

3 Metropolitan Adelaide

3.1 Available Information

Mapping Data (GIS)

The State Government's Geographical Information System (GIS) and biological databases have been used to produce the maps and statistics presented in this report. This data has come from various State Government sources. All the datasets are referenced in [Appendix 6](#).

Vegetation Mapping

All vegetation mapping and site data, collected according to the standards of the Biological Survey of South Australia, are held in the Environmental Database of South Australia, (Planning SA/DEH). These data are the primary source of information about plant communities found within the region. This information was supplemented with information on plant communities provided in the published literature.

In addition, the Urban Forest Biodiversity Program is collating information from various published and unpublished community sources.

Native Vegetation Cover

As part of the vegetation survey process for the agricultural regions of SA (Heard & Channon 1997), native vegetation cover is mapped from 1:40,000 aerial photography. Areas five to 10 hectares or larger are mapped (Mount Lofty Region only), with the remaining areas mapped down to one hectare. This provides a spatial layer of information showing where native vegetation is and the size of remnants. This mapping is used to derive the broad area estimates provided in Table 1 (p.6). Following this mapping, the vegetation surveys and floristic mapping take place. Native vegetation cover mapping exists for the entire Adelaide Metropolitan Region. Native grasslands are difficult to map using this technique and are mostly unmapped in the region.

Native Vegetation Survey

Vegetation surveys are conducted in a systematic nature across the agricultural and pastoral regions of the State. Native vegetation survey sites are selected using aerial photography and other known information about an area. Sites are chosen to select the range of vegetation and landform types within a study area. Native vegetation surveys using the Biological Survey of SA methodology (Heard & Channon 1997) have been undertaken across the Southern Mount Lofty Ranges. Vegetation site data from these surveys are available from Planning SA and the Department for Environment and Heritage.

Floristic Mapping

Plant communities in the Southern Mount Lofty Ranges (Goodwins & Stubbs 1998) were mapped from 1:40,000 colour stereo pair aerial photography. As with the vegetation cover mapping areas one hectare or larger are mapped, with some areas only being mapped to five or 10 hectares.

The mapping is based on the site based vegetation survey data, which is analysed using a grouping technique (Belbin 1991) to determine species composition of sites based on both species presence and cover abundance. The plant communities are defined using the analysis groups as a base with further groups added to represent plant communities delineated from aerial photograph interpretation and field checking. Plant communities are mapped using dominant overstorey species (to represent the particular suite of species likely to be found within that community), along with overstorey species height and projective foliage cover to indicate structure.

Plant communities from the floristic mapping (Goodwins & Stubbs 1998), are described along with area estimates and the degree of formal protection of these groups in [Chapter 4](#). A

description of the SA vegetation structural formation definitions is found in [Appendix 7](#).

Planning SA is currently re-mapping the remnant vegetation within the Adelaide region. It is expected that this exercise will consolidate the accuracy of previously collected information pertaining to remnant vegetation in the Adelaide region. A further assessment of vegetation condition for each discrete association would contribute immensely to a clearer picture of where we are now and what we need to do in the future.

Both regional and standard 1:50,000 tile based maps of the floristic mapping are readily available from Planning SA on request.

Floristic mapping for some of the larger NPWSA Reserves exists in GIS format.

In the Southern Mount Lofty Ranges region, much of the native grassland has not been included in this GIS floristic mapping.

Roadside Vegetation

Roadside vegetation has been difficult to map in a standard way due to the difficulty of using conventional aerial photography techniques for mapping narrow linear strips of vegetation. As a result, prior to the last two years, very little roadside vegetation mapping was available in GIS format for the Metropolitan Adelaide Region.

Lack of adequate mapping of native roadside vegetation and its condition has hampered efforts to regionally manage such vegetation effectively.

A methodology to rapidly assess and map roadside native vegetation has been developed by the State Government to survey vegetation on roads managed by Local Government and Transport SA (Stokes *et al.* 1998). The methodology provides for GIS mapping of roadside vegetation and assists in the development of appropriate management guidelines to be determined as a result. A number of roads in the Adelaide Metropolitan

Region have been surveyed using the methodology (see [Appendix 5](#)). For details contact the Geographical Analysis and Research Unit or the Environmental Unit, Transport SA. Interim roadside vegetation survey manuals are available from Planning SA.

Pre-European Vegetation Mapping

Broad mapping (1:250,000) currently exists for the Adelaide Plains (Kraehenbuehl 1996). This mapping provides an indication of broad plant communities of the area and their distribution before clearance. This mapping provides a valuable tool for revegetation projects that aim to try and restore some of the original plants and plant communities of the region. This map is readily available from Planning SA and the Urban Forest Biodiversity Program.

The Pre-European settlement plant communities for the southern Adelaide region are currently being mapped. The use of Pre-European settlement vegetation maps within a biodiversity planning context is extremely useful. Extending this exercise into the Hills Face Zone and beyond would provide valuable information.

3.2 Study Area

The Adelaide region has been described as having probably the richest source of biodiversity in the state before European settlement (Possingham *pers. comm.*). This high biodiversity is a consequence of a high rainfall gradient between the Gulf and the Mount Lofty Ranges (see [Map 1 Appendix 4](#)) and because the region has both coastal and interior elements. Such uniqueness and diversity is underscored by the fact that the Adelaide region supports several animal species at their northern and western limits of distribution (Tyler *et al.* 1976).

As a consequence of this habitat variety, the Adelaide region supported significant percentages of the State's terrestrial plants (30%), birds (58%), terrestrial mammals (32%), reptiles (20%) frogs (22%) and freshwater fishes (20%) in an area that is only 0.15% of the total land area of the State.

While it is unrealistic to aim at restoring all of the lost species, (indeed some are now totally extinct, not just in the Adelaide Metropolitan Area) we can aim to halt the current loss of habitat and therefore species, and to rehabilitate or even restore many areas.

The clearing of vegetation in the Adelaide region commenced with the arrival of the first European settlers. This was largely motivated by the desire to create suitable grasslands for the grazing of stock; to utilise timber for housing, fencing and firewood; and to clear areas for the construction of dwellings and infrastructure such as roads. The early settlers soon recognised the soil types and vegetation assemblages that provided the most productive areas for stock grazing. Consequently, many vegetation assemblages that were seen to be non-productive remained well conserved until only recent times. Kraehenbuehl (1996) indicates that the 'Black Forest' (*Eucalyptus*

microcarpa Woodland) at Goodwood was recognised early in Adelaide's European history as prime grazing land, and therefore the Black Forest was almost totally cleared by 1880. Areas to the North and West of the city (reedbeds, samphire, and coastal dunes) remained largely uncleared until as late as 1950. These areas were rapidly urbanised following the boom period after World War II.

The estimated area of metropolitan Adelaide is about 185,000 hectares.

Figure 1 (p.3) shows that the metropolitan area comprises a variety of different landuses. Land owners are presented with unique challenges when faced with managing remnant vegetation surrounded by a variety of contrasting landuses.

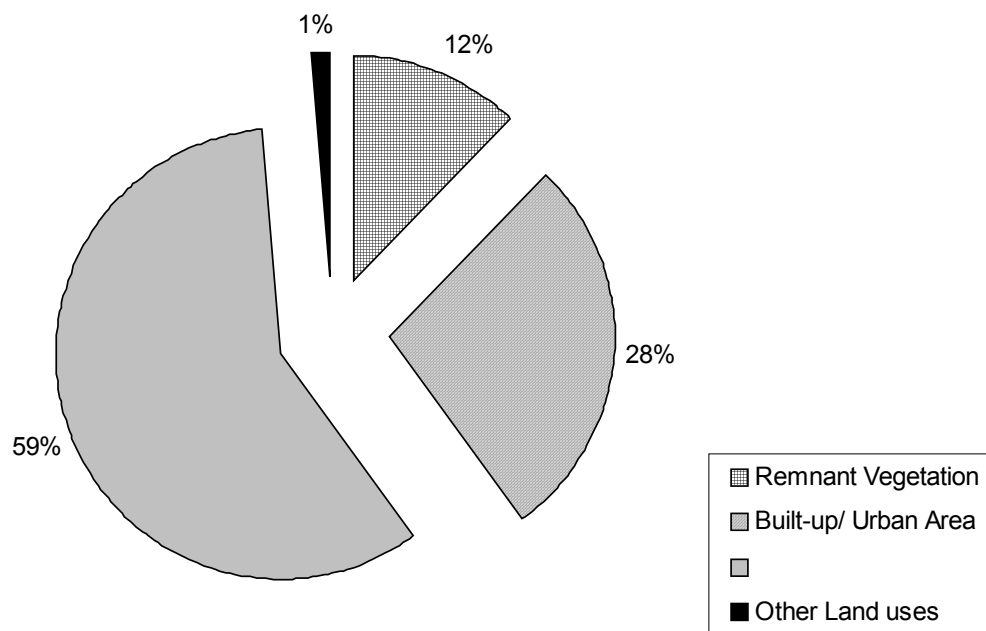


Figure 1 Relative landcover estimates for Adelaide Metropolitan Area

Source: GIS mapping (1985, 1987, 1991-1994 colour aerial photography landcover mapping)

3.3 Boundaries

The boundaries of metropolitan Adelaide have been defined differently by different authors and organisations. This document has used the

boundaries of the metropolitan area as defined in the Development Act 1993. (see [Appendix 4](#)).

Administrative Boundaries

The Adelaide Metropolitan Area includes 20 Local Government Areas (see [Appendix 4](#)). It completely encompasses 18 of these and includes the western third of the Adelaide Hills Council. The Adelaide Metropolitan Area also includes a small portion (166ha) of the District Council of Kapunda Light, north of the Gawler River and east of Main North Road.

The Adelaide Metropolitan Area covers part of three Soil Conservation Board Districts and directly adjoins one other (see [Appendix 4](#)).

Biological boundaries

In the interests of planning for the National Reserves System, the Interim Biogeographic Regionalisation for Australia (IBRA) has recently divided Australia into 80 discrete biological regions (Thackway & Cresswell 1995). Metropolitan Adelaide falls into parts of two IBRA regions, The Mount Lofty Block and the Eyre/Yorke Block (see [Appendix 4](#)). The Mount Lofty Block extends from the Quorn/Crystal Brook region in a narrow band along both sides of the ranges south to the tip of the Fleurieu Peninsula and includes Kangaroo Island. The Eyre/Yorke Block includes Eyre and Yorke Peninsula, but also extends down the northern Adelaide Plains in a south westerly direction from Gawler to the suburb of Cavan. All land south of this line is included in the Mount Lofty Block. The Eyre/Yorke Block should really extend further south on the Adelaide Plains to approximately Aldinga, as this region is biologically more like the Eyre/Yorke Block than the Mount Lofty Block. It is expected that this inaccuracy will be addressed following a comprehensive review of IBRA (Tim Bond *pers. comm.*).

While it is preferred that biodiversity plans be prepared and implemented according to biogeographic regions, it is considered that the metropolitan area has unique issues that require addressing at this social/administrative level.

3.4 Physical Description

Climate

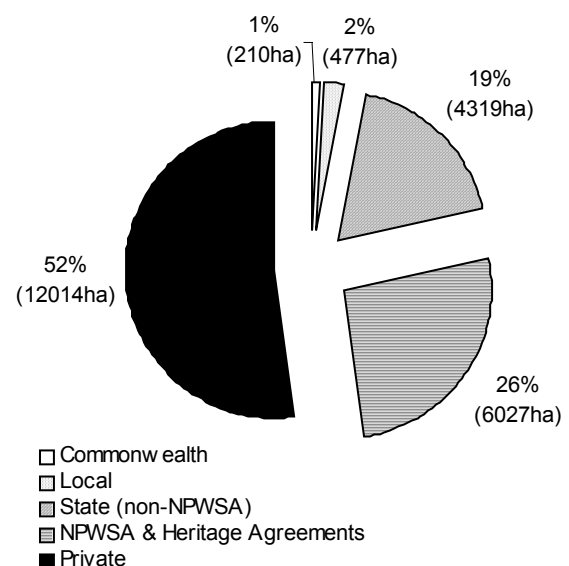
Metropolitan Adelaide has a mediterranean climate, consisting of long hot summers and cool wet winters. Yet across the region, there is significant variation in both temperature and rainfall, with a general trend of increasing rainfall from west to east (see [Appendix 4](#)). This variation is largely a result of variation in topography. Areas adjacent to Mount Lofty receive the highest average annual rainfall, with Stirling receiving an average of 1189mm of rain per annum. Areas to the north and west receive the lowest average annual rainfall; Edinburgh on the northern Adelaide Plains receives, on average, 440mm of rain each year.

3.5 Native Vegetation Tenure

Since European settlement, approximately 88% of native vegetation has been cleared, originally for agriculture, but increasingly for residential development (see fold out map). The remaining 12% (23,047ha) is largely concentrated in the Hills Face Zone. Indeed, 33% (7699ha) of metropolitan Adelaide's remnant vegetation is found in the Hills Face Zone. The bulk of this is found in the central Hills Face Zone between Anstey Hill Conservation Park and Belair National Park. This region, representing 5% of the total metropolitan area, supports 25% of the total remnant vegetation. The southern and northern Hills Face Zone contains comparatively little remnant vegetation.

Outside of the Hills Face Zone, much of the remaining remnant vegetation is found in the coastal mangrove/samphire communities (2117ha).

Approximately 26% (6027ha) of Adelaide's remnant vegetation is found in NPWSA reserves



or is afforded similar protection as a heritage agreement. With another 22% on land under government ownership, most of which is owned by the state government (primarily SA Water and Forestry SA). More than half of Adelaide's remaining native vegetation is held in private ownership (see Figure 2).

Figure 2 Land Tenure of Remnant Vegetation in Adelaide Metropolitan area

An analysis of the Adelaide Plains only, reveals even less remnant vegetation. Approximately 2.8% (2826ha) of the Adelaide Plains consists of remnant vegetation. The mangrove/samphire community along the coast makes up almost 75% of this amount (2117ha). Therefore, not including the mangroves and samphire communities, 0.7 percent of the Adelaide Plains is considered remnant vegetation.

Comparisons with other Planning Regions

Table 1 is a comparison of the area of native vegetation for different planning regions in the State.

As might be expected in an urban area, the Adelaide region is depauperate in remnant vegetation when compared with other nearby regions. As a percentage of the total region the Adelaide metropolitan area has only 12% native vegetation. Similar figures are obtained when comparing the total native vegetation reserved in NPWSA areas.

Table 1 Area and Tenure of Native Vegetation for South Australian Biodiversity Planning Regions (source: Kahrmanis & Carruthers (2000))

Biodiversity Planning Region	Total area of Native Vegetation '000 (ha)	Native Vegetation Cover as a % of Region	Total area of Native Vegetation '000 (ha) Formally Reserved	% of Native Vegetation Formally Reserved
Kangaroo Island	207	47%	132	64%
Eyre Peninsula	2188	43%	959	44%
Murray Darling Basin	4341	59%	1179	37%
South East	277	13%	108	39%
Mount Lofty Ranges	50	15%	14	28%
Northern Agricultural Districts	614	21%	50	8%
**Adelaide Metropolitan Region	23	12%	6	26%

Note:

Hectares rounded to nearest 1000.

Metropolitan Region has some overlap with the Mount Lofty Ranges region - primarily in the Hills Face Zone and on the Northern Adelaide Plains

Source:

Kangaroo Island Native vegetation mapping (GIS), 1991 1:40,000 colour aerial photography, Planning SA.

Eyre Peninsula Native vegetation mapping (GIS), 1991,1995,1996 1:40,000 colour aerial photography, Planning SA and 1:250,000 Landsat Imagery, National Wilderness Inventory.

SA Murray Darling Basin Native vegetation mapping (GIS), 1985,1989,1991 1:40,000 colour aerial photography, Planning SA and 1:84,000 colour aerial photography, DEH.

South East Native vegetation mapping (GIS), 1987 1:40,000 colour aerial photography, Planning SA and Forestry Reserves, Forestry SA.

Mount Lofty Ranges Native vegetation mapping (GIS), 1985, 1987, 1991-1994 1:40,000 colour aerial photography, Planning SA.

Northern Agricultural Districts Native vegetation mapping (GIS) 1991-1994 1:40,000 colour aerial photography, Planning SA.

Adelaide Metropolitan Region Native vegetation mapping (GIS), 1985, 1987, 1991-1994 1:40,000 colour aerial photography, Planning SA and UFBP Native vegetation mapping (2000)

All Regions: NPWSA Reserves (GIS), Conservation Reserves (GIS), Heritage Agreements (GIS), Bookmark Biosphere Reserve (GIS), DEH, current to Jan 2000 for SAMDB, NAD, Eyre and current to Jan 1998 for KI, Mount Lofty and SE regions.

****Adelaide Metropolitan Region statistics generated by SA Urban Forest Biodiversity Program**