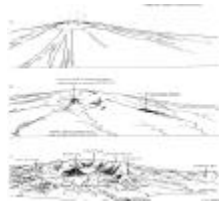


Figure 2.2 : The formation of the current Gold Coast landscape.
(from Willmott 1992, reproduced with the permission of the author)

These rocks consist of basalt, rhyolite, agglomerate, tuff and perlite. Since 1953 a perlite mine has operated in the Numinbah Valley. Between 215 and 180 million years ago (Jurassic period, the time of the Dinosaurs) to the west of the Gold Coast sediments were laid down that often contain considerable deposits of coal (Ipswich Coal Measures and Walloon Coal Measures) (Willmott 1992). Throughout this period some deposition of sedimentary material on the Gold Coast would also have occurred. However, much of this material would have moved through the coast and been deposited in the ocean.

Around 23 million years ago tension in the earth's crust resulted in a very large volcano forming the Tweed Volcano, centred where Mt. Warning is today. The volcano's peak was estimated to be some 2000M above sea level and flows of highly mobile lava reached the fringes of the volcano as far north as Mt. Tamborine, as far west as Mt. Lindesay and as far south as Lismore. Some of these flows moved down the existing rivers and streams to the east and cooled, level with the existing land surface. Remnants of these 'rivers of rock' remain today, now exposed as ridges and headlands. The basalt caps protected the underlying softer sediments and rock from erosion, while the surrounding land surface was eroded away. One example of this is Burleigh Heads (Willmott 1992). Figure 2.2 shows how the current landscape formed by the progressive erosion of the Tweed Volcano.

The volcano itself cooled and subsequently has been eroded to form the landscape that we have today. Softer rocks eroded faster than harder rocks causing valleys and ridges to emerge. For example, the Binna Burra rhyolite has been particularly resistant to weathering and forms the prominent cliff lines around the Springbrook and Binna Burra areas. Some rocks weathered in-situ to form soils, or were buried under sediments from hillsides (Colluviation) or from rivers and streams (Alluviation). Mt. Warning (approx. 1000M) is the remaining hard core of the original volcano and was deep below the summit.

2.2.2 Soils

There have been a number of surveys describing the soils of coastal region south of Brisbane, Queensland (Beckman 1967, Franks 1971, Beckmann and Reeve 1972, Holz 1979, Forster 1989). However, none of these studies covered the entire area of the Gold Coast or recognised acid sulphate soil areas, and all omitted the urban area from the study. None-the-less Franks (1971) provides the most detailed at a scale of 1 inch to the 2 miles approximately 1:100,000 scale.

In 1996 a complete land resource map for the Moreton region, including the Gold Coast, was completed at a scale of 1:250,000 (Noble 1996). While this study also excluded the urban areas it provides the most current and complete coverage for the area.

Figure 2.3 presents the land resource information for the Gold Coast from Noble (1996). Noble describes pockets of highly fertile red volcanic soils (Krasnozems derived from the basalt of the Tweed volcano) mainly on the elevated plateaux of Tamborine, Beechmont, and Springbrook.

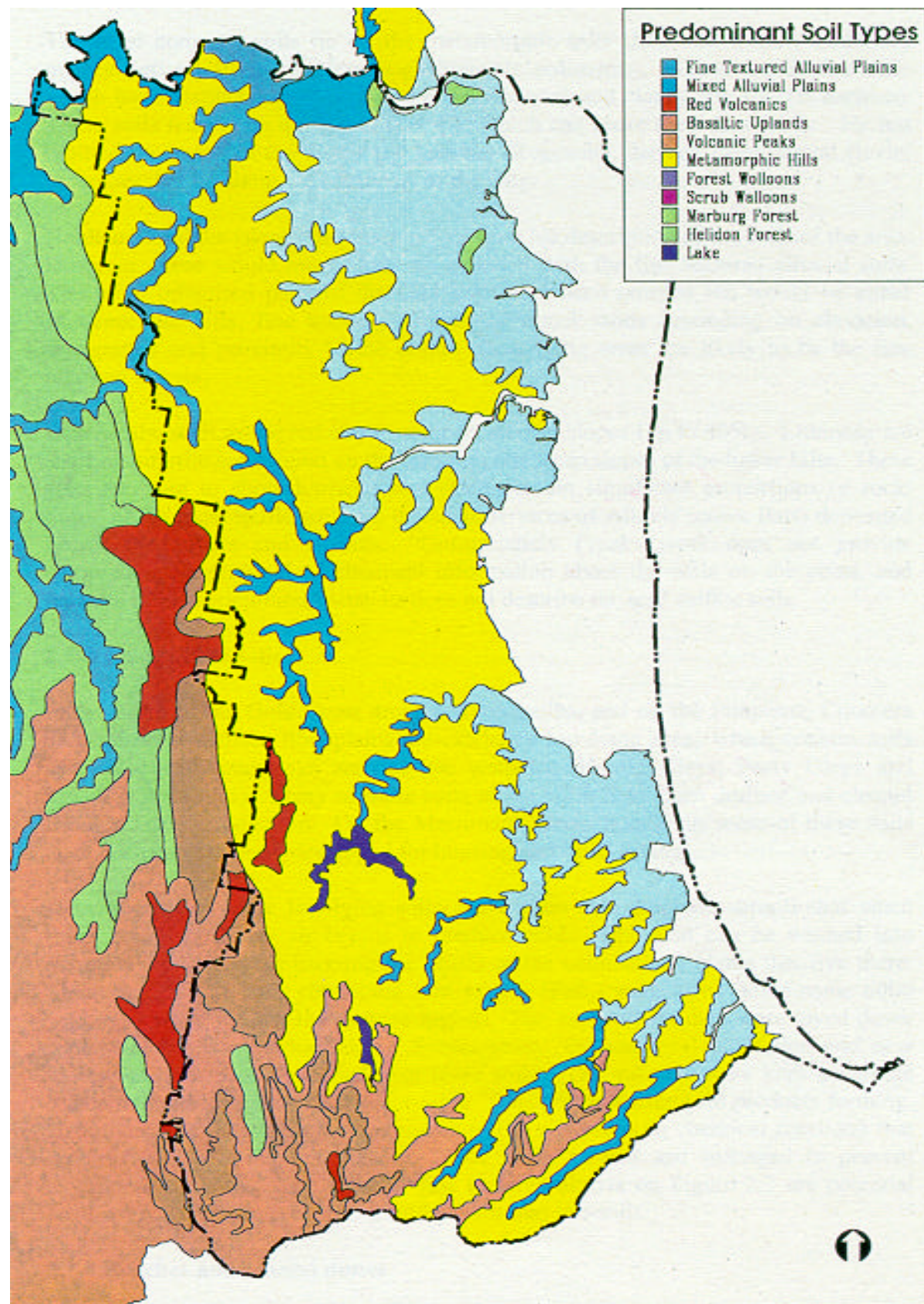


Figure 2.3: Land resource areas of the City of Gold Coast
(compiled by Forster and Harms in Noble 1996, reproduced with the permission of the Queensland Department of Natural Resources).

The most common soils lie on the metamorphic hills (Red and Yellow Podzolics mainly derived from the Neranleigh-Fernvale sediments). These are duplex soils which have distinct loamy surface-soil (A horizon) and clayey sub-soil (B horizon). These soils tend to be quite acid (pH 4.5) which can make them less fertile. He has omitted the sands of the dunes and beaches (Regosols), derived from coastal fluvial processes that lie along the east coast of the City.

Noble omitted the islands in Moreton Bay from his description of the soils of the area. However, these would most likely be included with the fine textured alluvial soils. The more urbanised parts of the City have also been omitted but would be either Metamorphic hills, fine textured alluvia, or dunal sands depending on elevation, topography and proximity to the ocean. Low lying areas are likely to be the fine textured alluvia.

Other soils, such as the red clays, occur on steeper slopes (up to 40%). Lithosols are shallow infertile soils found on the summits and steep slopes of the lower hills. These soils tend not to show horizons and often contain significant proportions of rock. Some of the most fertile soils are the small terraces of Alluvia (creek flats) deposited beside the Rivers and streams. Unfortunately Franks work does not provide comprehensive physical or chemical information about the soils on the coast, and because of his agricultural focus, he does not describe the acid sulfate soils.

2.2.3 Acid sulfate soils

In the north of the Gold Coast around Woongoolba, and on the Pimpama, Coomera and Merrimac/Carrara floodplains are extensive low-lying areas which contain soils associated with mangrove and tea-tree wetlands (Humic Gleys, Peaty Gleys and Meadow Podzolics). Many of these soils in the north have been drained and cleared for sugar-cane production. On the Merrimac/Carrara floodplain some of these soils have been subsequently developed for housing and canal estates.

Development of these low-lying soils can expose acid sulphate subsoil that when moist and exposed to air begins to produce acid. This acid can be washed into surrounding waterways harming the health of the animals and plants that live there. These acid-sulfate soils containing iron pyrites (FeS_2) were laid down some 6000 years ago when the sea levels were higher. The areas where they were laid down were then shallow marine lakes. Subsequently, the sea level has fallen and new sediments have been deposited over these soils. The subsoils were kept anaerobic (oxygen depleted) by the high water-table. This prevented the acid products forming. Disturbance of these soils and exposure to the air results in chemical reactions that produce acid. These acid products need to be treated and managed to prevent environmental harm. The areas of fine textured alluvia on Figure 2.3 are potential areas of the Gold Coast with acid sulfate soils and sub-soils.

2.2.4 Beaches and coastal dunes

The current beaches and dunes of the Gold Coast are a primary asset to the area. They are important to the quality of life of many residents and form the basis to the tourism, recreational and leisure industries that exist in the City. The sand that forms the

beaches of the Gold Coast is eroded from the New England Tablelands of Northern New South Wales.

These sands are then carried north in a longshore current along the coast. This current carries approximately 500,000 M3, net, along the coast each year to form the sandy ocean beaches of Northern New South Wales and Southern Queensland.

The beaches and dunes of the Gold Coast have been highly transformed through clearing and development for both agricultural and particularly urban expansion onto the fore-dunes. In addition to this, many areas along the Gold Coast have been totally disturbed through sand mining. These changes, and the construction of groynes which restrict the northerly flow of sand, have reduced the ability of the beach and dune system to withstand severe storms often associated with cyclones. Consequently, beach erosion is a major issue along the Gold Coast which the Council and Governments from both Queensland and New South Wales seek to address.

2.3 Climate - including rainfall

2.3.1 Rainfall

Average annual rainfall on the Gold Coast varies from around 1500mm on the Coast and in the northern half of the City to as much as 3000mm in Springbrook. Figure 2.4 represents this information as climate zones and Table 2.1 presents the seasonal spread of rainfall for four key stations; Southport, Mt Tamborine, Beenleigh, and Springbrook.

The rainfall varies across the City depending on altitude and latitude. The south of the City receives more rain than the north as the Springbrook plateau contributes to a rain-shadow over the rest of the Gold Coast.

Table 2.1: Rainfall summary data for five key stations in the City of Gold Coast
(source: Australian Rainman v2.2 1996)

Station	Mean annual rainfall (mm)	Maximum annual rainfall on record (mm)	Minimum annual rainfall on record (mm)	Average number of raindays per year
Mt. Tamborine	1550	3644	598	131
Southport	1457	2676	584	121
Beenleigh	1189	2398	390	97
Springbrook	3074	5649	1315	147

2.3.2 Temperature and evaporation

The Gold Coast has a number of rainfall stations. However, long-term records of temperature and evaporation data have only been recorded at three stations, Mt. Tamborine, Southport and Coolangatta.

Table 2.2 presents climate data of maximum and minimum average monthly temperatures and the months those temperatures occur, and the maximum daily

evaporation for Mt Tamborine as representative of the hinterland, and Southport as representative of the Gold Coast.

There are clearly intergrades between these points depending on elevation, aspect and distance from the Coast. It should be noted that Tamborine has a similar average annual rainfall to that of Southport.

Table 2.2: Maximum and minimum average monthly temperatures and evaporation for a hinterland and a coastal location on the Gold Coast

(source: Australian Rainman v2.2 1996)

Location	Average maximum temperature. (oC)	Average minimum temperature. (oC)	Maximum daily evaporation (mm/day, Class A)
Mt. Tamborine	25.6(Dec/Jan)	7.9(Jul)	3.7(Jan)
Southport	28.6(Jan)	9.2(Jul)	4.8(Dec)

Frosts are not frequently observed on the Gold Coast where average winter temperatures do not get below 6°. Frosts have mainly been observed in and around the crests and plateaus of the ranges. While severe frosts (< -2.0° on the ground) have not been recorded by the Meteorological Bureau at Mt. Tamborine although other hinterland locations may be more affected by frost.

2.3.3 Airshed and circulation with seasonal variations

The Gold Coast is affected, at times, by pollution from Brisbane's Central Business District (Boffinger, (1993). However, this is infrequent and restricted to the Coombabah area. Most effects on air quality are believed to be minor and local in origin.

This is mainly due to the fact that the Gold Coast enjoys the favour of daily cycles of wind movement due to the difference in temperature of the land and the sea. However, there are also seasonal variations on the wind direction. These influences combine to give predominant wind directions in the morning and afternoon in summer and winter. These are shown in Table 2.2.

Table 2.2: Dominant wind direction for the Gold Coast

	Summer	Winter
Morning	S to SE	S to SW
Afternoon	NE to SE	SE to W

2.4 Water

2.4.1 Groundwater

The ground water resources of the Gold Coast were identified to be of non-commercial quantity by the Water Resources Commission of Queensland in 1979 and are limited to the dunal coastal areas where a small lens of freshwater overlies the denser salt water. This lens, or aquifer, is fed by rainfall. Groundwater in the coastal areas would supply low yields of good quality water and would be subject to contamination from salt water if withdrawals were excessive.

Council has not conducted regular monitoring of the quality of the groundwater and it has never been recommended for drinking. However, the aquifer has been accessed by spear pumps for irrigation purposes. Evidence of iron staining on driveways and fences suggests the groundwater contains high levels of iron. Additionally, sulphide odours (eg. rotten egg gas) are apparent when using the water.

2.4.2 Streamflow

Streamflow in the Gold Coast changes considerably with the seasons and is typical of a subtropical environment. Most rainfall occurs in the spring and summer months, and much of this in storms. This contrasts with the relatively dry winter months. Consequently, most streamflow occurs in the Spring and Summer, and many minor tributaries and streams are ephemeral and only flow during periods of high rainfall. Environmental flow is that component of streamflow that is required to sustain the ecosystems of the waterway.

2.5 Ecosystem diversity, vegetation cover and species diversity

2.5.1 Ecosystem diversity

The environment of the Gold Coast consists of a wide range of landscapes, habitats, climates and land-uses, ranging from the coastal dunes, mangroves and waterways, through to the canelands in the north, the mountains and rainforests in the west, and the highly urban areas in the south-east. Southeast Queensland and Northeast New South Wales have a high diversity of landscape forms and habitat which contribute to the regions high diversity of native plants and animals. This high level of biodiversity has been compared to that of Queensland's Northern Wet-tropics (Catteral and Kingston 1993 p.3) and recently with Kakadu in the Northern Territory (M. Kingston, Ecograph pers. com.). The reasons for this diversity begins with the formations of the land itself, its geomorphology and its soils, as discussed earlier.

The soils, in conjunction with the climate, support different communities of plants. It is known that the Gold Coast land area was once completely covered with forest and bushland, ranging from coastal wallum (heaths), to mangrove, to open eucalypt woodlands to rainforest. However, through the process of European settlement of the land much of the original vegetation cover of the area has been cleared. Early estimates put the area of remnant bush at 40% (Catteral and Kingston 1993). However, more recent detailed studies have identified approximately 50% of the total City as being covered by remnant bush (M. Maher and associates *et al.* 1997).

The Gold Coast has a diversity of soil types and terrain that provides a number of subtropical ecosystems. These range from marine and estuarine to fresh water ecosystems, and from coastal heaths (wallum) to open forest, to closed forest to rainforest. In addition to these natural ecosystems there exists a number of human land uses such as grazing, agriculture, forestry and various forms of urban development that provide a wider range of ecosystems

This wide diversity of ecosystems in a single region presents a unique combination that supports the high species diversity evident in the City of Gold Coast.

2.5.2 Vegetation cover

Some 50% of the Gold Coast remains under remnant vegetation. The other 50% has been cleared for agricultural and urban development over the past 170 years, with most clearing taking place before the middle of this century. For example, the then land owner, Gooding, cleared Clear Island, which was once a wooded hill in the Clear Island Waters area, in 1915. Since that time significant amounts of natural regrowth has occurred as well as revegetation in urban and rural areas. Current estimates of remnant and regrowth natural bush cover of the Gold Coast approach 52% of the total area.

Despite the level of clearing that has taken place on the Gold Coast, the area still contains a higher proportion of Southeast Queensland's remnant bush (7.6% - Catteral and Kingston 1993) than any other local authority in the region.

This is due to the lower level of broadacre agricultural development that took place on the Gold Coast, the mountainous hinterland, and the recognition of the importance of the areas natural environments. This bushland has often been referred to as the 'green behind the gold' and has been a primary asset for the areas of tourism and recreation since the late 1800s. However, most remnant bush (66% - M. Maher and Associates *et al.*) is held as private land and is not specifically protected as it is in reserves and National Parks.

With the exception of an area behind the Coolangatta Airport, Pine Ridge Conservation Park and South Stradbroke Island itself, little to no coastal heath remains on the Gold Coast. Considerable areas of mangrove exist in the north of the region with remnant communities along parts of the tidal sections of the rivers and creeks.

Significant areas of open forest remain on the rolling hills between the coastal plain and the steeper sections of the mountains. Most of the areas of rainforest that remain are restricted to the National Parks. Interestingly, Antarctic Beech survive on the peaks around Springbrook. These trees are related to the beech trees that once existed in large forests in Antarctica when it, and Australia were a part of Gondwanaland.

This situation provides the City of Gold Coast with a tremendous opportunity for further developing and enhancing our unique lifestyle. It also places a great responsibility on the people of the Gold Coast to understand and manage the development of this resource.

2.5.3 Estuarine and marine systems

The entire drainage of the Gold Coast enters the ocean via its rivers and streams. With the exception of the Tallebudgera, Currumbin and Coolangatta Creeks, which enter the ocean directly, all other rivers and streams enter the Broadwater and Southern Moreton Bay before entering the ocean. All of the rivers and streams form tidal estuaries in their lower reaches. Salt water crocodiles were native to the area with one being caught in the Nerang River as late as 1890 (Jones 1988).

The Tallebudgera creek estuary forms the Southern Boundary for the Burleigh Heads National Park.

Southern Moreton Bay, including the Broadwater, is part of the Moreton Bay Marine Park which was declared a marine park by the State Government in 1993. Within the marine park there a number of Ramsar sites. These sites are recognised internationally as significant wetland areas by a convention signed in Ramsar in 1971. Ramsar is a City in Iran from which the convention took its name.

Coomabah Lake and its surrounding lands have long been recognised for their environmental importance, containing diverse habitats that range from open water, to saltmarsh, to mangrove. The tidal waters of the lake are recognised as a fish sanctuary under the Fisheries Act.

There are some 53km of ocean beaches along the eastern edge of the Gold Coast including South Stradbroke Island. These beaches and the surrounding marine environment are a major natural asset of the coast and underpin much of the tourism industry. While officially the beach below high tide and the offshore reefs fall outside the Council's boundary, they are a natural asset to the area and sustain a considerable range of marine species. Approximately 1600 different marine species have been identified in the waters off the Gold Coast (CFA Fisheries Research Foundation, 1996).

2.5.4 Species diversity

The Gold Coast has been identified as one Australia's most species-diverse regions in Australia, with more species than even Kakadu (M. Maher and Assoc. *et al.* 1997). This was discovered by consultants engaged to develop a nature conservation strategy for the Council. There are over 1550 identified species of native plant, over 323 species of bird, over 105 species of reptiles and amphibians and over 72 species of mammal.

In the past the area south of the Nerang River, the Merrimac/Carrara floodplain, was a large swamp with a number of 'islands'. This was a diverse wetland environment of tea-tree, sedges, heaths, ferns and vines, wallum banksia, she-oaks, some open forests and many areas of deep open water. This was a key area to the local aboriginal people and home to many animal species including the black swan. Remnants of these wetlands still exist in the floodplain. Black Swans can still be found around Carrara.

2.6 Socio-economic

2.6.1 Heritage listed sites, structures and landscapes

The lands and the landscape of the Gold Coast area are considered of heritage and cultural value to all residents. Within this landscape were many significant sites of Aboriginal cultural heritage. Today, due to past developments and practices only some sites remain, such as the Bora Ring at Burleigh Heads and the middens on South Stradbroke Island, and those around the Broadwater and Southern Moreton Bay.

While the Europeans have only been on the Gold Coast in comparatively recent times and many of the original buildings of the coast have been replaced, there are 11 buildings and 12 sites which are listed by either the National Trust or on the State Heritage Register as having heritage value. The buildings range from churches such as the Lutheran Church at Bethania (1872) to the Southport Drill Hall (1890) and the Pacific Cable Station (1902), which has since been relocated to The Southport School, through to the Pimpama and Ormeau War Memorial (1919) and to Kinkabool (1959) the first high-rise holiday apartment on the Gold Coast. Many National Parks, Conservation Parks and Reserves, and one Ramsar site are included in this list, as well as all known sites of Aboriginal heritage.

2.6.2 Environmental impacts on people

The environment of the Gold Coast is a positive part of the lives of people everyday. However, it can have negative impacts in many ways.

Catastrophic impacts, such as cyclones, flooding, bushfire and drought, are largely beyond the control of Council to mitigate. We can only reduce the impacts of these events when they occur through urban planning, building design and construction and infrastructure development. The impacts of these phenomena are only too easily observed on the beaches, along the river, and in the hinterland. The community, including Council, bears much of the cost of repairing the damage.

Less obvious environmental impacts on the City are a direct result of human activities in the ecosystem, coupled with the City's proximity to those ecosystems. For example, mosquitoes have long been associated with the Gold Coast. Much of this association is due to the fact that significant areas of the Gold Coast are adjacent to the mosquitoes' habitat. A second example is provided by the biting midge which causes problems to residents along some waterways. The biology of this species has yet to be fully explored but it is suspected that the materials used in the construction of the beaches in the canals can influence the numbers of this pest (R. Williams, Gold Coast City Council, pers. com. 1997).

2.6.3 Perceptions of people on the environment

There is no data specific to the City of Gold Coast. However, it is reasonable to assume that the population of the City holds similar views to that of Australians in general. The following information is based on Australian Bureau of Statistics data (ABS 1996):

- 70% of people consider environmental protection to be as important as economic growth. This figure has remained static since 1972.
- Since 1992 the number of people concerned about the environment has declined from 75% to 68% (1996).
- Most people concerned with the environment were between 35 and 44 years of age, or were women (except for pollution and land degradation), professionals, high income earners, and people with tertiary qualifications.
- Air pollution was seen as the single most important environmental issue (31% of respondents).
- Only 23% of the people surveyed believed that the quality of the environment had improved over the last ten years. 44% believed that it had declined.

2.6.4 Social

The Gold Coast has been described as a sunbelt city that has developed and grown due to net migration from other areas of Australia, in particular Sydney, New South Wales and Melbourne, Victoria. A significant proportion of migrants are retirees but in recent times there has been an increase in business and tradespeople moving from other parts of Australia to escape economic downturns. The attraction of the coast as a home for many people is its lifestyle, its proximity to a State Capital, its services and its growth rate.

The rapid development of the Gold Coast has led to some recent suburban areas suffering social isolation and a lack of public facilities and transport.

2.6.5 Current population and demographic features

The population of the Gold Coast is approximately 356,571 people (June 1996), with 49% male and 51% female. The population is growing at around 15,000 people (4.8%) a year which is equivalent to the Gold Coast growing by a new city the size of Warwick, Queensland each year. These people will require between 17,000 and 24,000 new dwellings from 1995 to the year 2000. Some 65% of these new dwellings will be separate houses (Taylor 1996).

Like the population of Australia as a whole, the population of the Gold Coast is aging. For example, in 1991 there were 14% of the Gold Coast's people over the age of 65. This compares to 11% of the population over 65 for either Queensland or Australia. This age group is expected to represent between 20.5% and 22% of the population by the year 2041 (Taylor 1996). Some 89% of the Gold Coast's population live in urban areas (A. Taylor, GCCC Demographer pers. com.).

The number of single parent families on the Gold Coast has increased by 86% since 1986. Gold Coast households have become smaller with nearly half (49%) comprised of either one person or a couple with no children. More than 55% of households averaged 2.2 people, or less (Taylor 1996).

Some 1600 Gold Coast residents (0.45% of the population) are of Aboriginal and Torres Strait Islander descent. About 25% of Gold Coast Residents were born overseas with approximately 9% from non-English speaking countries.

2.6.6 Economic

It is difficult to estimate the total size of the Gold Coast's economy and a definitive figure for the gross regional product (GRP) of the Gold Coast has yet to be achieved. However, in the last few years researchers have estimated a Gross Regional Product at \$4,446 million (Raybold 1996) and the size of a number of sectors of the Gold Coast's economy; tourism - \$1,614 million (Raybold 1996), education - \$320 million (Mula 1995), and \$308 million for the community services sector excluding parks and gardens, sport facilities, waste management and environmental protection (\$5m/\$72m 94/95) (Mules 1997).

2.6.7 Industry structure (number of enterprises/type)

There are 17 different types of enterprise on the Gold Coast. Table 2.2 shows the total number per category for the City. Most enterprises on the Gold Coast are in manufacturing, construction, wholesale and retail trade and financial, insurance and property and business services. However, of the rest, only mining, electricity and gas, communication and government represent small numbers of enterprises.

2.6.8 Employment by sector

In 1991, the total labour force of the Gold Coast was 136,556 (56% full-time, 25% part-time, 5% not stated, and 14% unemployed).

Most employees on the Gold Coast (73%) are employed in six main industries, wholesale and retail (21.47%), finance, insurance and property and business services (13.02%), personal and other services (10.31), manufacturing (10.08%), construction (9.95%) and accommodation (8.36%). People employed in the tourist industry are not recorded in a single category but are distributed across many. However, the Gold Coast has a higher proportion of people employed in the construction, wholesale and retail, insurance, finance, and property and business services sectors than both Queensland or Australia in every case.

Fewer people on the Gold Coast were employed in community services than for either Queensland or Australia. There is a higher proportion of unemployed people on the Gold Coast than for Queensland or Australia

Table 2.3 Number and type of enterprises on the Gold Coast
(source : GCCC Ec. Dev. Branch 1996)

Enterprise type	Number of enterprises	Percentage of employed people in 1991
Agriculture, Forestry and Fishing	465	1.25
Mining	58	0.28
Manufacturing	4496	10.08
Electricity, Gas and Water	27	0.42
Construction	2977	9.95
Wholesale and Retail Trade	4517	21.47
Accommodation, Cafes and Restaurants	939	8.36
Transportation and Storage	735	3.92
Communication Services	60	1.22
Financial, Insurance and Property and Business Services	4176	15.84
Government Administration and Defence	46	2.84
Education	256	4.92
Health and Community Services	1124	8.03
Cultural and Recreational Services	467	3.97
Personal and other Services	769	10.31
TOTAL	17812	100.00

2.6.9 Income

In 1991, there was a larger proportion of residents earning less than \$12,000 than in Queensland or Australia. In addition, there was a smaller proportion of residents earning above \$30,000. Family incomes reflect these data. More families on the Gold Coast earn less than \$12,000 than for Queensland or Australia, and fewer families earn more than \$40,000 than for Queensland or Australia.

2.6.10 Council expenditure on the environment

The total budget of the Council for 1995/96 was approximately \$375,500,000. This represents an expenditure of around \$1100 per resident. The Council employs around 2300 staff.

The Gold Coast City Council spends at least 70% of its budget on environmentally related activities. This was identified through an Australian Bureau of Statistics trial survey. The main components of this expenditure are in provision of clean drinking water, and in waste and sewerage services to the community. Fewer amounts were spent on environmental protection and/or repair of environmental damage. Planning of the development of the City is also included as a key area associated with maintaining and protecting the environment. Only around 1% of the Council's budget is spent on protecting and enhancing the natural environment.

2.7 References

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