THE VISUAL LANDSCAPE CHARACTER TYPES OF WESTERN AUSTRALIA

(DRAFT 3)

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INTRODUCTION

Western Australia covers an area of more than 2.5 million square kilometres, approximately one third of the landmass of the Australian continent, and the diverse coastline which fringes this area is more than 12 500 km in length.

The deep gorges, vast deserts, rugged ranges, spectacular coastlines and majestic forests form part of the intrinsic image of Western Australia, and such visual appeal and aesthetic sense of place is integral to the unique landscapes of this State.

In recent years, land management and protection agencies throughout Western Australia have recognised that the visual quality of a landscape is a resource in its own right, and can be assessed and managed in much the same way as other social resource values such as fauna, flora, soil and water.

Visual Landscape Character Types

Managing the visual landscape as a social resource depends not only on recognising and understanding the essential natural character of a landscape, but also on understanding existing and proposed land uses. The first step in this landscape management process is to identify and describe Western Australia's *Visual Landscape Character Types* , which is the focus of this study.

The term *Visual Landscape Character Type* refers to a broad area of land that possesses common distinguishing visual characteristics. These areas display a distinctive natural unity in the elements of geology, soils, landforms, vegetation, waterform, and also landuse. When a Character Type exhibits diversification over a broad area, Visual Landscape Character Sub Types (distinct areas showing significant differentiation) are defined.

Once essential landscape elements have been identified, assessed and classified into *Visual Landscape Character Types*, it is possible to evaluate how particular management strategies and alternatives will affect the appearance of those landscapes and whether they reflect, enhance, contrast or ignore such visual elements. Subsequently, appropriate landscape guidelines and controls can be developed with other resource management objectives to assist agencies, communities and individuals who wish to conserve and manage the visual character of Western Australia's unique landscape heritage.

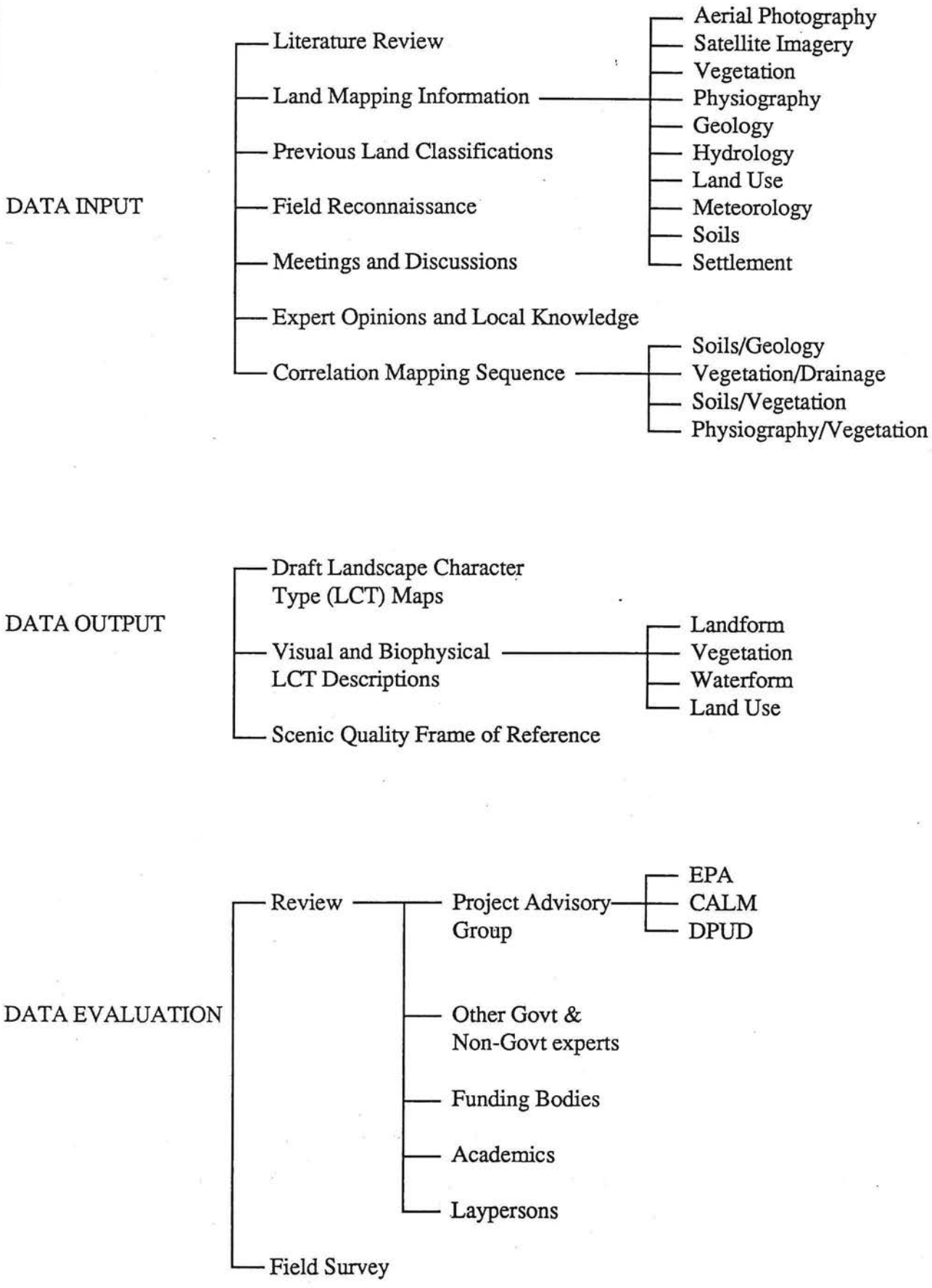
Methodology

The original draft and accompanying map (1:3 000 000) were produced to provide a preliminary broadscale classification of the state into Visual Landscape Character Types. This follows the Visual Landscape Management Systems used by various government agencies in Western Australia. It is important to note at this initial stage of the study, that due to the complexities involved with the analysis and inventory of base information, that a broadscale biogeographical approach is necessary.

The initial classifications were largely compiled with reference to earlier publications. These included: J. T. Jutson, 1914, *Physiographic Divisions*; E. de C Clarke, 1926, *Natural Regions*;

VISUAL LANDSCAPE CHARACTER TYPES OF WESTERN AUSTRALIA

STUDY METHODOLOGY FLOW CHART



L. S. H. Teakle & C. A. Gardner, 1938, *Soil and Ecological Regions*; Gentilli & Fairbridge, 1952, *Physiographic Regions*; Jennings & Mabbutt, 1977, J. A. Beard, 1981, *Vegemap Series*. The information from these maps were combined to show parts of the State that are visually different and distinct. This procedure provided some common boundaries and the basis for more detailed investigation.

A more detailed literature survey was conducted and difficulties encountered at this stage included the lack of uniformity in both detailed coverage available, gaps in the available information, and the variability of scale in mapped information. Landsat imagery and aerial photographic coverage were also used at this point.

The result of this preliminary study was the delineation of 44 Visual Landscape Character Types and subtypes in the State, and their summarised descriptions. These were submitted to the steering committee (comprising of officers from CALM and EPA) involved with the first draft.

The first step in the current stage of the study was to attend to the recommendations made by the initial steering committee and prepare a revised draft. An amended draft report (Draft 2) and map resulted and the Visual Landscape Character Types were reduced in number from forty-four to forty-one, based on the committee's suggestions.

A small working group was formed consisting of officers from CALM, EPA and DPUD to discuss the aims of the project and evaluate its progress. The amended summaries and map were sent to relevant professionals (active and retired), lay persons with suitable expertise, and personnel from CALM, EPA, DPUD and the Department of Agriculture, for review and evaluation. Constructive critical reviews were received, detailing omissions and advice for the study, and leads to further research material and contacts were also suggested.

The fact that the Visual Landscape Character Type boundaries are not determined by a single criterion (Eg. vegetation), but by the most dominant visual feature proved to be an initial obstacle for some reviewers. Ground work will answer many of the questions put forward, but due to the practical problems involved with field testing the Visual Landscape Character Type boundaries of the entire State, this has not been possible to date.

Keywords and relevant base information have been included in the summaries for future expansion, and after a further intensive literature review, five detailed Landscape Character Type descriptions have been included in this document: Swan Coastal Plain, Darling Plateau and Blackwood Plateau Sub Type, Scott Coastal Plain and Leeuwin Naturaliste Coast.

Leeuwin Naturaliste Coast Visual Landscape Character Type Model

To present a uniform approach to analyse the steps taken to produce a Visual Landscape Character Type, the following methodology was developed:

Stage 1: Literature Survey - An extensive data review defining major works relevant to the Character Type. (See Bibliography)

Stage 2: Base Mapping - CALM maps at 1 : 50,000.

Stage 3: Inventory of Resource Data

Landform - Information was combined from geological surveys, soil studies, land capability studies, aerial photography and landsat imagery.

Vegetation - Owing to the complete coverage at varying scales, the major source was Beard's Vegetation Series, supplemented by relevant texts specific to the area, and also aerial photography.

Waterform - Water Authority records and topographic maps were consulted, although specific information in regard to waterform was found to be either incomplete or unavailable.

Climate - Information was generally available as tabular data or broadscale mapping. Specific details were gained from Agriculture Department records.

Landuse - Information was drawn from topographic maps, specific texts, and plotted from aerial photographs and Landsat imagery, which provided a detailed overview.

Stage 4: Assessment

The alluviates of the Blackwood Plateau Visual Landscape Character Sub Type and the dominant sands of the Leeuwin Naturaliste Coast denote the line of division between the two Character Types. While this factor does not provide a dominant visual contrast, it is one of the major factors that influences the vegetation differences and also the land-use. Vegetation could not be relied upon in this instance to provide a Character Type border as much of it has been cleared for agricultural purposes. The land use pattern in this area is quite distinct in this area and it was generally for this reason that soil types were chosen to provide a dividing line.

This decision was supported by mapped information (Tille & Lantzke, 1990), and also after studying landsat images (1:100,000), and colour aerial photographs (1:25,000). The dividing line is not visually prominent (in contrast to the boundary between the Swan Coastal Plain and the Darling Plateau), but it must be noted that the divisions between the Visual Landscape Character Types can, in some cases, be indistinct.

LEEUWIN NATURALISTE COAST
VISUAL LANDSCAPE CHARACTER TYPE

General Description

The Leeuwin Naturaliste Coast is the most westerly of the Visual Landscape Character Types of the south-west coast. It lies between Cape Naturaliste in the north and Cape Leeuwin in the south and terminates inland just west of the Dunsborough faultline. It is comprised of three zones: the narrow coastal strip and associated dunes, the central ridge of abrupt, steep, limestone hills, and in the east, undulating gravel and pale, sandy slopes.

The prevailing winds and salt spray determines the height and density of the exposed patchwork of coastal heathland vegetation. Diverse woodlands exist in more protected zones, and on the top of the central ridge, a stunted Jarrah Marri forest is located, growing only to its normal size to the east. Towering creamy yellow and grey variegated trunks of the Karri tree, benefitted by the high rainfall, are a highlight on the lower third of this Character Type.

The well drained undulating slopes to the east are generally cleared for agriculture, most notably viticulture. This is associated with the small town of Margaret River, which is one of the Leeuwin-Naturalist Coast's major population centres.

Climate

The Leeuwin-Naturaliste Ridge and its close proximity to the ocean are the major influencing factors on the climate of this Character Type.

Onshore winds are an important feature of the climate, and they vary daily and seasonally. The regular passage of cold fronts occur every three to five days throughout winter, bringing strong north-west winds reaching speeds of 35-50kmph. In summer, land breezes from the east and south-east bring light and variable winds of less than 25kph.

Rainfall occurs largely between May and August, varying between 500mm and 1200mm per annum with an average of 800mm to 850mm. Cape Naturaliste records over 1000mm per annum with Margaret River inland at 1150mm.

The hottest months are January and February with an average daily summer maximum of 26°C and a daily winter maximum of 18°C. A general tendency is for the temperature to decrease and for the rainfall to increase from north to south throughout this Character Type.

Landform

The Leeuwin-Naturaliste coastal strip is a panorama of abrupt rocky shorelines, sweeping asymmetrical beaches such as at Yallingup, and embayments such as at Hamelin Bay, punctuated and shaped by rugged granitic headlands and towering sea cliffs. The exposed rugged granite and pale limestone capping also form the numerous islets and reefs that fringe the shore, creating the heavy surf for which this coast is renown.

Wind sculptured foredunes and parabolic dunes backdrop the gently undulating white sand beaches, often to rise steeply as the western flanks of the central ridge. While most dunes throughout the coastal strip are stabilised, blowouts occur where the vegetation cover has been disturbed. The extensive mobile sandsheet at Boranup is clear evidence of the extreme wind action at work on this high energy coast. To the north of Boranup, in the Hamelin Bay area, a small area of unique conical dunes are also evident.

Central to the Character Type, and its most prominent feature, is a discontinuous limestone ridge, known locally as the Leeuwin Naturaliste Ridge. Formed on a granite bed, the exposed margins of the ridge are seen as abrupt, pale limestone seacliffs at Biljedup Brook and Wilyabrup. Generally, the margins are obscured and softened by rounded, undulating hillslopes rising from 100m to 200m in height. The sands of the ridge, originally a coastal dune deposit, have solidified and dissolved to form the dark, cool cave systems that are an interesting feature of this region. The most accessible of these often spectacular formations can be found between Yallingup and Augusta. Sea caves of granite and limestone can also be found to the north-east of Cape Naturaliste.

To the east of the ridge lies the Margaret River plateau, the easterly zone characterised by an almost completely flat to gently undulating plain, with slight gravelly rises or knolls and occasional granitic outcropping.

Vegetation

The remaining native vegetation of the Leeuwin Naturaliste Coast is predominantly low, impenetrable heath and tall, open forest, often highlighted by the imposing Karri trees. Its pattern across this Visual Landscape Character Type is both complex and rapidly changing, controlled by soils and exposure to the prevailing winds. Land use has had a more marked effect on the fertile land to the east of the prominent central ridge, and large scale clearing for agriculture and timber has, in some areas, resulted in an open landscape with a colourful patchwork of exotic crops, grasses, and regrowth forest, with roads often shaded cool by overhanging Eucalypts and soft green peppermints.

Throughout the western half, exposure to extreme wind conditions and salt spray makes the vegetation of the foredunes and seaward slopes highly susceptible to disturbance and erosion. Owing to their infertile soils these slopes have remained largely uncleared and a high proportion of the coastal margin is now retained within the Leeuwin-Naturaliste National Park.

Primary colonisers such as the bristly Green Spinifex *(Spinifex hirsutus)* and soft Marram Grass *(Ammophila arenaria)* appear on the low dunes, with the scrubby Coastal Daisy *(Olearia axillaris)* occurring in protected dune depressions. In areas of coastal limestone, soft Chenille Honeymyrtle *(Melaleuca heugelii)* and spiky Parrot Bush *(Dryandra sessilis)* feature among the heath, notably at Canal Rocks and Yallingup, and Rottnest Tea Tree *(Melaleuca lanceolata)* makes an appearance in woodlands on the sheltered limestone slopes to the north-west of Bunkers Bay.

On the exposed western slopes of the ridge, the vegetation pattern is low, scrubby heath. Wind pruned Acacia and Jacksonia are common, with an understorey of bright yellow Hibbertia, the glossy dark leaves of the twining Hardenbergia, Pimelea and the soft blue flowers of *Scaevola*

crassifolia occur throughout, with Prickly Moses *(Acacia pulchella)*, and Dwarf Sheoak *(Allocasuarina humilis)*, occuring more regularly to the north.

Soft, cool Peppermints *(Angonis flexuosa)* and rough barked Banksias. dominate a range of structural remnant vegetation types, including low forest, woodlands and open forest. These are interspersed with Bullich *(Eucalyptus megacarpa)*, Melaleucas. and Blackboys *(Xanthorrhoea spp.)*. Jarrah *(E. marginata)* , and Marri *(E. calophylla)* occur as tall shrubs throughout, only reaching their full height as Jarrah-Marri forest on the deeper soils of the leeward side of the limestone ridge and eastern plateau.

Brown sandy loams, located in protected depressions and gullies on the sheltered side of the main ridge, support the most westerly occurrence of the towering, smooth, creamy yellow and grey trunks of the Karri *(E. diversicolor)*. Where the ridge is particularly steep, low heath dominates and the transition to tall forest occurring in protected depressions is often abrupt. The cool, isolated pockets of Karri occurring in the south of this area are the most extensive at Boranup. The soft, sun dappled Karri forest understorey often contain Banksia, Karri Oak *(Allocasuarina decussata)*, and Peppermints with a shrub layer of Karri Wattle *(Acacia pentadenia)*, bright purple Hovea, yellow Hibbertia, Karri Hazel *(Trymalium spathulatum)*, and Soft Leaved Lasiopetalum (*Lasiopetalum molle*)

The vegetation pattern on the gentler eastern leeward slopes is largely dictated by land use. Within the cleared rural areas, large tracts are utilised for agriculture and these present a colourfully contrasting patchwork of exotic trees, plants and grasses, which are dissected by drainage channels and often continuous roadside vegetation corridors, linked to uncleared remnant vegetation, timber reserves and State forest. The open forests of this area are dominated by tall Grey barked Jarrah trees *(E. marginata)* and the rough barked Marri *(E. calophylla)* with the understorey featuring Blackboys *(Xanthorrhoea preissii)*, Banksias and weeping Peppermints. Noticeably widespread among the understorey in many areas, as a low continuous layer of bright green, is bracken, an introduced fern commonly seen along roadside verges. Flooded Gums *(E. rudis)* shade many drainage lines with Forest Blackbutt *(E. patens)*, and spiky rushes occuring commonly in damp areas.

Waterform

Margaret River is the major drainage feature of the Leeuwin -Naturaliste Coast Character Type. It cuts through the ridge near Prevelly Park in a deeply incised east-west valley before it flows over the shallow sandbar to the ocean. Its tributaries form the main catchment of the Margaret River Plateau.

The ridge is also cut by a series of westerly flowing brooks. These are often short in length, intermittent and with well-defined valleys. The most southern of these, Turner Brook cuts the ridge in a spectacular limestone gorge at Deepdene, and a gushing waterfall is a feature at Quininup.

Freshwater is also available on the coast at springs such as Contos and Sugarloaf and in lakes impounded by narrow barrier dunes, the largest of which can be seen at Bunkers Bay.

Poor drainage caused by a geology of shallow soils over clay and high rainfall result in the seasonal swamps and soaks that are scattered throughout the eastern half. Some deeper depressions remain wet throughout the year due to groundwater seepage.

Land Use

The major land uses that dominate the Leeuwin-Naturaliste Coast Visual Landscape Character Type are agriculture, timber production, residential and more recently, tourism and recreation.

Physical evidence of the former Aboriginal inhabitants of this area has been found in the rough limestone caves and along the coast. The clearing of much of the forest for farming land prevented the Aboriginies from continuing their traditional activities and many were sent to Aboriginal settlements at Moore River or Carrolup near Katanning while farm homes and an orphanage were set up for a short while at Margaret River.

Much of the land to the east of the ridge is cleared of its native vegetation and large tracts are occupied by farms. The traditional pursuit is grazing,with sheep and cattle dominant in the north, and cattle (particularly dairy cattle) to the south.

Diversification in farming practices has seen the rise of alternative produce and crops throughout the region. Acres of geometrically aligned grapevines denote the increasing interest in viticulture, and the production of fine quality table wines for local consumption and export. Specialisation in orcharding (avocado's), fruit (kiwi fruit), vegetables (potatoes and corn), nuts and flowers, and also in the farming of exotic animals, particularly deer, is becoming widespread.

Historically, the timber industry was a major land use within the area and mainstay of the economy. This is still maintained today through State forest, share farming, exotic tree plantations and shelter belts, windbreaks and agroforestry, producing both softwood and hardwood.

Both agriculture and forest industries support tourism and recreation as the most rapidly expanding land use. Industries created from timber production, such as furniture and fine wood crafts (turning and sculpture), specialised agriculture, the farming of trout, marron, deer, exotic fruits, added to wine and cheese.

The coastal settlements of Gracetown and Augusta, and service centres like Margaret River and Cowaramup provide a variety of residential and visitor accommodation, freehold land for rural living, hobby farms and bush blocks, and many are centres for thriving craft industries. A district architecture style of local rammed earth and mud brick is rapidly developing throughout the area, embodied in private dwellings, and commercial facilities and public buildings. Water related activities from beaches such as Hamelin Bay and Yallingup include fishing, swimming, windsurfing and diving, and the world class surf occurs near Margaret River attracting many visitors.

Land use for extractive industries is minimal within the area. Known minerals include mineral sands and coal.

Conservation values and the scenic attractions of the Leeuwin-Naturaliste Coast are protected by the Leeuwin-Naturaliste National Park. The extensive lands of the park run the length of the coast from Cape Naturaliste to Cape Leeuwin, each defined by a stark white lighthouse. Within the park and adjacent State forest, particularly Boranup, are the most westerly occurrence of the Karri, the limestone ridge cave system, world-class beaches and surf, and an almost continuous coastal heath ecosystem.

SWAN COASTAL PLAIN
VISUAL LANDSCAPE CHARACTER TYPE

General Description

The Swan Coastal Plain Visual Landscape Character Type is a narrow strip of land situated on the lower western coastline of the State, abutting the western edge of the Darling Plateau, and slopes gently westward to the Indian Ocean where it terminates in a system of well-defined coastal dunes.

This low-lying sandy plain extends to the region north of the Moore River and follows the long, stretching coastline south to Geographe Bay. Three distinct land systems occur that are characteristic of this area: foothills, alluvial plains and three successive coastal dune systems.

The northern half of the Swan Coastal Plain is subject to hotter summers and drier, warmer winters than the landscape to the south. Owing to this climatic difference, the vegetation in the south appears more lush and of increased height than that to the north where there are fewer trees of a decreased stature.

Waterforms are a major characteristic of this region. Over its length are numerous swamps and wetland lakes as well as meandering rivers and streams. Estuaries and inlets feature on the coast.

This Visual Landscape Character Type has the state's highest population concentration. Perth is situated in the central region of the Swan Coastal Plain, and other major centres include Fremantle, Bunbury and Mandurah.

Climate

Classified as temperate, the climate of the Swan Coastal Plain can generally be characterised by clear skies and fine weather.

Rainfall increases toward the south where it becomes more reliable, with a low annual variability. It ranges from 1200mm - 800mm per annum. The northern section, with a lower rainfall of 600mm - 400mm per annum or less has a higher daily maximum temperature with an average of 26°C. The temperature decreases to the south, falling to a July minimum of 11°C in Busselton.

The influence of the prevailing winds is seasonal. Moist winter winds are southwesterly, changing to east-south-east in summer with a regular afternoon sea breeze.

Landform

Abutting the abrupt Darling Scarp at the eastern margin of the Swan Coastal Plain are the gently inclined foothills which are remnants of an ancient geological feature known as the Ridge Hill Shelf. Once a continuous feature, they appear today as a series of gently sloping flattened spurs and are seen from Bullsbrook in the north, to the Collie River in the south and rise to a height of 76m - 91m above sea level.

A gently inclined alluvial plain with long open views has developed in front of the scarps and foothills, and along river courses. This low-lying area is constructed largely of riverine material,

with pale soils dominated by grey sands, and other gravels, loams and clay. This often level plain has developed more extensively in the high rainfall zone around Busselton to the south of this Visual Character Type where increased runoff has resulted in the watercourses depositing more sediment from the uplands onto the plain.

To the west of the plain lie three successive dune deposits occuring in bands which generally run parallel to the Darling Scarp and the present coastline.

The Bassendean Dune System abuts the low-lying plain to the west and is an accumulation of beach sands along an ancient shoreline. Formed into low, rounded hills (to 100m ASL) of pale grey quartz sand, these dunes are most extensively seen in the northern region of the Character Type such as at Bayswater.

The Spearwood Dune System occurs to the west of the Bassendean dunes and are younger, steep hills of increased height, with soils of soft yellow to rich toffee coloured sand. Underlying the sand is a belt of pale, rough limestone which is exposed in many places, and can be seen in the cliffs at Blackwall Reach on the Swan River and in the deeper caves at Yanchep.

Quindalup, the third and most recent Dune System, consists of low, elongated windswept dunes of pale sand which are forming along the Indian Ocean coastline today. From their narrowest point at Fremantle, they develop into successive beach ridges, the widest occurring near Busselton and from Rockingham to Becher Point.

The coastal margin of the Swan Coastal Plain features long, gently curved beaches of bleached sand and low dunes, such as at Geographe Bay, which are broken by coarse, pale, limestone cliffs, jutting headlands and wavecut platforms. Synonymous with the onshore coastal characteristics of this region are the off-shore elements of the coastal landscape. Rottnest Island is a distinctive focal point in the offshore landscape to the west of Fremantle, appearing as an elongated rise on the horizon, fringed by glistening white beaches. Garden, Wedge, and Penguin Islands all offer the same appealing coastal landscape features, as do the foaming and gurgling limestone nearshore reefs which are scattered along the coast, such as at Trigg and Marmion Marine Park.

Vegetation

Of all the factors affecting the vegetation of the Swan Coastal Plain, the climate has the most marked influence. From the north to the south, the vegetation associated with the landforms of the area changes from low scrubby Banksia woodlands with stunted Eucalypts in the north, to lush, towering forested areas in the south.

Beginning at the southern margin near Dunsborough, the influence of European settlement is obvious, as it is over the entire Character Type. Much land has been cleared of native vegetation for agricultural, urban and industrial purposes, revealing long views over the landscape. On this southern plain there are remnants of an open rough barked Marri *(Eucalyptus calophylla)* forest scattered over grazing land, with isolated tall Jarrah *(E. marginata)* on higher ground. Marri and the dark trunk of the Blackbutt *(E. patens)* are seen near rivers and streams, and following the meandering watercourses are spreading Flooded Gums *(E. rudis)*, white peeling bark of Swamp Paperbarks *(Melaleuca raphiophylla)*, and cool green Peppermints *(Agonis flexuosa)* closer to the

coast. Where there is poorer drainage on the plain, scattered clumps of Paperbark woodland are seen with isolated specimens of the seasonally splendid WA Christmas Tree *(Nuytsia floribunda)* which features conspicuously bright tangerine blooms in the summertime. Rough, olive green Banksias with Paperbarks and Christmas Trees are also present in more sandy positions on the plain.

The vegetation associated with the low, rounded Bassendean Dune System, which begins as a narrow belt near Busselton, includes scattered tall Jarrahs with Paperbarks and Banksias. To the northwest of the Sabina River, Tuarts *(E. gompholocephela)* make their first appearance. These unique tall trees with erect, solid trunks of rough, mottled grey once occurred in pure stands throughout much of the limestone ridges of the Spearwood Dune System, and today, protected remnants exist in the Ludlow Tuart Forest National Park. A lower storey of lush Peppermints is often associated with these trees, or they appear in a parkland setting in a combination with Jarrah. Other understorey species here are Banksias, Sheoaks *(Allocasuarina fraseriana)*, with Blackboys *(Kingii australis and Xanthorrhoea preissii)*, and Zamia Palms *(Macrozamia reidlii)*. The willow-like Peppermint is the dominant understorey species in this southern zone, while Banksias and Sheoaks become more dominant to the north.

On the protected and low-lying coastal areas of this southern zone is a scrubby mixture with a low open Paperbark forest. Further north the mobile foredunes are scattered with bristly, blonde Spinifex and other tenacious grasses. On the protected sides, a low shrubby heath appears, with heights varying with protection from the wind, and a dense, impenetrable thicket has occurred in some areas. Where the dunes become more stable, and more protection is offered, a tall thicket appears and in some areas this is seen as a low forest featuring Peppermints.

Between the solid tuarts occurring on the limestone ridges and the low, rich green Peppermint forest on the coast are the Vasse and Wonnerup estuaries where salt tolerant Samphire *(Arthrocnemum spp.)*, forms a low, open heath. This is fringed by Saltbush *(Rhagodia spp.)* with a surrounding margin of scrubby Salt Water Paperbark *(Melaleuca. cuticularis)*.

Moving further north on the Swan Coastal Plain, the vegetation begins to change. Very little original vegetation remains on the plain as the relative richness of the soil has encouraged widespread clearing for agriculture and pine plantations. The timber trees of Jarrah and creamy barked Wandoo *(E. wandoo)* have virtually disappeared, along with the once richly diverse shrub flora and ground covers, and the remnant trees appear as an area of parkland over wide, open pastoral expanses. The original vegetation was an open Marri forest on better drained areas with Wandoo and Jarrah, and Banksias dominant in the understorey, with Christmas Trees, Blackboys and Zamia Palms. Watercourses and areas of poor drainage again featured Paperbarks with fringing woodlands of Flooded Gum.

The narrow area of the Bassendean Dune System becomes broader to the north of the Swan Coastal Plain and the watertable appears to be the factor controlling the vegetation cover there. On higher ground, the Jarrah-Marri open woodland occurs as remnants with Banksia and a soft Sheoak understorey. To the north of Perth, Banksia woodland becomes the dominant remnant vegetation, with Sheoaks, Christmas Trees, and a richly diverse shrubby undergrowth. Jarrah is not at its peak here and becomes short and branchy. In the vicinity of Lake Gnangara, rough, peeling Pricklybark *(E. todtiana)* appears and eventually replaces Jarrah as the dominant Eucalypt.

The freshwater lakes, swamps and other low-lying areas have skirting spiky sedge communities extending to the low water-line, and pale Paperbarks, combined with Flooded Gum dominating the fringes. The introduced strappy-leaved Bullrush *Typha orientalis* has also become a common sight, invading many of the wetlands of the Swan Coastal Plain.

The northern coast supports similar plant communities as are found to the south. A few isolated remnants of Rottnest Cypress *(Callitris preissii)* occur, but the area is generally dominated by a mixture of wind buffetted Acacias, Melaleucas, Clematis and Hardenbergia. Peppermints reach their northern limit near Mandurah and occur commonly in the sheltered areas of stable dunes. The coastal belt near Rockingham has remnants of what was a distinctive closed scrub heath community. The vegetation is open now, disturbed by fire and grazing, and is dominated by Acacias and Blackboys. The salt lakes along the coast here are similar to those further south, and are fringed by Samphire, Saltbush and Paperbarks.

The landscape to the north of this Character Type features a predominance of small scattered trees, generally being Pricklybark, scrubby Sheoaks, clumped Paperbarks, Banksias and occasionally an isolated Marri. This vegetation regularly encloses the long views across the level plain to the isolated wetlands and elevated dune systems in the western distance, most notably at the Moore River National Park. Associated with these is an open layer of tall shrubs and a thick, dusty layer of smaller heath shrubs, including an abundance of soft, Grey Smokebush *(Conospermum spp.)*, bushy, grey green Acacias, Christmas Trees, scrubby Tea Trees *(Leptospermum ellipticum)*, brittle, scratchy Parrot Bush *(Dryandra sessilis)* and Blackboys.

Deep swamps and wetlands are surrounded by tree cover generally of Paperbarks, Banksias, isolated Sheoaks and Flooded Gums. A large number of these occur in the vicinity of the Moore River and further south. Near the Gingin River, scattered low Marris appear in an area dominated by Banksia woodland, and Paperbark, Tea Tree and reed swamps are again numerous.

In the vicinity of Yanchep, low Banksia woodland and scrub heath become the dominant vegetation overlying the limestone ridges of the Spearwood Dune System. The Eucalypt woodlands which occurred further south become less dominant, smaller and more isolated. The stands of Tuarts, familiar to the south occasionally appear in small patches over limestone ridges and are apparent in depressions.

Waterform

Meandering watercourses dissect the Swan Coastal Plain along its length, but the area to the north of Perth is more poorly drained than the south. While many streams enter this area after descending the abrupt escarpments, very few reach the Ocean. They are either diverted north or south on encountering the linear dune systems, or they link up with larger watercourses such as the Murray or the Swan, or terminate altogether.

Estuaries are a highlight on the coastline and are more extensive to the south of the Swan Estuary at Fremantle. Major inlets, seen as wide expanses of shimmering blue waterways, include the Vasse Estuary near Busselton, Leschenault Inlet at Bunbury, and the Peel Harvey Inlet, the largest estuary in the south-west, at Mandurah.

Wetland lakes such as Lake Joondalup and Lake Preston, and swamps such as Beanup and Benger are characteristic of the Swan Coastal Plain and are found scattered throughout. They are often circular in shape but may also occur as linear chains which are sub-parallel to today's coastline. These linked wetlands drain in a southerly direction into rivers or the starkly geometric man-made drains and canals which occur south of the Swan River. Many of these wetlands are associated with the dune formations, either situated inter-dunally or where the dune systems abut.

Land Use

The major land uses on the Swan Coastal Plain have been influenced mainly by agricultural, as well as urban and industrial activities.

The Aboriginals who originally inhabited the Swan Coastal Plain felt the brunt of European settlement, and as it spread, their traditional way of life soon became very difficult. Many town reserves were established for their use and others were sent to Aboriginal settlements such as at Moore River. Today, little evidence of their original habitation remains, and small communities have been established in various areas of the Character Type, their current and future land uses centred on maintaining their cultural heritage and their strong relationship with the land.

The urban development of this Character Type is a very dominant visual feature throughout, and is rapidly expanding in the Perth region particularly within the northern corridor, at areas such as Joondalup. Bunbury and Mandurah are the major population centres to the south of Perth, with many small towns dotted over the landscape at regular intervals, including Lancelin, Rockingham, Pinjarra, Brunswick Junction and Busselton.

The alluviates of the Pinjarra Plain at the easterly margin of the Character Type comprise the most arable soils of the Swan Coastal Plain for pastoral development. Due to the reliable rainfall, combined with groundwater resources for irrigation and regular fertilization, the area is quite agriculturally productive. Extensive areas of cleared green pastoral land indicates the widespread grazing of sheep, beef and dairy herds upon the plain, while the geometrically distinct white wooden fences which cut across the landscape are generally evidence of thoroughbred horse studs.

Bright patchwork rows of lush, contrasting greens indicate irrigated market gardens which occur on the outskirts of many towns, including Perth. Orchards, most commonly of round, shiny leaved citrus fruits, occur in the vicinity of Harvey and other smaller centres, and the green parallel lines of Western Australia's oldest established vineyards are dominant in the region of the upper Swan Valley. The relatively rich soils of the plain also support large areas of State Forest with the contrasting dark green of pine plantations, particularly near Wanneroo, and more recently Tasmanian Bluegums *(Eucalyptus globulus)* have become established in plantations to the south of Perth.

Extractive industries are a highly visible activity along the coastal plain. Heavy mineral sands are mined today in areas associated with both the present day coast and the established beach sands of ancient shorelines. Concentrated deposits are being removed in areas including Waroona, Capel, Bunbury and Dardanup.

Limestone quarries occur in many locations for road making and building, and lime for agricultural and industrial areas is extracted from the coastal sands. The fine textured clays of the alluvial plain are also removed from long established pits for brickmaking, most notably at Cardup and Waterloo.

Recreation and tourism is widespread on the Swan Coastal Plain. Many leisure time activities are water oriented, especially in the summer months. Fishing, diving, surfing, boating, windsurfing and swimming are all popular, especially in the coastal towns to the south of Bunbury, particularly Busselton and Dunsborough.

Several conservation areas have been established in this Character Type, to protect unique landscapes and natural ecosystems. These include National Parks such as Yanchep, Yalgorup, Moore River and Ludlow Tuart Forest and also many areas of special reserves such as Ellen Brook Reserve for the protection of endangered or rare native fauna and flora. Pockets of native State forest are also scattered along the coast for water, wildlife, amenity and scientific research values.

SCOTT COASTAL PLAIN
VISUAL LANDSCAPE CHARACTER TYPE

General Description

The Scott Coastal Plain is the State's most southerly Visual Landscape Character Type, sandwiched between the Darling Plateau and the Southern Ocean. It is a low-lying, swampy plain featuring windswept parabolic dunes, and impressive limestone and granite cliffs and headlands. Between the rugged headlands lie stretches of protected beaches and the mouths of the many rivers and estuaries which are characteristic of the southern coastline.

Better drained areas in this high rainfall zone highlight pockets of the lofty Karri, with Jarrah and Marri forest, while much of the remaining vegetation is limited to low stunted growth, shaped by the prevailing winds.

The major centres of Albany, Walpole and Denmark are rewarded with many tourists as this Visual Landscape Character Type provides several popular recreational and scenic attractions.

Climate

The climate of the Scott Coastal Plain is temperate, with mild warm summers and long, cool, wet winters.

Reliable rainfall of between 160 and 260 days per annum are recorded between April and November and the area receives only 3-4 dry months per year. The annual rainfall varies only slightly along the length of the coast, from 1000mm at Hardy Inlet and Denmark in the west to 950mm at Albany. Inland, south of Northcliffe, the State's highest rainfall zone occurs, where recordings in excess of 1400mm are taken. The wettest months are June and July.

The plain extends 350km, west to east, but generally less than 25km north to south, resulting in a low variance of temperatures. The yearly maximum is in the low 20's with Denmark recording 20.6°C, and the hottest months are January and February. The average minimum is centred on 10°C.

The prevailing winds dominant throughout the Character Type tend east-south-east in summer and south-westerly in winter.

Landform

The Scott Coastal Plain, buffetted by the prevailing winds of the southern ocean, is the most southerly of the Character Types. It lies between the hills marking the southern margin of the Darling Plateau and the ocean, and to the west by the Hardy Inlet. Continuing eastward along the coast, it tapers in width to terminate at the towering granite cliffs of Cape Vancouver, east of Albany.

The region is comprised of a series of windswept dunes and shoreline deposits fronting a low-lying wetland corridor, though no clear boundary divides the two. To the north, low, rounded hills and scattered ridges descend gradually to the gently inclined sandy plains below. Remnants of

sub-coastal linear dunes occur inland, parallel to the coast, and are most concentrated west of Broke Inlet. The presence of granite monadnocks and hills appear as large domes, often dominating the surrounding landscape, and occur as groups of bulbous outcrops or as isolated inselberg formations. Mt Chudalup, at 185m, is notable as the most westerly occurrence of this formation type.

The sandy plains, particularly to the south-west, are often subject to inundation, with the winter water table on or near the surface. The swampy deposits and low-lying water have resulted from the infilling of coastal lagoons and estuaries which were blocked by the gradual movement of dunes. Diffuse drainage patterns and high rainfall contribute to the permanent and seasonal swamps that form along the wetland corridor. Numerous rivers and tributaries traverse the region, and the dissections which these rivers create varies from broad, shallow channels to steep sided valleys with exposed rocky slopes such as the lower Donnelly River. Many watercourses terminate on the plains, while others flow into the peaceful inlets and estuaries that feature regularly along the coast.

The swampy lowlands and estuaries are separated from the coast by a belt of solidified and active dunes. Unconsolidated dunes overlay much of the coastal limestone and granite, and though stabilized by the vegetation, they are highly susceptible to disturbance and erosion.

The coastline of sweeping white sand beaches as seen at Windy Harbour is interrupted by exposed, foaming nearshore reefs and rugged cliffs. The cliffs at Point D'Entrecasteaux and between West Cliff Point and Cliffy Head, and those at the mouth of the Donnelly River and Nullaki Peninsula, are some of the more prominent. Rocky outcrops, wave-cut platforms and granitic headlands which guard gently curving beaches and inlets also feature on this coast.

In the upper reaches of the Donnelly River, and exhibited as rugged columnar outcroppings at Black Point, unique examples of dark Bunbury Basalt can be found. The occurrence of lunettes, or crescent-shaped dunes, on the eastern margins of Nornalup and Wilson's Inlet, is also notable.

Vegetation

The vegetation in this area is diverse in composition and structure, ranging from sedges to low heath, woodlands and forests.

On the hills and slopes above the swampy corridors, the vegetation is determined by soil type and exposure. Inland areas dominated by granite outcrops support scattered Bullich *(Eucalyptus megacarpa)* and a thin shrub community of Peppermint *(Agonis flexuosa)*, soft feather flowers (*Verticordia spp.*), Wattles (*Acacia spp.*), and the cushion-like *Andersonia sprengeliodes*. Ferns, mosses, liverworts and lichens form the lush, green ground cover.

The extensive taller forests in this Character Type include the grey, fibrous barked Jarrah (*Eucalyptus marginata*) and mottled, rough barked Marri (*E. calophylla*) which occur in a mixed patchwork pattern with the imposing Karri trees (*E. diversicolor*) with tall, smooth silver, cream and peach variegated trunks. The Karri's occur, often abruptly, in various areas in this landscape, from shallow gullies to hill slopes, to low plains abutting granite outcrops, to the summit of low hills, reflecting the occurrence of red to yellow-brown loamy soils it favours.

The soft, lush understorey includes a variety of Wattles with bright yellow blooms, Hazels (*Chorilaena spp.*), Water Bush (*Bossiaea aquifolia*), Bull Banksias (*B. grandis*) with rough bark and long, deeply serrated leaves, Snottygobbles (*Persoonia longifolia*) and a dense shrub layer of cool Peppermints and a diversity of sinuous, twining creepers.

The lower, poorly drained slopes have a low open woodland of stunted Jarrah-Marri forest occurring with a dense, low shrub layer of Hibbertia spp., Peppermints, Paperbarks *(Melaleuca thymoides)*, Isopogon spp., Blackboys *(Xanthorrhoea preissii)*, and graceful Native Willows (*Oxylobium lanceolatum).*

In the lower areas of the plain, the variability of the water table effects the vegetation cover surrounding the swamps and lakes, and often heath and sedge will merge without distinct definition. The heaths are mainly of Swamp Bottlebrush *(Beaufortia sparsa)*, Pea Bushes (*Pultenaea reticulata),* Myrtle *(Astartea fascicularis)*, Black Gin *(Kingia australis)*, Mountain Kunzea (*K. recurvata*) and Tea Tree (*Leptospermum sp.*). Sedgelands of Gahnia, Anarthria, and rushes occur with scattered Christmas Tree *(Nuytsia floribunda)*, and thickets of Paperbarks. Adjacent to the estuaries are thickets of Wattie *(Angonis juniperina)*, Oxylobium, Samphires, Sedges and Paperbarks.

The inland dunes and hummocks have woodlands of Banksia, Sheoaks, and Bullich, with a dense understorey of Jacksonia, Blackboy and Zamia Palms *(Macrozamia reidlii).*

The plains feature some unique examples of endemic plant species, notably the Albany Pitcher Plant (*Cephalotus follicularis*), the vivid Red Flowering Gum *(Eucalyptus ficifolia)*, and the glossy red blooms of Swamp Bottle-brushes. The area is also renown for its unique and diverse array of delicate native orchids.

The coastal zone exposed to salt spray and high winds supports woodlands of Bullich, Bushy Yate (*Eucalyptus lehmanii*), Peppermint, Banksia and Sheoaks, with shrubby Prickly Moses*(Acacia pulchella)*, Jacksonia, Zamia Palms, Tea Tree and Hakea. The coastal heaths include aromatic Boronias and bristly Spinifex.

Much of the native vegetation characteristic of the Scott Coastal Plain is protected and conserved by National Parks, including Scott, William Bay, Walpole-Nornalup, D'Entrecasteaux, West Cape Howe and Torndirrup.

Waterform

Numerous watercourses drain the Scott Coastal Plain, often terminating in the estuaries and inlets that occur at regular intervals along its length.The major rivers include the Blackwood, Scott, Donnelly, Warren, Gardner, Shannon, Deep, Frankland, Kent, Denmark, Hay, King, and Kalgan. Many minor rivers, streams and springs also occur.

The inlets of the south coast like Wilsons at Denmark are often seasonally closed by sandbars throughout the summer, forming lagoons running parallel to the coast. Earlier coastal dune movements have resulted in the establishment of several large lakes, including some freshwater,

such as Lake Jasper, numerous swamps, wetlands and estuarine systems, which are significant to migrating waterfowl.

The swampy lowlands that lie inland which back the coastal dunes are largely fed by the meandering rivers before they pass through the dunes to the Southern Ocean. The dissections which these rivers create through the plain varies from shallow valleys to steep eroded cliffs.

Land Use

A large percentage of the privately owned land of the Scott Coastal Plain has been cleared for a variety of uses. Multi-purpose farming is dominant with pastoral land for sheep, pigs, cattle and dairy farming, and land cultivation for vegetable production is prevalent.

Aboriginals were employed for their excellent bush skills and knowledge of the area by early settlers of the southern coastline. However, after the land was cleared, their traditional way of life was constricted and many were moved to Aboriginal settlements such as Carrolup near Katanning or Moore River, while others remained as labourers. Communities remaining in the area today continue, where possible, traditional activities such as hunting, gathering and camping, maintaining close ties with the land and their cultural identity.

Extraction of limestone near Point D'Entrecasteaux has been long-standing in this region and the removal of low grade peat has occurred in isolated areas. Currently, several selected sites in the Scott Coastal Plain are being considered for the further development of heavy mineral sands mining ventures. Logging of both hardwood and softwood resources takes place both in State forests and plantations.

The bays and estuaries along this coastline provide a perfect situation for a large fishing industry which takes good advantage of the schooling and breeding grounds for various species of commercial fish found abundantly along the southern coast.

Fishing, at spots such as Black Point, is also just one of the attractions along this scenic coastline for the considerable population of tourists and holiday-makers who flock to this area annually. Quiet shores such as Mandalay Beach and Peaceful Bay entice swimmers and sunbathers alike, as well as other water sport enthusiasts. Towns like Walpole and Denmark have become other popular holiday destinations, as has the tiny fishing settlement of Windy Harbour.

The conservation zones such as D'Entrecasteaux National Park, Walpole-Nornalup National Park Mt Frankland National Park and the Shannon National Park are a significant land use on the Scott Coastal Plain. Heavily vegetated, they encompass much of the coastline here in uninterrupted lengths, for the protection of its unique vegetation, water, wildlife, leisure and scientific research values.

DARLING PLATEAU
VISUAL LANDSCAPE CHARACTER TYPE

The Darling Plateau Landscape Character Type occurs in the south-west of the State, bordered to the west by the steep Darling Scarp and the Swan Coastal Plain Character Type, to the north and east by the extensive, open Wheatbelt Plateau Character Type and by the low-lying Scott Coastal Plain Character Type to the south. It features two distinct Sub Types within its forested borders: the Darling Uplands and the Blackwood Plateau.

Distinguishing Features

The Darling Plateau is a deeply dissected, rolling landscape to the east of the abrupt Darling Scarp. It is an ancient laterized land surface cleaved by major V-shaped river valleys, and features numerous rough granitic outcrops and valuable water reservoirs.

Extensive areas of tall Jarrah forest and enclosed views, framed by the trees and the rolling landscape, are the dominant visual characteristics of the Plateau, and the magnificent towering Karri trees are a highlight, occurring at the southern margins. Many small towns are scattered over the Plateau, being remnants of a once widespread timber industry in this region.

Climate

The Darling Scarp landform has a significant effect on the precipitation levels of the Darling Uplands as its presence results in a rainfall peak about 10km east of the Scarp and decreases progressively north-east. Average recordings range from 1280mm in Dwellingup to 970mm in Collie. Reliable rainfall can be expected between May and August.

Temperatures in summer are generally moderate at the Scarp, increasing further inland. January is the hottest month with a daily maximum of 23°C. Winter temperatures are mild dropping to a minimum of 9°C in August.

The climate of the Blackwood Plateau is temperate. Reliable rainfall occurs largely between the months of May to August, with a variability of 1200mm in the south decreasing to 1000mm in the north. Temperatures throughout range between a mild 21°C average maximum in summer and 11°C average minimum in winter.

DARLING UPLANDS
LANDSCAPE CHARACTER SUB TYPE

The Darling Uplands Sub Type is an undulating, dissected land surface with the rubbly, pale orange lateritic soils and pea gravels cloaked by extensive areas of tall forest. It is an ancient erosional plateau cut by deep, steeply sided valleys, and studded with impressive granite outcrops (monadnocks), extrusions and boulders which contrast with the surrounding landscape, most notably at Monadnock National Park. Many small hills which rise above the general elevation include Mt Saddleback (567m), Boonerring Hill (528m), and Mt Keats (478m).

The Darling Uplands is bordered to the west by the Darling Scarp which is the surface expression of the Darling Fault. This rugged and rocky landscape rises abruptly from the Swan Coastal Plain Landscape Character Type to a height of approximately 300m ASL and is most clearly expressed between Muchea and Dardanup. The major percentage of its surface is made up of shallow soils and exposed extrusions of granitic caprocks covered by remnants of scrubby vegetation in many areas.

The eastern region of the Darling Uplands develops into a landscape of gentler slopes with fewer distinct dissections. Similarly the Collie region is in a depressed basin where the undulations become more shallow with some broad, sandy flats and swamps. Further South, in the vicinity of Bridgetown, Balingup and Nannup on the Blackwood River, the landscape of the Darling Uplands becomes more distinctly rolling, with deeply eroded, steep-sided valleys, creating one of the most picturesque landscapes in the State.

Valleys are a major landform feature of the Darling Uplands and the watercourses of this landscape are largely responsible for the shaping of this ancient erosional surface. The network of tributaries and the swampy depressions from which many headwaters spring all culminate to form the steep-sided and strongly dissected valleys.

This Sub Type is dominated by the tall, grey barked forests of Jarrah *(Eucalyptus marginata)* which have developed on the pale orange lateritic soils as one of the finest hardwood forests in the world. Once almost pure stands of this towering Eucalypt were common, but the early utilization by the timber industry have left only pockets of virgin forest. Subsequent invasion into the Jarrah forest by disease has left many stark openings, exhibiting clumps of yellowing Banksia's and Blackboy's as well as the emergent bare grey limbs of Jarrah, silhouetted above the surrounding green canopy and severely impacting the visual quality of the forest. Interspersed with areas of cleared pastoral land, the forests which are today managed by the State still cover extensive areas throughout this Sub Type.

The rough, grey trunks of Marri *(E. callophylla)* are associated with the Jarrah forest, but is more common, even dominant on the loamy soils of the lower valley slopes and gullies and towards the eastern and northern perimeters. The valley floors of the Darling Uplands Character Type offer a diverse mixture of mottled, dark Blackbutt *(E. patens)*, creamy, smooth barked Wandoo *(E. wandoo)*, and more notably in the southern parts, pale Bullich *(E. megacarpa)*.

Understorey plants associated with these trees and laterite soils include soft Sheoaks (*Allocasuarina fraseriana*), olive, serrated leaved Bull Banksias (*B. grandis*), Zamia Palms *(Macrozamia reidlii)*, Blackboys *(Xanthorrhoea preissii)* and the pale green leaves of the Woody Pear *(Xylomelum occidentale)*.

Many smaller shrubs, climbers and herbaceous species are scattered amongst the undergrowth of the Jarrah forest. Sinuous vines with glossy leaves are seen twining over the lower branches of bushes and trees, decorated by splashes of bright red or vivid blue flowers. In the springtime, wildflowers appear in profusion. Red and green Kangaroo Paws *(Anigozanthus manglesii)*, bright yellow Hibbertia, the sky blue Leschenaultia (*L. biloba*) and carpets of vivid yellow Wattles (*Acacia spp.*) are commonly seen amongst the undergrowth and scattered along roadsides.

The vegetation of the Darling Scarp depends on soil depth and rainfall, creating a variable growth pattern for many species, and has created specialised and characteristic flora. The upper slopes with areas of shallow soils and scattered granite outcrops support the yellow trunked Butter Gum *(E. laeliae)* and the scrubby Rock Sheoak *(Allocasuarina heuegliana)*. Lower slopes of the scarp and areas of deeper soil feature Wandoos with Marris, and where the slopes of the scarp are less acute, Jarrah becomes more dominant. Flooded Gum *(E. rudis)* and peeling white trunks of Paperbarks occur in some areas of the river valleys as they dissect the scarp to reach the Swan Coastal Plain.

Heath and herblands occur on the rough granite outcrops and rounded monadnocks. Trapped water in eroded depressions over their rough surface feature liverworts, mosses, algae and lichens, and they are often fringed by Rock Sheoak.

To the south of the flooded gum covered swamps of the Collie area, and the Jarrah forest over the hills of Nannup, Western Australia's tallest tree begins to appear. The smooth yellow-white and grey mottled trunks of the Karri *(E. diversicolor)* stand out like pale sentinels amongst the surrounding olive green forest. These cathedral-like, towering trees occur in scattered pockets in their northern limit, and become more concentrated in cool, ethereal gullies near Pemberton and at Beedelup and Warren National Parks. Far beneath the Karri's open canopy, Karri Oaks *(Allocasuarina decussata),* Banksia's, Wattles and other soft, large leaved shrubs occur commonly in the sun dappled understorey.

Several watercourses deeply dissect the surface of the Darling Uplands and scarp with diverse valleys and irregular slopes, and contribute to the extensive weathering which is evident over its surface.

Major rivers which drain the area from the north to the south include the Avon, Serpentine, Murray, Collie, Harvey, and the Blackwood which, with its tributaries, drains much of the southern area. Associated with these rivers are major dams including Mundaring, Serpentine, Wellington, Logue Brook and South Dandalup. These reservoirs supply water for the Perth and metropolitan area, and benefit the populations of the Swan Coastal Plain and Darling Plateau, as well as the Goldfields and part of the Wheatbelt.

Many low swampy depressions are scattered over the Darling Uplands. These are generally the springs or headwaters of the creeks and tributaries which weave over the ancient land surface. Many swampy areas are also apparent in the shallow sandy depressions of the Collie basin.

Extensive tracts of laterized soil on the Darling Uplands which have remained uncleared for agriculture have been designated as State Forest. Multiple forest land uses include timber and water production, conservation and recreation.

Many formerly forested areas which have been clearfelled or were badly effected by the dieback disease have been replanted with exotic Pines *(Pinus spp.)* and Tasmanian Bluegums *(Eucalyptus globulus)*. Large, uniform areas of the dark green Pine are visually dominant in the Blackwood Valley landscape between Bridgetown and Nannup, often exhibiting abrupt, geometrical edges, contrasting with the surrounding landscape.

The Jarrah forests also provide a popular recreational amenity, providing many areas for picnics and barbecues, scenic drives and panoramic views. Numerous walk trails thread their way across the landscape, most notably the Bibbulmun Track. The larger rivers provide many leisurely or exciting pastimes and host major boating events such as the Avon Descent and the Blackwood Classic.

The views of the major water catchments which occur on the Darling Uplands are favoured by the surrounding region of native forest, as its retention is an assistance in controlling water quality. Honey production is also dependent upon these forested areas.

Clearing for agriculture in this Visual Landscape Character Type is mostly concentrated on the red alluvial soils of the valleys and slopes. Grazing of sheep and cattle are predominant in many areas, with the various greens of numerous orchards dotting the hillsides, notably in the vicinities of Hacketts Gully, Donnybrook and Balingup.

The Aboriginal tribes formerly residing in this Character Type were constricted by the clearing of much of the forested land for farming and the increasing activities of the timber industry. Many Aboriginals went to settlements such as Carrolup near Katanning and at Moore River, while others remained in small scattered communities. Today the retention of traditional land use activities such as hunting, gathering and camping are ongoing, with the preservation of their cultural identity.

Many major mineral resources are utilized by extractive industries on the Darling Uplands Sub Type. Bauxite leases cover large areas to the east of the Darling Scarp around Dwellingup and Jarrahdale. Tin and tantalite have been mined in the low hills around Greenbushes since the turn of the century, and coal is extracted from the valleys of the Collie and Wilga basins. Large quarries for the extraction of blue metal occur along the Darling Scarp and its vicinity, and lateritic gravel is excavated from numerous shallow pits scattered over the plateau.

Conservation areas of the Darling Uplands consist mostly of specialised nature reserves. These are areas of land specifically designated to protect an ecosystem for preservation and research of rare or endangered species of fauna or flora. This includes Lane-Poole Reserve near Dwellingup, Kulikup Reserve near Kirup, and Boolading Reserve in the Collie District. John Forrest and Serpentine are only two of the National Parks which occur on the Darling Scarp to the north of the Darling Plateau and are widely utilised due to their proximity to Perth and the Metropolitan areas.

Collie is the largest population centre of the Darling Uplands Sub Type outside the "hills" suburbs of Perth. Smaller towns including Manjimup, Donnybrook, Dwellingup and Bridgetown, occur at regular intervals along its length. Many more population centres than this once occurred in this area. The remnants of towns such as Grimwade, Willow Springs and Donnelly River and the railways that once linked them are a reminder of the once bustling timber towns of years gone by.

BLACKWOOD PLATEAU
LANDSCAPE CHARACTER SUB TYPE

The Blackwood Plateau Visual Landscape Character Sub Type extends westerly to the Leeuwin-Naturaliste Coast Character Type, easterly to the Darling Scarp, and is sandwiched between two coastal plains - the Swan to the north and the Scott to the south.

It is a low, undulating plateau, from 80-180m ASL, which was once extensively capped by pale orange, gravelly laterite. The remaining lateritic gravel and sand is underlain by ancient sediments and dark Bunbury basalt, sloping downwards from north to south and from east to west. The Whicher Scarp is a noticeably abrupt marine erosional feature which marks the northern boundary of this area.

The U-shaped valleys which cut into the surface of the plateau are generally associated with the Blackwood River, which is considerably wider here then further upstream. St John's Brook and St Paul's Brook, the tributaries associated with the Blackwood River, drain the southern area of the Sub Type, and the Capel, Ludlow and Abba Rivers drain the northern margins. The central region of the Blackwood Plateau contains some large swampy areas which are associated with the headwaters of Margaret River and its tributary, the Mowen River, which dissect the central area of the plateau. Largely uncleared, the vegetation of the Blackwood Plateau consists mainly of an open Jarrah *(Eucalyptus marginata)* forest with Marri *(E. calophylla)*. The trees here generally don't reach the stature which is associated with their species on the Darling Uplands, and are described as stunted.

The well defined lower storey consists of large serrated leaved Bull Banksia's *(B. grandis)*, soft, tall Sheoaks *(Allocasuarina fraseriana)*, and Snottygobbles *(Persoonia longifolia)*. The lush undergrowth spreading beneath the understorey consists of spiky Zamia Palms *(Macrozamia reidlii)*, Wattles (*Acacia spp.*), shiny,dark green leaves of the Hovea, Black Gins *(Kingia australis)* and the strappy leaved Pineapple Bush *(Dasypogon hookeri)*. The swampy regions in the upper reaches of the Margaret and Mowen Rivers feature sedgeland surrounded by Paperbark *(Melaleuca preissiana)* and Banksia's.

Forestry is the main industry in the Blackwood Plateau. The best timber often occurs in the valleys, but the higher rainfall and swampy regions favour the proliferation of Jarrah dieback disease, and pale grey skeletonised limbs of trees are a common sight emerging above the canopy. Pine plantations have been established in some areas, often replacing portions of badly diseased native forest.

Cleared pastoral and agricultural land occurs on the lower slopes and valleys of the Sub Type, featuring sheep and cattle grazing, and a patchwork of irrigated orchards.

Beside the State managed forests, no conservation areas presently exist in this region. However, several conservation parks and nature reserves have been proposed by CALM to be established in the near future. These include St John's Brook Conservation Park and the Blackwood Conservation Park.

Towns are virtually non-existant in the Blackwood Plateau, and the small timber town of Jarrahwood is the most notable settlement, a pale reminder of the once bustling South-West timber industry.

WHEATBELT PLATEAU
VISUAL LANDSCAPE CHARACTER TYPE

The Wheatbelt Plateau Visual Landscape Character Type occurs in the south to south west of the state, bounded to the west by the rich forests of the Darling Plateau, to the east and north by the extent of the vermin proof fences and the base is formed by the vast Southern Ocean. There are three distinct Landscape Character Sub Types occurring within its boundaries: the Dryandra Uplands, the Merredin Plateau and the Esperance Plains.

Distinguishing Features

This wide, open landscape of long views is dominated by its agricultural land use. The natural vegetation has been extensively cleared from this area which openly displays the almost level to gently undulating topography. Scattered remnant vegetation stand sentinel at the periphery of the broad fields or are clustered in groups surrounding granite outcrops and on the low laterite hills. These surviving remnants provide not only a refuge for wildlife, but in their scattered solitude become, in areas, dominant landscape features.

The seasonal cycle of the cereal crops varies the colours of this landscape, from ploughed hectares of rich terracotta soils to rippling vivid green shoots contrasting brightly against the sky, to a swaying golden carpet of ripened grain to a greying spikey stubble after the harvest.

This region is part of the Great Plateau of Western Australia, a very ancient landmass which has been worn down by natural erosion. The underlying granitic basement rock is visible in several areas in this Landscape Character Type as lichen encrusted outcrops, tumbled piles of boulders or as immense, dominating features.

The drainage patterns throughout this Landscape Character Type are unique to each Sub Type. The Dryandra Uplands features westward drainage to the Indian Ocean, and the watercourses of the Esperance Plains drain south into the Southern Ocean, while the Merredin Plateau is characterised by a linked chain of low-lying saline wetlands and salt lakes which only flow after exposure to extremely heavy winter rains.

Aboriginal communities scattered over the Wheatbelt Plateau today focus their current and future land use activities on the maintenance of their cultural identity and their close links with the natural environment. In various areas over the Character Type they continue traditional activities including hunting, gathering, camping and wood collection for fires and crafts, ensuring their cultural knowledge is passed on to future generations.

Climate

The Wheatbelt Plateau Landscape Character Type is dominated by an extra dry mediterranean climate which infers warm to hot sunny days with cool nights in the summertime, to very cool, wet winters with a reliable rainfall.

The levels of precipitation in this region are highest at the south-western border and along the southern coastline, tending to decrease further inland. Average annual rainfall amounts vary from

389mm at Wongan Hills, 623mm at Wandering, 618mm at Esperance, to 281mm at Southern Cross. The useful rainfall for the dominant agricultural land use occurs generally over winter and spring, between May and October, with occasional heavy summer storms which bring heavy rain.

The Wheatbelt Plateau has approximately seven to eight dry months per year. Temperatures tend to increase further inland in association with the decreasing rainfall. Mean maximum temperatures range from 22°C at Narrogin and Esperance to 26°C at Southern Cross, and many areas regularly feature temperatures over 30°C.

DRYANDRA UPLANDS
LANDSCAPE CHARACTER SUB TYPE

This Sub Type extends easterly from the green forests which cloak the Darling Plateau Character Type to the division which marks the westerly limit of the wide shallow valleys of the Merredin Plateau Sub Type. This area is an agricultural landscape featuring extensive open bleached blonde paddocks, occasionally punctuated by dams and windmills, with long views across the undulating terrain

The valley systems in this Sub Type have dissected the terrain more distinctly than those further east, and the head-waters of many westward flowing watercourses originate here including the Williams-Murray system. The extensive catchment areas of the Avon and the Blackwood Rivers have a widespread influence over the topography and the eastern margin of the Sub Type marks the limit of their constant westward flow.

The vegetation of the Dryandra Uplands is dominated by cereal crops and pasture, which have pushed the native remnants to the periphery of their extent. Patches are common along fence lines, enclosing and shading roads as well as marking the meandering watercourses, dissecting the gently undulating landscape. York Gums (*Eucalyptus loxophleba*) regularly feature along the roadsides or as scattered clumps in cleared fields. This straggly tree with rough grey bark is often seen growing in combination with the low bushy Jam Tree (*Acacia acuminata*) which dominate in remnant vegetation patches where the taller trees are not prevalent. The pale silver grey or mottled creamy yellow of Wandoos (*Eucalyptus wandoo*) are also seen along the roadside as part of the mixed low woodland and as isolated shade trees in cleared fields. Larger areas of remnant vegetation often belie outcroppings of granite. They appear as tumbled piles of lichen encrusted boulders, as horizontal sheets of rock peppered with low tenacious plants such as Pincushions (*Borya sphaerocephala*), and as large domes which dominate the surrounding landscape, e.g. Boyagin Rock.

Low pale terracotta coloured hills of lateritic gravel are scattered over this terrain appearing as isolated islands surrounded by crops and pastoral land. These eroding hills, and also areas of dissected laterite and pale clay known as breakaways, are made more apparent by the patchy remnant vegetation decorating their slopes, often consisting of Powderbark Wandoo (*Eucalyptus accedens*) and Brown Mallet (*E. astringens*).

The Dryandra National Park is a distinctive highlight of this Sub Type as it is a reminder and impression of part of the natural landscape which existed before the extensive clearing for farming was undertaken. This large area features a remnant Wandoo and Powderbark Wandoo woodland forest which is quite distinct from the expanse of agricultural land which surrounds it. The strong line created by the smooth mottled creamy yellow bark of these trees contrasts with the green grey of the sparse low herbaceous undergrowth and patches of soft Sheoak and prickly Dryandra thicket. Dense areas of young Wandoo trees with thin brown and silver grey whippy trunks occur in patches, with the glossy leaved Brown Mallet, which has also been established in plantations, seen scattered amongst the older Wandoos.

The major river valley systems, such as the U-shaped Hotham River valley, were the first areas to be cleared by early settlers for agriculture. Extensive areas of pastoral land dissected by split post fences, dotted with numerous herds of sheep and occasionally cattle, intermingle with broad fields of cereal crops.

The visual attributes of the long, low grey-white storage silos, and the occasional abandoned farmhouses built from local materials, are as much of this altered landscape as natural features. Farming communities and towns form a major part of the cultural character of this landscape, featuring many well known historic sites and associated structures. Two of these historic sites include the Spanish style Benedictine Monastery and community at New Norcia, and the Aboriginal settlement at Moore River near Mogumber, which were originally established here to look after Aboriginals of the south-west who were displaced by European settlement.

Northam is the largest population centre of the area, closely followed by Narrogin, and smaller communities include York, Kojonup, Toodyay, and Brookton.

MERREDIN PLATEAU
LANDSCAPE CHARACTER SUB TYPE

Pastoral fields, expanses of cereal crops and wide, open views are the dominant characteristics of this Sub Type, extending from the Dryandra Uplands Sub Type to the western edge of the Kalgoorlie Plain Character Type, and north to the Meekatharra Plateau Character Type.

The sweeping views of the wide, shallow valleys of the ancient drainage channels and distant low cresting hills are often unobstructed by remnant vegetation. The valley systems of this Sub Type are almost indistinguishable, no longer exhibiting the constant flow of watercourses as they once did. The waterbodies are present in the form of a series of linked saline wetlands such as Lake Dumbleyung and as expanses of shallow, shimmering salt lakes such as Lake Grace and Lake King. The periphery of the wetland areas are generally fringed by the soft green grey Swamp Sheoaks (*Casuarina obesa*) and pale trunked Saltwater Paperbarks (*Melaleuca cuticularis*) with the succulent low red Samphires (*Halosarcia sp.*) growing on moist salt flats. Many of these wetland areas reflect the growing salinity problems widespread in this region. Skeletonised trees with bleached fingers reaching skyward are often a common sight in patches adjacent to, or in some cases almost encompassing, the wetland area.

The tall, flat topped Salmon Gum (*Eucalyptus salmonophloia*) appears as the dominant tree amongst the small patches of remnant woodland vegetation and denotes the location of the richer pale pink clay soils. The smooth, glowing bark of the delicate trunks reflect silver greys with creams, pinks and peaches, a subtle presence amongst the grey greens of the low surrounding mallees (multi-stemmed Eucalypts) and other shrubby growth. The sturdy mottled silver and pale orange trunk of the Inland Wandoo (*E. capillosa*) occur as isolated specimens glimpsed occasionally in the landscape or with other trees in small huddled groups, including Redwoods (*E. transcontinentalis*), Red Morrels (*E longicornis*), and further toward the eastern border, glossy copper barked Gimlets (*E. salubris*). Low shrubby Sheoaks and Acacias are commonly dispersed in the sparse understorey, occasionally with olive Slender Banksias (*B. attenuata*), Flat-Topped Yates (*Eucalyptus Occidentalis*), and the bushy Roadside Tea Tree (*Leptospermum erubescens*).

A mallee-heath combination, often dominated by low bushy Acacias, black and grey Tamma's (*Allocasuarina spp.*), Broombush and Honeymyrtles (*Melaleuca spp.*), is common in remnant patches where soils are predominantly the pale apricot to soft yellow of the sandy loams (known locally as the sandplains). These remaining low vegetation fragments occasionally follow roads as linear reserves, enclosing the long views to encompass the rich diversity and colour of the sandplain heath. Spectacular colourful displays of wildflowers are produced by this richly diverse carpeting heath in the springtime, producing splashes of vivid colour amongst the ashy grey foliage.

Glimpses of the landscape beyond the sandplain heath reserves denotes what is more commonly visible in their absence. Often long, uninterrupted panoramas over the low-lying, gently undulating landscape are checked only by long lines of fences scored across the agricultural landscape. Distant linear silhouettes of remnant vegetation generally denote the location of a field boundary, a property entrance, or a narrow drainage line. Any area of even modest elevation in this gently undulating landscape becomes a landmark for several kilometres around. Small hills are often visible on distant horizons and isolated granite outcrops become a very distinct visual highlight, contrasting with the surrounding topography. Wave Rock at Hyden, an unusual granitic formation, marked with dark vertical streaks and surrounded by a soft whispering woodland of Rock Oaks (*Allocasuarina huegeliana*) is an impressive example of this.

Appearing faintly on the horizon as a series of small pyramid formations are the highlight of the Merredin Plateau - the Stirling Ranges. These seemingly insignificant distant rises quickly grow to the abruptly rugged ranges of unexpected proportions, standing out starkly from the surrounding topography. The ranges are blanketed by a dense, richly diverse heath, exhibiting a patchwork of muted colours and forms, interrupted by rugged, rocky bluffs and crags which are occasionally topped with a dazzling dusting of snow.

Human settlements within this Sub Type are sparse, with many small isolated communities scattered over long distances. Old buildings of soft red brick with timber boarding and corrugated iron are scattered throughout the towns and act as a reminder of the long farming history associated with the area. The long, white, geometric wheat silos again make their mark on the landscape, with only the quiet sidings and the long, parallel railway line for company, are often the only noticeable feature of the railway sidings. The largest rural centre here is Merredin and other small communities include Gnowagerup, Hyden, Mukinbudin, Lake Grace and Kondinin.

ESPERANCE PLAINS
LANDSCAPE CHARACTER SUB TYPE

The Esperance Plains Sub Type forms the southern fringe of the Wheatbelt Plateau Character Type and is located south of the Merredin Plateau Sub Type between Albany and Israelite Bay, meeting the Southern Ocean in a majestic coastline.

These low-lying, level to gently inclined sand plains are again dominated by the agricultural land use which has become widespread here in just a handful of decades. Long open views across the expansive fields of swaying crops and grazing livestock are only interrupted by silhouetted horizontal lines of trees or huddled clumps of remnant vegetation, or as long linear roadside reserves, such as the Hassell National Park.

The remnant vegetation forms a small but definite part of the sand plains landscape and is generally made up of a low but richly diverse heath interspersed with bushy mallees. Enclosing the long views for a brief time, near Ravensthorpe is an isolated pocket of taller, pale Salmon Gum (*Eucalyptus salmonophloia*) woodland, offering a surprising contrast to the big skies of the surrounding agricultural landscape and remnant low mallee heath. The heath displays subtle impressions of muted colours amongst the diverse vegetation. Soft green-golds and russets of new leaves combine with olive greens, greys and browns amongst the dense growth, and in the springtime, the wildflowers offer a spectacular show with splashes of cerise, soft pinks, vibrant reds, purples and oranges. The soft pale green oval leaves of the Tallerack (*E. tetragona*) are a common sight amongst the heath, often appearing as a straggly emergent slightly above the heath, and is in company with other mallees such as Bushy Yates (*E. lehmanni*), Hakea's such as the robust Ashy Hakea (*H. cinerea*), dense Melaleuca's, sprawling Grevillea's, bushy Banksia's and prickly Dryandra's.

Dissecting this landscape with broad, shallow floodwash plains or as deeply incised, U-shaped valleys are numerous intermittent watercourses including the Young, Lort, Fitzgerald, Gairdner and Pallinup Rivers, winding their way south, via inlets and estuaries, to terminate in the cold waters of the Southern Ocean. The broad floors of the incised valleys feature a more undulating, dissected topography, and closer to the coast, some feature caramel coloured slopes and cliffs of horizontally bedded spongilite (soft depositional rock of clays and sands), Eg. at Beaufort Inlet. The shallow floodways and the valleys are generally well vegetated with a taller dense heath, dominated by Melaleuca species, with small patches of Flooded Gum (*Eucalyptus rudis*) and Swamp Sheoak (*Casuarina obesa*), offering a stark line of remnant vegetation meandering across the gentle topography.

The largely uncleared coastal landscape at the southern fringe of the Esperance Plains Sub Type offers a picturesque combination of long, low, curving white beaches often backed by tall windswept solidified limestone dunes cloaked in a dense green coastal heath. These beaches and sweeping bays are protected by hard rounded rocky headlands formed by large stippled granite outcrops which protrude into the turquoise near shore waters of the Southern Ocean.

Interrupting this striking coastline at various intervals are the waters of the coastal estuaries and inlets, including the Oldfield, Beaufort, Torradup, Gordon, Fitzgerald, Culham, Barker, and the

uniquely deep Stokes Inlet, which are closed to the ocean for most of the year by low ribbons of narrow white sandbars.

The mottled and striated pinks and greys of the large, rounded, rocky granitic headlands and islands are a visual delight along this coastline, with the best to be seen in the vicinity of Esperance, Cape Arid and Cape Le Grand. Outcrops of this attractive rugged granite stud the many deep meandering riverbeds and is visible again in the rugged form of Mt Manypeaks. This abrupt, low range, like the Barrens in the Fitzgerald River National Park and the granite hills at Esperance, contrast with the coastline and the surrounding gently inclined sandplains, appear as small pyramid shapes on the distant horizon.

Backing the windswept dunes, the coastal hinterland features areas of trapped saline lakes and swamps, such as Pink Lake, which no longer have a connection with the sea. The salt flats of these shallow water bodies are fringed by the red shades of the low succulent Samphires (*Halosarcia spp.*) and are generally surrounded by dense stands of the scrubby pale Salt Water Paperbark (*Melaleuca cuticularis*).

Coastal vegetation has stabilized the fragile shifting frontal dunes, but is inundated in many areas by the stark fingers of dunal blowouts of varying sizes, appearing as slashes of glimmering white against the carpet of grey green heath vegetation. Forming the low dense scrubby heath along the coast are a diverse combination including bushy Wattles (*Acacia spp.*), Tea Tree thickets (*Leptospermum spinescens*), Broom Honeymyrtle (*Melaleuca uncinata*), bushy Banksias and in more protected areas, dense, low cool Peppermint (*Agonis flexuosa*) woodlands with some taller trees including Redheart Mallee (*Eucalyptus decipiens*), Redwood (*E. transcontinentalis*) and Flat-topped Yate (*E. occidentalis*).

Enclosing the sweeping ocean views of the bay at Esperance are a series of low stark granite islands which form part of the Recherche Archipelago, earning the area the whimsical title of the 'Bay of Isles'. These islands, as well as others scattered along the coastline, such as Bald Island and the Doubtful Island Peninsula, combined with the foaming and crashing of the nearshore limestone reefs and platforms, add an exciting offshore aspect to the coastal views.

Extensive areas cloaked by a velvety cover of diverse heaths and mallees, undisturbed panoramic vistas across a rugged coastal range, deeply dissected V-shaped valleys, stark spongilite cliffs, and smooth, gentle waters of rivers and inlets bespeak of the Fitzgerald River National Park, one of the highlights of this Sub Type. This is the largest area of uncleared land in the Esperance Plains Sub Type and is an expansive representation of the natural landscape which existed before large areas were cleared for agriculture. The steep, ragged Barren Range captures the focal point of many views over the park, starkly contrasting with the low-lying heath covered sand plains and shimmering blue of the Southern Ocean and Inlets.

Scattered along the length of this Sub Type are isolated towns which reflect the agricultural heritage of the area. Esperance is the largest population centre. It expanded historically due to its proximity to the goldfields, and more recently by the growth of agriculture and its attraction as a tourist destination. Featuring as an alternative energy source on the coastline at Twilight Beach are the upright windmills, large vertical structures with slowly rotating twin blades which form part of the recently established wind farm at Esperance.

Ravensthorpe and Jerramungup are two smaller communities situated inland to the west amongst fields of pastoral land and crops. Coastal townships such as Bremer Bay and Hopetoun reflect the fishing industry which has been in place here for several decades and is evidenced by small colourful fishing boats, often seen bobbing at anchor in the sheltered bays along the coastline.

KALGOORLIE PLAIN
VISUAL LANDSCAPE CHARACTER TYPE

General Description

The Kalgoorlie Plain Visual Landscape Character Type occurs to the north of the Esperance Plains Sub Type, between the Wheatbelt Plateau Character Type and The Nullarbor Character Type, and is bordered on the northern perimeter by the extensive mulga country of the Meekatharra Plateau Character Type.

A very gentle topography is characteristic here, and the terrain is interrupted by many long shallow salt lakes and conspicuous hills and low ranges.

Open Salmon Gum woodlands dominate extensive areas, with low mallees and scrubby heath over richly shaded soils, all featuring colours as bold and vibrant as the goldfields history which has shaped much of this landscape.

The major cities and towns of this area include Kalgoorlie/Boulder, Coolgardie, Kambalda and Norseman - which are synonymous with the rich gold mining history of this State.

Climate

Classified as an arid climate, the Kalgoorlie Plain Character Type is generally typified by clear days of uninterrupted sunshine, with temperatures increasing and rainfall becoming less seasonally reliable from the south-west to the north-east.

A period of very hot, dry weather occurs over the summer season, which extends from December through until about March, with temperatures commonly rising above 30°C. Kalgoorlie has a minimum average summer temperature of 17°C, reaching an average maximum of 32°C, with Norseman and Coolgardie offering similar ranges.

The winter months feature cold weather with temperatures often dropping below 2°C, and chilling frosts are common. Kalgoorlie's average winter temperatures range from 5°C to 17°C.

Regular winter rainfall generally occurs from May to August, but its unreliability and variability are characteristic. Kalgoorlie has an average fall of 257mm, but it varies between 488mm to 123mm. Norseman's annual average precipitation is 276mm, but it has a variance from 613mm to 152mm. Echoing summer thunderstorms also produce erratic falls of rain with bruised blue skies, a sombre backdrop over ochre soils.

Landform

The Kalgoorlie Plain Character Type is typified by an expansive, gently inclined landform which appears level in many areas. Views over this landscape are often enclosed and interrupted by the dominant woodland vegetation, but in patches of cleared land featuring low herbaceous growth, and from high points such as Mt Charlotte in Kalgoorlie or the craggy summit of Peak Charles, the broad, far-reaching views over the landscape extend to the distant, hazy, blue-grey horizon.

Interrupting these encompassing views are scattered low stony hills with rock peppered surfaces, abrupt rough granite or burnt red ironstone outcrops, and low dissected ranges. From a distance, these protruding forms appear as dominant focal points in the almost level panorama, and when viewed at close proximity, they command the landscape. The rugged rust and blue-grey streaked granite peaks include Peak Charles and Peak Eleanor (at Peak Charles National Park), Kangaroo Hills, Toonarrie Rock and Saddle Hills near Coolgardie, Mt Burges and Mt Hunt near Kalgoorlie, and the extensive Fraser Range on the eastern perimeter of the region.

Dissecting this subdued terrain are a series of shallow to almost imperceptible depressions which act as floodways, linking the extensive scattered chains of salt lakes after heavy rains. These shallow lakes are found in broad, indistinct valleys with the eastern and southern peripheral margins occasionally fringed by low-lying dunes.

The colours of the soft sandy soils of the Kalgoorlie Plain are a characteristic feature amongst the sparse, scrubby woodland undergrowth. The variable shades appear from hues of soft peach to warm, rosy pink-reds, to vivid, rich copper, tones which are often reflected in the smooth, glossy trunks of the woodland trees.

A layer of pale, stony rubble is often seen scattered over the surface of these shaded soils, and appearing occasionally are small rocky piles and rough mullock heaps. These remain today as physical reminders of the extent to which goldmining has impacted upon this region and reflects the past history of this Landscape Character Type.

Vegetation

The vegetation of the Kalgoorlie Plain is one of the intrinsic visual ingredients of this landscape, often enclosing and channelling long views, or opening up to reveal sweeping views of wide azure skies over the gently inclined landscape.

Tall woodland Eucalypts are the predominant vegetation type in this region, most notably the slender, flat topped Salmon Gum (*Eucalyptus salmonophloia*). Supporting shimmering, glossy leaves, the sleek, lustrous trunk of this tree displays variegated shades from silver grey and cream to pale salmon pink and warm peach.

Interspersed with the delicate Salmon gums are other tall, slender mallees. These include the fluid line of the burnished olive bronze to copper trunks of Gimlets (*E. salubris*) decorated by glistening leaves, the rough, dark stumped Cleland's Blackbutt (*E. clelandii*), the Goldfield's Blackbutt (*E. lesouefi*) with flaking bark revealing a smooth, light silvery brown trunk, Woodline Mallee (*E. cylindrocarpa*), the Red Morrel (*E. longicornis*) and the Redwood (*E. transcontinentalis*).

Views which penetrate deeply into the scattered woodland are obstructed only by a predominance of slender, whippy trunks. Two definite layers are often conspicuous in the understorey beneath the tall woodland trees. The upper layer consists of small, slender, dark-leaved mallees mingled with rough looking rounded broombush Borees (*Melaleuca sheathiana* and *M. pauperiflora*).

The lower layer appears as a patchwork of colours from the rich copper to pale peach shades of soils in open clearings occuring between the dull, dusty greens and furry greys of the shrubby vegetation including Grey Bush (*Cratystylis conocephala*) and Pearl Bluebush (*Maireana sedifolia*). Sheaths of tattered pale grey bark with twigs and discarded limbs are littered across the whole area.

After heavy falls of rain, soft grasses appear, covering the bare earth between the low shrubby plants, offering contrasting shades of soft silver and pale gold, with flashes of dull red. New growth on trees and bushes is distinct from the dark olive of mature growth, with dusted fringes showing fresh yellow and golden greens.

Toward the western perimeter of the Kalgoorlie Plain, the Salmon Gum woodlands become interspersed with broad patches of a low bushy heath. This heath, which is extensive in areas over sandy plains allows broader views over this gently undulating landscape. It is renown for its rich and colourful diversity and consists of low mallee-form Eucalypts with many shrubby Acacias, Grevilleas and Sheoaks.

In the springtime, a profusion of vividly coloured wildflowers appear amongst the normally soft green-grey heath, filling the air with the sweet scent of nectar. Wattles, sprinkled with bright yellow blossoms appear everywhere, mixed with red toothbrush blooms on Grevilleas, soft lacy grey Smokebush (*Conospermum stoechadis*), and profuse Red Bead Hopbush (*Dodonea lobulata*).

A wealth of smaller wildflowers abound between larger bushes, displaying splashes of bright blues, stark whites, yellow buttons and vivid purples. Delicate everlasting daisies perched on long delicate stalks are widespread, most notably the bright candy pink Schoenia (*S. cassiniana*) which blankets the ground extensively beneath the taller vegetation. A highlight of the heath vegetation in spring is the Flame Grevillea (*G. eriostachya*), a wispy bush emerging above the height of the surrounding heath, erupting in a blaze of tangerine blooms.

Fringing the edges of the shallow salt lakes are a collection of hardy salt tolerant shrubs including Samphires (*Halosarcia spp.*) which extend down onto the floor of the saline lakes, scrubby Saltbush (*Atriplex vesicaria*) and Bluebush. These lakes are generally surrounded by isolated dense thickets of shrubs and mallees, including the rough Poverty Bush (*Eremophila spp.*), rounded, bushy Wattles, Sheoaks, and low woodlands of the lustrous-leaved Boorabin Mallee (*E. platycorys*), often occuring on low dunes at the lakes edge.

Softening the abrupt rocky edges of the prominent granite peaks and outcrops are dense, low woodlands and thickets of rounded, broombush shrubs. Often pure stands of the soft, dark olive rock oak (*Allocasuarina huegliana*) huddle around the base with dense thickets of Wilyurwur (*Acacia lasiocalyx*) and bushy Jams (*A. acuminata*), with spiky, yellow-flowering Broom Honeymyrtle (*Melaleuca uncinata*), soft Tamma (*Allocasuarina campestris*) and the thick, Coarse-leaved Mallee (*E. grossa*).

Waterform

The extensive, ancient drainage lines which have been reduced to tortuous linear strings of saline lakes are the characteristic waterform of the Kalgoorlie Plain. These often extensive lakes offer mirror image views over their smooth surfaces to low windformed dunes on opposite shores. Lake Lefroy and Lake Cowan are two well known broad saline lakes seen between Norseman and Kambalda.

Scattered, glistening white salt flats often form part of a salt lake chain, and after periods of heavy rain, the saline water bodies flow into one another by linked drainage channels, appearing almost as inland seas. In dry periods, distant shimmering mirages offer false hopes of water in flat, dessicated lake beds.

The scarcity of freshwater in this region caused many problems for early pioneers and settlers until the advent of the Goldfields Water Supply. Apart from a few dams on grazing properties, fresh surface water is limited to shallow claypans which fill after heavy rains and retain water for some months. Small shallow reflective pools of water form on, or at the base of numerous granite outcrops which effectively provide run off to the pools, even after small showers of rain.

Lake Cronin, a small circular body of water in the western region of the Kalgoorlie Plain is unique in being an almost permanent source of fresh water, only drying up after years of low rainfall.

Land Use

Synonymous with the Kalgoorlie Plain landscape is the rich cultural history of the Goldfields. The discovery of gold in 1892 at Coolgardie and in 1896 at Kalgoorlie, and the subsequent colourful history of mining for the precious metal, has been a major influence on this landscape. It is in evidence almost everywhere, from the cars and trucks covered in rich ochre dust to the angular poppetheads and headframes which stand guard over the entrances to underground shafts, rising above the landscape.

Large, steep-sided, flat topped man-made mullock hills demonstrate the extensiveness of some of the open cut gold mines in this area. Nickel is the other major mineral which is being mined in this region at Kambalda, where the nickel smelter display a tall slender funnel stretching above the woodland trees.

A cultural legacy remains from the boom times of the goldfields in its grand buildings and architecture, protected from decay by the harsh and drying climate. The Kalgoorlie Mint, Boulder Town Hall, and Coolgardie Warden's Court are evidence of the mineral richness of the area and the accumulated wealth of the lucky few. A testimony and epitaph for those not so fortunate reads in the names of Broad Arrow, Ora Banda, Kookynie and Kanowna, just a few of the bustling communities that serviced the 'diggings' to be silenced with the last sighs of gold fever.

The ingenuity of the engineer, C. Y. O'Connor, solved the major water problems experienced in the goldfields by piping water all the way from Mundaring Weir, on the outskirts of Perth, to Mt Charlotte Reservoir in Kalgoorlie. Today, the water pipe is seen as a continual cylinder of silver grey paralleling the Great Eastern Highway to Perth.

The woodland forests surrounding Kalgoorlie today generally consist of regrowth trees. During the initial fever of goldrush, most serviceable timber within an extensive radius of the diggings was clearfelled for the use in the mines as pitprops, for construction and railway lines. Any other timber was used for fuelling the immense water condensers, and vast amounts were supplied to gain income by those not so lucky on the fields to fuel domestic and commercial fires. This once avid desire for the timber resource has been reduced greatly and today, the main dependency on wood is for domestic heating and the few licenced cutters generally need to travel considerable distances to attain their product.

Sandalwood trees (*Santalum spicatum*) have also been a desirable resource from this area for many years as an export product. Among the early pioneers were Sandalwood getters who forged their way through this inhospitable landscape, forming many of the early travel routes. Today, the tree is becoming increasingly scarce and trial plantation plots are now being established in reserves to ensure the industry's future. Sandalwood and other local trees such as the dark, lustrous Myall (*Acacia papyrocarpa*), the pale gold of the Native Pine (*Callitris columellaris*) and the pale Native Willow (*Pittosporum phylliraeoides*) are also appealing and attractive timbers for the local fine wood and craft industries.

Extensive pastoral leases are situated on lands generally to the east of Norseman and Kalgoorlie. They mainly feature herds of sheep, with an increasing number of cattle.

The largest population centre of the area is the City of Kalgoorlie-Boulder which has a bustling population of 27 000. Coolgardie, once containing a population of more than 16 000 people is almost regarded as a ghost town today with a population of 1 200. Kambalda's current mining boom has reflected in it's population of 5 000 and Norseman today, has 1 500 residents.

The original inhabitants of this land are a facet of the character of the Kalgoorlie Plain. Since mining activities commenced in 1896 in Kalgoorlie the Aboriginals have suffered social and territorial disruption and fragmentation associated with their relocation onto missions such as Cundelee, fringe settlements and reserves. Today, making up 7% of the population of Kalgoorlie, the Aboriginal people still retain strong emotional and spiritual ties with the area, even if they live great distances from their home 'country'.

THE NULLARBOR
VISUAL LANDSCAPE CHARACTER TYPE

The Nullarbor Visual Landscape Character Type occurs at the very south eastern corner of the State, abutting the WA/SA border. To the south it meets the Great Australian Bight abruptly with striking vertical sea cliffs and coastal plains, and the red sand dunes of the Great Victoria Desert encroach its northern borders. Three distinct Sub Types occur within its boundaries - the Nullarbor Plain, the Mardabilla Plain and the coastal Israelite Plain.

Distinguishing Features

Images of the vast, open, treeless plain and the endless skies which emphasise the flat, arid topography, are the lasting impressions of this region. The extensive expanse of the Nullarbor Plain proper, occurs mostly at the central part of this area, and the periphery is fringed by open Mulga, Myall, Sheoak and Mallee woodlands.

Rugged, stark coastal cliffs form part of the southern margin and are linked by wave-cut escarpments which are backdrops to the low-lying coastal plains and wind-swept dunes.

Below the intrusive narrow finger of the Kalgoorlie Plain Landscape Character Type is an extension of the Nullarbor. This area features rocky granite outcrops and low ranges emerging from the level topography which project above the surrounding landscape.

There are no existing watercourses over the entire area due to the nature of the arid limestone plain forming the landscape. Scattered saline lakes occur to the north, and chains of elongated lagoons are associated with the extensive coastal dune systems.

The visual landscape qualities of the Nullarbor Visual Landscape Character Type are unique to Western Australia. They stand alone from other Character Types which display greater variety and visual interest of such attributes as topographic and vegetative form, line, pattern, colour and texture. However, the Nullarbor's landscape monotony is of special visual interest and rate no lower than Moderate Scenic Quality.

Climate

The climate of the Nullarbor is classified as arid to semi-arid, with the open landscape providing relentless exposure to the desiccating heat of summer and the chilling winter winds, emphasising the sensation of remoteness and isolation experienced on the open plain.

Over the summer months, the temperatures are regularly influenced by the inland climate, often resulting in several very hot days. This pattern is generally followed by many cooler days derived from the moist air flow of the Southern Ocean. It is possible for temperatures to exceed 50°C in summer time here, but the general average summer maximum temperatures experienced include 26°C in Eucla, 33°C in Forrest, 32°C in Rawlinna and 25°C at Point Malcolm.

The cold winter weather is a result of the influence of the prevailing south-westerly winds from the Southern Ocean, and further inland, cloudless winter nights regularly result in bitter frosts.

Rainfall has a seasonal pattern along the coast, but the arid interior has a uniform distribution over the year. The precipitation overall can generally be characterised as both variable and unreliable. Along the coast, the seasonal rainfall occurs generally in winter as sporadic showers and the average annual levels include 257 mm at Eucla, 300 mm at Eyre and 400 mm at Pt Malcolm.

The rainfall levels decline further northwards and falls are evenly distributed throughout the year. Forrest receives 187 mm, Rawlinna 188 mm and Jubilee is recorded as low at 150 mm annually. Summer rainfall and occasional thunderstorms which leave booming echoes across the subdued terrain sometimes bring heavy but unreliable showers in localised areas.

NULLARBOR PLAIN
LANDSCAPE CHARACTER SUB TYPE

The Nullarbor Plain VLC Sub Type is an extensive area of land occurring to the immediate north of the sweeping blue embayment of the Great Australian Bight, to the south of the invading windformed dunes of the Great Victoria Desert, and continues eastward beyond the State border. It is stamped as a unique landscape with the pale floury soil and thin veneer of clay disguising one of the largest limestone areas in the world. This wide, open landscape is a near horizontal plain, tilting imperceptibly toward the sea.

The extensive treeless region at its heart is responsible for most of the characteristic images formed, with gentle undulations barely texturing its surface under a limitless sky with astonishing, virtually uninterrupted views over the vast terrain. Derived from the immense area of subterranean limestone, subdued landforms interrupt the open panorama at distant intervals. Over much of the plain and extensively in the southern region, round, shallow, clay-filled indentations, more commonly known as dongas, pockmark the surface. In some areas, these indentations merge to form linear, clay-filled corridor flats. These shallow depressions are separated by low, elongated, rubbly limestone strewn crests which occasionally run in a parallel pattern.

Much of the rough limestone beneath the level surface of the plain has been dissolved away leaving hollow cavernous formations such as Roaches Rest Cave and the extensive Cocklebiddy Cave. These subterranean features occasionally interrupt the level surface of the plain to reveal themselves in the form of roughly circular holes in the ground which are generally littered with stony, flat limestone rubble, often with sheer vertical or overhanging edges protecting the entrance to a sunless cavern beneath. Toward the northern perimeter of the plain, extensive, deep, enclosed depressions are scattered over the limestone surface. These flat floored cavities often exhibit rough, rocky walls and edges with sharp, abrupt rims following the circumference with pale, broken limestone protruding through the surface.

Emphasising the level topography of the Nullarbor Plain is a low carpet of Bluebush (*Maireana sedifolia*), the dominant vegetation. Rarely growing taller than ankle height, this twiggy grey blue shrub appears in the foreground as a scattered cover with many bare peach coloured clay patches between, and in the distance, forms a dense, tufted blanket continuing on into the far, level horizon. Often appearing unrelieved by another species of plants, Bluebush persists over the whole area, whether in the presence or absence of trees. Saltbush, including Bladder Saltbush (*Atriplex*

vesicaria), and tufted Bunch Grasses (*Stipa* sp.) are interspersed with Bluebush, and in some areas become more predominant, seen as a soft silver grey carpet.

The position of dongas over the plain is made conspicuous by providing the only areas where taller shrubs will grow on the plain. These shallow depressions pool rainwater and have slightly deeper clay soils than other areas, providing a more hospitable environment for plants such as Myalls (*Acacia papyrocarpa*), bushy Miljees (*Acacia oswaldii*), graceful, Weeping Pittosporum (*Pittosporum phylliraeoides*), and stiff, spiky Kurara (*Acacia tetragonophylla*).

Appearing at the periphery of the Bluebush plain are lonely, isolated specimens of the taller vegetation which is more predominant to the north and the west of this Sub Type. Tenacious Myall stands as green islands above a sea of Bluebush, and many brittle, skeletonised trees are scattered on the edge of the open plain, as victims of vermin, grazing and drought, which interrupt the long views to the distant, flat horizon. Moving toward the northern perimeter of the Nullarbor Plain, the gradually thickening tree cover over low grasses and Bluebush, is a mixture of tangled Mulgas (*Acacia aneura*), huddled groves of tall, wispy Black Oaks (*Casuarina cristata*) especially in the vicinity of the shallow saline lakes, Sugarwoods (*Myoporum platycarpum*), sinuous trunked Giant Mallees (*Eucalyptus oleosa)*, pear Fruited Mallees (*E. pyriformis*), spreading Witchetty Bushes (*Acacia kempeana*), spiky Kuraras, bushy Sandalwoods (*Santalum spicatum*), Quandongs (*S. acuminatum*) and a few scrubby Myall. Travelling towards the western perimeter of the Sub Type over the flat clay soils, the views of the open skies are enclosed by the dominant thick Myall scrub with wispy Black Oaks, Sugarwoods, and a few Mulgas over the patchy Bluebush and Saltbush ground cover.

Moving southerly, the Nullarbor Plain suddenly ceases with a startling abruptness 60-100m above the crashing waves and fringes of surging white froth from the relentless waters of the Great Australian Bight. From Point Culver to Twilight Cove the imposing, precipitous Baxter Cliffs form continual vertical to overhanging rugged walls, emphasised by shaded horizontal layers of rich toffee to pale cream. At Twilight Cove, the Hampton Scarp appears. This wave cut escarpment is an emerged and weathered continuation of the sheer rock face of the Baxter Cliffs, and links it to the corresponding Bunda Cliffs in South Australia.

At the base of the Hampton Scarp, a low-lying coastal plain has developed, dominated by extensive areas of windformed dunes. Some of these areas of deep, weathered sand have been piled up against the face of the Hampton Scarp where they have spilled over the rim to form unique clifftop dunes, seen at Toolinna and Eucla.

A low, diverse belt of mallee woodland fringes the summit of the Hampton Scarp and progresses further northwards, gradually thinning toward the extensive treeless plain. Ridge Fruited Mallees (*E. angulosa*), Soap Mallees (*E. diversifolia*) and the Giant Mallees are the most prevalent with the canopies becoming reduced closer to the cliff, pruned and buffetted by the prevailing winds. Slightly further inland, the mallee becomes more sparse with patches of soft blonde grasslands with Bluebush, Greybush (*Cratystylis conocephala*), Tea-Trees (*Melaleuca lanceolata*) and broombush under Soap Mallees, Red Mallees (*E. socialis*), Giant Mallees and Port Lincoln Mallees (*E. conglobata*). On the windformed sandpatches and precarious clifftops, a tenacious heath has established, with Ridge Fruited Mallees, Narrow Leaved Red Mallees (*E. foecunda*), and

Soap Mallees, bushy Rigid Wattles (*Acacia cochlearis*), and the Southern Plains Banksia (*B. media*) and low bushy *Banksia epica* being prevalent over the sandpatches.

Sandwiched between the abrupt Hampton Scarp from Twilight Cove to Wilson Bluff, and the curving embayment of the Great Australian Bight is a subdued coastal plain dominated by windformed dunes. Extensive rounded domes of bleached dunal sand occur from the western margin at Twilight Cove and stretch toward the centre of the level plain for several kilometres. Piled up in undulating mounds near Eucla, more bright dunes have collected, spilling over the top of the Hampton Scarp to encroach onto the plain beyond. Meeting the blue waters of the Bight, a fringe of elongated dunes with a rocky limestone shore mark the limit of the coastal margin, sending slender fingers of sand to encroach the subdued hinterland.

An extensive, open treeless plain with pale rubble scattered over its sandy surface separates these dunes and is dominated by a patchy cover of scrubby Saltbush (*Atriplex vesicaria*), with low Greybush and Bluebush beneath. Patches of succulent scrubby Samphires (*Halosarcia halocnemoides*) predominate in shallow saline depressions scattered over its surface.

Along the foot of the Hampton Scarp and the seaward margin of the plain, a belt of mallees which closely resembles those occurring on the plain inland, beyond the Scarp, enclose the Saltbush dominated heart. The Saltbush is still present beneath the taller whippy mallees with wavy branches decorated by a flat, lacy canopy, as well as Greybush and the spiky Spear Grasses (*Stipa hemipogon*). The scattered dense thickets of mallees include Giant Mallees, Narrow Leaved Red Mallees, with Frog Hakeas (*H. nitida*), Cue York Gums (*E. striaticalyx*), and dark, bushy Native Cypresses (*Callitris preissii*).

The undulating dunes are covered by a low bushy growth which provides a dense patchwork of tufted colours featuring various shades of greens and greys over bare patches of bright, bleached blonde sand. Rounded darker green Broombush (*Melaleuca* sp.), with Coastal Daisy Bushes (*Olearia axillaris*) and the sharp, spiky leaves softened by the feathery, wheat-like flowers of Spinifex (*Triodia scariosa*) are common, with other wind pruned heaths.

The response of the vegetation to good rains, and the change it makes to the appearance of the landscape is astounding. The scattered openings of bare ground beneath the trees and amongst the almost boundless Bluebush plains are overwhelmed by a dense carpet of pale green and soft golden grasses, with sprinkled dots of bright colour from ephemeral plants such as the flame-like glossy red and black Sturt Peas (*Clianthus formosus*), stark white spots of White Everlastings (*Helipterum floribundum*), bright pink Sticky Everlastings (*Helichrysum davenportii*), the soft pink pom-pom blooms of Hairy Mulla-Mullas (*Ptilotus helipteroides*) and the large, creamy yellow Splendid Everlastings (*Helipterum splendidum*).

Waterbodies play a very subtle role in the landscape of the Nullarbor. Other than the wide blue expanse of the Great Australian Bight, very few sources of permanent water are available. To the northern region of the plain, the extensive enclosed rocky depressions generally feature a centralised claypan where rainwaters pond after gushing down gullies formed in the steep walls.

The extensive, shallow salt lakes at the northern and western margins are only filled after rains with a few inches of saline water. Rare, ancient drainage lines are also apparent at the northern perimeter of this Sub Type, but today they show no obvious relation to rivercourses at all.

Further south on the extensive, open plain, the dongas collect water after rains, as well as the numerous rock holes scattered over the surface of the plain, providing unexpected sources of fresh water.

On the coastal plain below the Hampton Scarp, elongated interdunal lakes and claypans have developed, providing a vital source of fresh water to many early explorers and settlers before the numerous wells and bores were sunk to sustain the activities which take place on the Nullarbor Plain today.

The dominant activity over the lower half of this Sub Type is pastoral grazing, dominated by sheep which benefit from the Bluebush, Saltbush and ephemeral grasses as fodder, and are more tolerant to the levels of salinity in the Nullarbor Plain water. The importance of the bores and wells to the sustenance of this activity can be surmised by the numerous tracks and area of dusty bare ground surrounding each precious water source.

Rabbit shooters patrol areas on both sides of the border attempting to control the alarming populations which this pest has reached. The effect which rabbits have had on the Nullarbor Plain landscape is marked, stripping many areas of vegetation completely and leaving a devastated encompassing view of scattered, small black twigs over pale rubble which were once part of the Bluebush plain.

Nature reserves encompass extensive areas of this Sub Type. Most notably, the Great Victoria Desert Nature Reserve is almost totally enclosed in this region, at the north-eastern corner. The Nuytsland Nature Reserve incorporates the Baxter Cliffs and part of the coastal plain, and a portion of the Plumridge Lakes Nature Reserve is situated on the north west perimeter. At the south-eastern corner of this area is the Eucla National Park, which protects the extensive undulating dunes and the historical abandoned telegraph station.

The indigenous people of this region once widely inhabited the northern fringe and coastal strip below the Hampton Scarp, occasionally venturing onto the treeless plain after good rains. Today, the activity by Aboriginals in the region includes rabbit shooting and more traditional hunting, especially on the Great Victoria Desert fringe which abuts the Maralinga Tjaruta Lands in South Australia.

The abundance of extensive subterranean caverns has attracted many adventure enthusiasts to the area for underground explorations, but other than historical ruins and the abandoned telegraph lines, major tourist attractions are sparse. It is generally a region through which most people travel, enduring its incredibly straight roads to reach their destination, it is rarely a destination in itself. Aside from the scattered pastoral stations, the other sparse settlements are concentrated around the roadhouses, hotels and petrol stations on the Eyre Highway and the isolated railway stations along the route of the Indian Pacific.

MARDABILLA PLAIN
LANDSCAPE CHARACTER SUB TYPE

The Mardabilla Plain is the most southerly Landscape Character Sub Type of the Nullarbor. It is a flat landscape like many other parts of this Visual Landscape Character Type but its individuality stems from the occurrence of rough granite outcrops which stud its subdued surface. These outcrops present an imposing landform contrasting abruptly with the surrounding landscape and dominating the long views to the distant horizon. Mt Ragged (592m), occurs as part of the Russell Range, with other discerning peaks including Diamonds Hill and Mt Buraminya. Many smaller rough, rocky domes and rounded boulders protrude above the surface and include Mardabilla Rock, the Pups and Rays Rock.

The shaded pale peach clays cover the surface of the Mardabilla Plain disguising the characteristic limestone of the Nullarbor which is never far below the surface. This feature is more apparent towards the eastern border of this sub type where parts of the underlying rock have collapsed into craters and shallow caves such as Gecko Cave, breaking the smooth clay veneer of the plain and exposing rough, pale grey limestone rubble amongst the depressions.

Creating an abrupt edge on the eastern margin of the Mardabilla Plain is the Wylie Scarp. This steep landform once appeared as a continuation of the precipitous sea cliffs featuring along parts of the Nullarbor coastline, but it is seen today as a weathered backdrop to the narrow Israelite Plain Sub Type, and stretches from Pt Malcolm to Point Culver.

Enclosing the long views over the level terrain, widespread clumps of the distinct white-stemmed Many Flowered Mallee (*E. cooperiana*) are an attractive and striking feature of this plain. The smooth white bark of this low multi-stemmed tree contrasts brightly against the deep green lustrous leaves, with glimpse of purple on new branches. Interspersed with these conspicuous trees are isolated Salmon Gums (*E. salmonophloia*) with glossy variegated trunks of peach and silver, Alexander River Mallees (*E. microanthera*), Hook-Leaf Mallees (*E. uncinata*), and Giant Mallees (*E. oleosa*) which become more dominant to the north of Mt Ragged over a patchy Bluebush and Saltbush understorey.

The low shrubs forming the understorey beneath these trees often don't appear taller than knee height. Many of the stunted bushes leave gaps between the huddling clumps, revealing the smooth peach coloured clay soils with some scattered pale limestone rubble strewn over the subdued surface. Understorey plants include Cockies Tongues (*Templetonia retusa*) with bright red and pink flowers, Pink Bottlebrush (*Beaufortia schaueri*), splashes of red amongst the rich green foliage of Grevilleas (*G. pauciflora and G. plurijuga*), scratchy olive green Dryandra (*D. longifolia*) and low shrubs with silvery, scaly leaves and creamy flowers (*Microcybe* sp.).

The steep slopes and gravel strewn bases surround the abrupt peaks of the Russell Range feature vegetation slightly distinct from that of the surrounding plain. The gravel strewn sandy bases surrounding these protruding peaks are dominated by a diverse, thick sand heath scrub which features low mallees, the dark olive serrated leaves of the showy Banksia (*B. speciosa)* emerging above the heath, the tall, robust southern plains Banksia (*B. media*), and the prickly foliage of the oak-leaved Dryandra (*D. quercifolia*). On the lower slopes of the range, the mallees and Banksia disappear, and in their place the vegetation includes the soft grey green Scrub Sheoaks

(*Allocasuarina humilis*), interspersed with plants such as the One-Sided Bottlebrush (*Calothamnus quadrifidus*) and Needle Leaved Broombushes (*Melaleuca pentagona*). Moving toward the summit of the abrupt range, low, pale green Peppermints (*Agonis linearifolia*), bushy Baxter's Kunzea with soft, glossy red bottlebrush blooms (*Kunzea baxteri*), and low, bushy Cypresses (*Callitris preissii*) are predominant, especially close the exposed ridges.

There are no permanent waterbodies existing throughout this Sub Type. The only drainage lines present are very ancient remnants which have no directional flow. To the west and north west of the Russell Range, numerous small salt lakes occur in concentrated clusters, and are filled by good falls of rain. These are surrounded by narrow glistening sandsheets and low windformed dunes. Fresh water is collected in rock holes and they are filled by runoff resulting from good falls of rain. These, however, are intermittent and very unreliable.

There are no settlements whatsoever occurring in this Sub Type, presumably due to the harsh conditions and lack of reliable fresh water. The level of success of past attempts at settlement are exhibited by homestead ruins at Balbinya and Deralinya.

The major land use of the Mardabilla Plain is conservation. Cape Arid National Park extends from the coast northwards into this area, including the Russell Range and other prominent peaks nearby. Abutting the National Park's eastern boundary is the Nuytsland Nature Reserve which narrows as it reaches the coast, encompassing the Israelite Plain Sub Type and beyond.

ISRAELITE PLAIN
LANDSCAPE CHARACTER SUB TYPE

The Israelite Plain Landscape Character Sub Type is a low-lying coastal plain sandwiched between blue waters at the western edge of the Great Australian Bight and the abrupt Wylie Scarp.

Windswept coastal dunes dominate this narrow plain. Bleached blonde mobile dunes line the coast and reach into the sea, while further inland, extensive rounded dunal hills, such as the Bilbunya Dunes, are a highlight at the northern region. The shapes and patterns of the dunes forming here are slightly distinct from those in other parts of the Visual Landscape Character Type. This is due to the north-east trend of the plain below the scarp, which protects it from prevailing winds, resulting in more rounded rather than elongated dunal shapes.

Projecting through the pale dunes at scattered intervals in the southern region of the plain are low, rocky granite hills. These rough, solid forms contrast distinctly with the surrounding fluid lines of the windformed sand.

The Wylie Scarp, which appears as a backdrop to the plain, emerges in the area adjacent to Point Malcolm. Rising from sea level, this rocky, weathered escarpment reaches a height of 100m at its northernmost location at Point Culver. Here the Israelite Plain peters out and the scarp becomes part of the sheer Baxter Cliffs which continue eastward around the Bight.

At the base of the scarp, along its length and rising a small distance up the face, a scree of loose rubble has formed. Pieces of pale ochre clay and fragments of rough, grey limestone are scattered

amongst the sand, pebbles and small boulders which have fallen away from the escarpment to rest at its foundations. This accumulation of rubble inclines gently down to the plain to meet the softer lines of the encroaching pale sandy dunes.

Rugged granite headlands including Gegelup Pt., Cape Pasley and Pt. Dempster, occur at the southern coastal margin of this Sub Type, resisting the tumbling surf and strong persistent tides, protecting the narrow elongated plain beyond.

Adding contrast to the long views over the blue waters of the Great Australian Bight are nearshore limestone reefs evidenced by gurgling and foaming waters, and rocky granite islands such as Daw Is., Pasley Is., Bellinger Is., and the Eastern Group of the Recherche Archipelago.

The low dunes forming along the coastline of the plain are partially blanketed by a low, dense scrubby heath, contrasting with the bright areas of bleached mobile sand occurring at intervening patches. Some of the bushy shrubs occurring here and also over the deep sands of the stable dunes further inland, include Showy Banksia (*B. speciosa*) which emerges conspicuously above the general level of the rich heath, Coastal Wattles (*Acacia cyclops*), weeping Native Willows (*A. salicina*), Native Junipers (*Myoporum insulare*), the bushy One-Sided Bottlebrush (*Calothamnus quadrifidus*), and the spreading Granite Bottlebrush (*Melaleuca elliptica*). Much of the area over the stable inland dunes is also covered by a dense mallee scrub dominated by Ridge-Fruited Mallees (*E. angulosa*).

Small shallow swamps and elongated chains of coastal lagoons are frequently impounded in depressions behind the dunal systems. These often dry waterbodies are filled by good falls of rain in winter and also by the few shallow intermittent watercourses which descend the scarp.

The major land use of this Sub Type today is conservation. The entire area is part of the Nuytsland Nature Reserve which continues eastward around the Great Australian Bight.

Settlement here in the past has been unsuccessful and relicts of those attempts are shown by the abandoned homesteads at Wattle Camp and Glencoe, where there is also the ruins of an old jetty. Striding down the entire length of the coastline of this Sub Type is the old abandoned telegraph line which was once a vital communications link to many areas, but has today been long superseded by modern technology.

MEEKATHARRA PLATEAU
VISUAL LANDSCAPE CHARACTER TYPE

General Description

The Meekatharra Plateau Visual Landscape Character Type is situated to the north of the Wheatbelt Plateau and Kalgoorlie Plain Character Types, to the west of the vast Great Victoria Desert, and inland to the east of Shark Bay.

This is an ancient, eroded landscape typified by gently undulating plains, with rough, rounded granite outcrops and low, rugged ranges and hills appearing conspicuously on its surface. Small erosional scarps or breakaways and mesas are remaining evidence of a former plateau landscape which once overlay this area.

Covering this landscape almost unbrokenly with enduring tenacity is the mulga tree, a stunted form of Acacia. This is the principal vegetation of the Meekatharra Plateau Character Type and its predominance here makes this the most significant mulga region of the State.

The western portion of this Character Type features shallow drainage lines and upstream flow of westward flowing watercourses including the head-waters of the renown Murchison River which partially fringes the northern margin. Further to the east, extensive salt lakes, saline playas and clay pans are scattered over the subdued surface.

There are many small townships scattered over this Character Type including Laverton, Sandstone, Mt Magnet and Yalgoo. Other isolated communities in the area are associated with the extensive pastoral industry which is the dominant land use here, and at several mining areas. Many more bustling townships once graced this region, their inhabitants attracted by the lure of gold, but today most remain only as vague place names on old dated maps.

Climate

The Meekatharra Plateau Character Type received a semi-arid to arid climate. The low, often unreliable rainfall, the high evaporation rate, and the temperatures which regularly reach past 40°C all contribute to the dusty, parched impression of this landscape under broad azure skies.

Essentially, this is a dry region where droughts are as much a part of the climate as localised, short-term flooding. From the south western border to the north east, the seasonality of the precipitation varies from a partially reliable winter rainfall to moderately unreliable summer falls.

Yalgoo has an average rainfall of 262mm mostly from March to August. Meekatharra receives an average fall of 220mm annually, with a variability of 441mm - 66mm, and Laverton's average rainfall is 221mm which can very annually between 452mm and 66mm. Widespread, erratic falls of rain are also received from remnants of tropical cyclones from the northern region, from winter frontal systems of the south-east, and from scattered thunderstorms which roll over the landscape in summer.

The Meekatharra Plateau Character Type generally experiences long, hot summers with virtually cloudless skies, and temperatures often reach over 40°C. The winters are cool and mild. Laverton

experiences summer temperatures from the average maximum of 35°C to an average minimum of 20°C, and in winter the temperatures range from 18°C to 6°C. Meekatharra's summer temperatures range from a maximum average of 37°C, to a 23°C minimum, with a 19°C maximum and an 8°C minimum experienced in winter. Occasional winter frosts occur over most of the area, associated with clear, starry nights and cold weather.

Landform

Distinguishing the gently inclined plains under big skies which are dominant in the Meekatharra Plateau Visual Landscape Character Type are the warm terracotta to rich maroon shades which colour the soils and rocks in this region, creating a stark contrast with the rounded, olive mulgas, green-blonde spinifex tussocks, and the wide azure sky.

Sandplains of deep, burnt red shades form a notable part of this landscape. Generally appearing as a level to gently undulating land surface interrupted by a few long, scattered, windformed dunes, these sandy plains often occur on higher ground and are the remnants of the ancient, eroding plateau surface.

Fringing many of the sandplain regions as a sudden edge are abrupt, steep, rust shaded cliffs of rugged breakaways, such as the Barr Smith Range north-east of Sandstone, with irregular, rubble strewn concave slopes often gouged by vertical furrows. A horizontal layer of contrasting creamy grey clay is commonly seen leaching down the lower slopes of the scarps onto the stony, pale rubble strewn plain at the foot of the breakaway. This generally appears parallel with the flat-topped lip at the top of the scarp, which is decorated by a fringing line of silhouetted trees.

Other areas of extensive plains occuring in this landscape are generally strewn with irregular pale quartz rubble or orange red pea gravel, contrasting sharply with the maroon to burnt red soils. Earthy red soil plains which are free of rubble generally denote the location of the deep, compact hardpan, known as 'Murchison Cement', which is occasionally revealed fringing broad, shallow gullies.

Alluvial and floodwash plains with broad saline plains form an extensive part of this landscape, generally defined by the low, shrubby plants scattered across their level, often stony surfaces, and are occasionally fringed by low, red sandy mounds. More defined watercourses occur closer to the major river networks, such as the Murchison River, graduating from mud flats to shallow floodways, to large creeks which strongly dissect the plains toward the western perimeter of the Character Type, often apparent only by the concentration of vegetation following their meandering courses. Occasionally fringing some of the drainage areas are irregular, broken limestone platforms which appear a stark near white against the contrasting deep red earth surrounding the rough outcrops.

Extensive areas of long, shimmering salt lakes, such as Lake Austin, were once part of an ancient river system over this area, joined by the broad, shallow valleys in the aged plateau surface. Many of these considerable waterbodies show active weathering on their western shores by the presence of more rugged, rust shaded breakaway scarps and low rocky hills, littering gravelly debris down the gentle slopes to the lakes edge. The low eastern margins of the lakes are often hemmed by

rounded crescent dunes of deep red windformed sand and rubbly mounds of paler kopi (gypsum) dunes.

Disturbing the open, far reaching views over the gently inclined plains and interrupting the long horizontal skyline are isolated flat-topped, mesas and vertical buttes, rounded whaleback hills and low elongated, irregular ranges, which are often spaced horizons apart, appearing as low, dark, wavy mounds in the hazy distance. The gentle, maroon rubble covered slopes of these elongated ranges are generally softened by a contrasting thin cloak of dull green vegetation disguising the rough surface and lending to their appearing as an undulating hazy blue shaded form in the distance with concave crescent shadows on the gentle slopes revealing shallow gullies.

The low, solitary hills with rounded rubbly peaks and the extensive ranges are visually prominent in this landscape from every direction, such as Warramboo Hill near Mt Magnet, due to the accentuated contrast with the surrounding plain, revealing an almost full circle view of the gently undulating, windswept terrain. Other rocky mounds of eroded granite are scattered over the area at various localities, occasionally appearing as mottled rubbly horizontal sheets, such as Cockatoo Rocks near Goongarrie National Park, or as upright tors such as Mt Boreas near Laverton.

Vegetation

The vivid colours of the landscape in the Meekatharra Plateau Character Type are cloaked by a diverse, contrasting mixture of vegetation dominated by Acacias, most notably the hardy Mulga (*Acacia aneura*).

Mulgas are prevalent over much of this wide, open landscape and are a primary facet of many vistas, especially the extensive burnt red granite plains strewn with broken pieces of pale quartz gravel, and the copper shaded "Murchison Cement" hardpan. Appearing generally as a low broombush shape or as a wispy, rounded tree on slender black trunks, the Mulga huddles in scattered groves with irregular open areas revealed between them, exposing the richly coloured gravel littered soils and sparse, low undergrowth. They are also seen strewn across the plains in wide, almost evenly spaced intervals, contrasting as rounded dots of pale, dusty olive grey scattered over the burnt red soils, leaving long dark shadows in the golden light of early morning and evening.

Scattered amongst the scrubby mulgas are other Acacias, their presence often localised, denoting a change in the underlying soil structure or local topography. Mulga with the stiff Kurara (*A. tetragonophylla*) often occurs fringing drainage lines, and with the Hop Mulga (*A. craspedocarpa*) are seen in deep red soils within drainage lines. Limestone Wattle (*A. sclerosperma*) are seen around pale rough limestone platforms and the spreading Bowgada Bush (*A. linophylla*) often grows on rocky hills.

Other taller vegetation dispersed amongst the low, open woodland of Acacias includes the stark, smooth white bark of the Red River Gum (*Eucalyptus camaldulensis*) and the crooked, pale barked Rough Leaf Range Gum (*E. aspera*) which form part of an open fringe along less saline water courses. Coolibahs (*E. microtheca*) with distinct smooth silvery bark, Giant Mallees (*E. oleosa*) and Barlee Box trees (*E. lucasii*) are sometimes seen bordering limestone platforms, and pale, rubble strewn granite hills are generally covered with scattered Miniritchie (*A. grasbyi*) and

needle leaved Cork Trees (*Hakea subera*) as well as Mulga. The open, rough, grey barked Kingsmill's Mallee (*Eucalyptus kingsmillii*) if often seen with Mulga on deep red sandplains and the rubble strewn slopes and sheltered bases of breakaways sometimes features bushy, dark green Native Cypress Pines (*Callitris huegelii*).

Toward the western and southern borders of the Meekatharra Plateau Character Type, Mulga begins to lose it dominance over the landscape due to the increased seasonality and levels of winter rains. The wispy Horse Mulga (*Acacia ramulosa*) begins to be more prominent in these areas.

The low rough shrubs which form the sparse rounded shapes out in the wide, open landscape or as a understorey beneath the taller Mulga woodland are principally Poverty Bushes (*Eremophila* spp.) and Broombushes (*Cassia* spp.). The pale leaves of Wilcox Bush (*Eremophila leucophylla*), the dense, dark green glossy leaved Burra (*E. fraseri*), narrow leaved Warty Poverty Bush (*E. latrobei*) and the pale yellow-green leaves of the Turpentine Bush (*E. clarkei*) all contrast vividly with the dark red, often rubbly soils surrounding them.

Soft, silvery Grey Cassia (*C. desolata*), furry White Cassia (*C. luerssenii*), with pale grey Cotton Bushes (*Ptilotus obovatus*), are starkly distinct against the shaded soils. Other bushy shrubs seen in the Meekatharra Plateau Character Type include the smooth Native Senna (*Cassia pleurocarpa*), the broad Grass Leaved Hakea (*H. multilineata*), and the stiff, curved, needle-like leaves of the Djarnokmurd (*Hakea recurvata*).

Beneath these low bushes are stunted, rough herbaceous plants which are sparsely scattered over the burnt red soils. Many of the low herbs in this area are ephemeral, appearing and growing vigorously after good falls of rain. These plants exhibit an astounding variety of richly diverse colours in a massed display when flowering, from candy pink to mauve daisies with yellow hearts, to bright yellow and stark white everlasting, all seen generally as carpets of nodding blooms extending into the far distance. Included amongst these colourful flowers are the soft pink Narrowleaf Mulla Mulla (*Ptilotus drummondii*), vivid yellow and white Pompom Head (*Cephalipterum drummondii*), flaming clusters of glossy black and red Sturt Peas (*Clianthus formosus*), large creamy yellow Splendid Everlastings (*Helipterum splendidum*) balanced on long, delicate wispy stalks, candy pink carpets of Shoenia (*S. cassiniana*), pale Pink Velleia (*V. rosea*) and vivid yellow Bright Podolepis (*P. canescens*).

Rains also stimulate the vigorous growth of many types of grasses which are scattered over much of this region. Spinifex (*Triodia* and *Plectrachne* spp.) forms the only extensive areas of grasslands, seen over the burnt red sandplains as bleached blonde tussocky domes or rings with needle-like leaves projecting in all directions. After rains these spiky domes are softened by wheat-like flowers, rippling and swaying in the wind.

Banks of tenacious perennial tussock grasses occuring on the burnt red sand plains and sandy banks are known as Wanderri grasses, generally appearing under bushy shrubs such as Bowgada Bush, Wilcox Bush and Sandbank Poverty Bush (*Eremophila margarethae*). These grasses are under pressure from the widespread pastoral industry and their regularity over the ground varies from a fairly dense ground cover of spiky grasses with small, regular gaps revealing orange red soils, to sparse, isolated tufts and stubble amidst large areas of exposed bare soils. Bandicoot Grass (*Danthoria bipartita*) and Creeping Wanderrie (*Eragrostis lanipes*) are two of the perennial

Wanderrie grasses occuring here and Mulga Grass (*Aristida arenaria*) is one of the many short annual grasses which proliferate after rain, carpeting the ground with a thin veneer of wispy pale green to blonde blades.

The low lying areas in this region such as floodwash plains, salt lakes and their margins, are generally dominated by characteristic salt tolerant plants. These areas are distinguished by extensive regions of low, bushy blue-grey, pale olive and maroon shrubs which are often lower than knee height, with taller growth such as Mulga being generally sparse and conspicuous.

One of the dominant plant types on these low-lying areas is Saltbush (*Atriplex* spp.) including River Saltbush (*A. amnicola*), Bladder Saltbush (*A. vesicaria*) and the fuzzy, pale orange Spongebush (*A. spongiosa*). Other plants tolerant to these saline conditions are Bluebushes (*Maireana* spp.) including Sagobush (*M. pyramidata*), Satiny Bluebush (*M. georgei*), and the glossy leaved succulent Bronze Bluebush (*M. atkinsinia*). The rough, hairy Gee (*Dissocarpus paradoxus*) covered in round, spiky prickles, Sage (*Cratystylis subspinescens*) and the mat-like Seaheath (*Frankenia pauciflora*) are also widespread. Lake floors and margins are often dominated by the steadfast Samphires (*Halosarcia* spp.) which increased in density simultaneously with rises in soil salinity.

Salt lakes such as Lake Annean, are fringed by low dunes of kopi (gypsum) and dark red sands. The sandy mounds occasionally feature the slender Cue York Gums (*Eucalyptus striaticalyx*), or a few wispy Black Oaks (*Casuarina cristata*), but are mostly covered by a few scattered shrubs such as the erect Wheel Grevillea (*G. spinescens*), the stout, densly-leaved Kopi Poverty Bush (*Eremophila miniata*), and the unusual, upright, candelabrum shaped Dunna Dunna (*Lawrencia helmsii*).

Slightly away from the edges of salt lakes, more vividly colourful annuals display their nodding blooms, such as the pea flowered Purple Vetch (*Swainsona pterostylis*), which form extensive bright carpets, marking the lakes outer margins.

Waterform

The presence of water in the Meekatharra Plateau Character Type is very much dependant upon the rainfall. Periods of extended dry weather are common, creating a different landscape image from that experienced after good falls of rain have occurred.

In drought or dry periods, the vast, sinuous salt lakes of the eastern half of the Character Type, such as Lake Austin, Lake Way and Lake Barlee, appear as extensive, empty parched flats with glistening patches of white salt crystals fringing areas of higher ground. After periods of good rainfall, these lakes can become filled to the extent of appearing almost as inland seas. Linking along ancient, shallow watercourses, they are interrupted by low, rounded islands and peninsulas fringed by low, sparse shrubs and isolated trees.

Toward the western region of the Meekatharra Plateau Character Type, the waterforms appear as tributary creeks and as headwaters of major rivers including the Greenough River, and the Roderick and Sanford Rivers which eventually merge into the extensive Murchison River. In drier periods, these watercourses often appear as flat beds of water sculpted sand with small, isolated

blue pools of glassy water scattered along their length. After good falls of rain, the parched creeks and rivers can become muddied torrents, collecting and channelling water from the alluvial and floodwash plains. When the torrent has calmed, the water flows gently past broad tree fringed banks with small, isolated terracotta coloured sandy beaches. In some areas, the rivers broaden into stretches of quiet water such as Yalgar Pool, with steep, burnt red shaded rocky fringes surrounding the still surface which reflects the deep blue skies, the green fringing vegetation and occasionally the stark white trunks of the Red River Gums.

Shallow claypans and mudflats, such as Geeloo Claypan on the Greenough River, cover extensive ground often in the upper reaches of watercourses, where they spread out over large areas, with shoots of bright green grasses emerging above the smooth surface. Small, limpid pools of mirrored water are seen trapped in shallow depressions on rocky areas after rain, and pits of abandoned mines, such as Big Bell mine near Cue, become sheer-sided, rain filled waterholes.

Land Use

The dominant and widespread land use of the Meekatharra Plateau is the pastoral industry, which sees immense herds of sheep and occasionally cattle, grazing through the scrubby native vegetation on the extensive pastoral properties situated over the region.

Signs of this activity are present everywhere, from the isolated pastoral homesteads, often appearing as lush green oases, to the familiar whirr of the rotating grey metal blades of upright windmills which stand sentinel over the circular water tanks of corrugated iron, warm orange local stone, or smooth grey cement. Extensive lengths of fencing are common in this region, comprised of various materials. Piled, tangled lines of brush are formed into enclosures to yard sheep, geometric grey wooden fences form more permanent sheep yards near corrugated iron shearing sheds and other out buildings, and linear expanses of horizontal strand wire fencing interrupted at regular intervals by vertical star pickets or wooden posts form perimeters to grazing land. Often a stark contrast is obvious on fence boundaries, between land containing stock and areas free from grazing, known as the 'fence-line effect'. Areas outside the fences appear to contain a healthy range of diverse vegetation, while the areas inside the fences appear as having considerably reduced diversity with broad, bare red patches of earth common between plants, with sinuous fingers of the black and grey skeletons of former trees and bushes emerging amongst the sparse olive green growth.

The rich history of gold mining in this Character Type brought many areas of settlement to the region. Population centres such as Mt Magnet, Meekatharra and Leinster sprang up resulting from the tempting lure of riches and fame in the Murchison goldfields, but many more mining settlements such as Nannine and Field's Find, which were once bustling townships, are now only signposts pointing to mounds of dirt with forgotten relicts of houses and habitation.

Signs of the extensiveness which gold mining once had over this Character Type are apparent in many areas. Deep, gaping holes in the ground from abandoned mines, such as Big Bell mine near Cue, angular metal poppet heads perched precariously over smaller rubble strewn pits, and scattered piles of broken concrete with other discarded, rusting relicts amongst mounds of sand and rocks. More subtle visual influences which gold mining has had on the Character Type include the denuded regions surrounding many older towns such as Sandstone and Meekatharra

due to the wood taken for mining timbers and firewood. The pale grey clay slime dumps are also associated with many disused mines, and now wash over the ground in broad, flat grey sheets virtually obliterating all in their path.

Signs of on-going mining here include the immense, flat-topped mounds of spoils around open cut mines which stand in conspicuous isolation in the landscape. Within these deep mounds are descending rings of spiralling roads which descend into the open cut pit, travelled by virtual convoys of red dust covered oversized trucks and giant earth-moving equipment which rumble past the stark, angular mine buildings and grey metal structures. Minerals which are found in this area other than gold are silver, nickel, fuller's earth clay, copper and zinc, and precious stones including emeralds and opals.

Aboriginal occupancy was widespread throughout the region and the occurrence of Ochre pigments, particularly within the Weld Ranges at Wigemia near Meekatharra created a trade which reached far into the eastern part of Australia for thousands of years. Visual evidence of the cultural use and importance of these pigments can still be seen in the pale faded images of rock paintings, such as at Wolganna Rock, near Cue. The utilization of the lands by Europeans for grazing and mining resulted in dispersal and migration of the Aboriginal peoples. Communities have been established for some of the displaced Aboriginals at Mt Margaret and Cosmo Newberry on the eastern perimeter of the Character Type.

Conservation areas of the Meekatharra Plateau Character Type consist mostly of specialised Nature Reserves which act to protect and preserve samples of various ecosystems and the resident fauna and flora therein. The Goongarrie National Park east of Menzies is the only National Park throughout the Visual Landscape Character Type.

Meekatharra is the largest population centre of the Character Type, and smaller townships are Mt Magnet, Leonora, Laverton, Wiluna, Yalgoo, Paynes Find, Cue, Leinster and Menzies. These communities as well as the many pastoral properties are linked by long, straight roads, often unsealed, which support passing traffic, including the venerable road trains, leaving the fringing roadside vegetation coated in a pall of red dust.

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VISUAL CHARACTER TYPES OF WESTERN AUSTRALIA (DRAFT)*

1 KIMBERLEY PLATEAU
2 CAMBRIDGE GULF LOWLANDS
3 LEOPOLD-DURACK RANGES
- 3.1 FITZROY UPLANDS
- 3.2 CARR-BOYD RANGES

4 YAMPI PENINSULA
5 ORD PLAIN
6 SPRINGVALE HILLS
- 6.1 SPRINGVALE HILLS

7 FITZROY PLAINS
- 7.1 FITZROY RANGES

8 DAMPIER TABLELANDS
9 EIGHTY MILE PLAIN
10 STURT PLATEAU
11 GREAT SANDY DESERT
12 TANAMI SANDPLAIN
13 CENTRAL SANDPLAINS
- 13.1 MUELLER SANDPLAIN
- 13.2 STANSMORE RANGES AND DUNEFIELD
- 13.3 MACKAY DUNEFIELD
- 13.4 McDONALD SANDPLAIN
- 13.5 AMADEUS LOWLANDS
- 13.6 RAWLINSON PETERMANN RANGES

14 GIBSON DESERT
15 WARBURTON RANGES
16 GREAT VICTORIA DESERT DUNEFIELDS
- 16.1 STANLEY HILLS AND DUNES
- 16.2 CARNEGIE PLAIN
- 16.3 GLENGARRY HILLS
- 16.4 LEEMAN SANDPLAIN

17 THE NULLARBOR
- 17.1 NULLARBOR PLAIN
- 17.2 MARDABILLA PLAIN
- 17.3 ISRAELITE PLAIN

18 LITTLE SANDY DESERT
- 18.1 RUDALL TABLELANDS

19 DE GREY LOWLANDS
20 NULLAGINE HILLS
21 CHICHESTER RANGES
22 FORTESCUE VALLEY
23 KARRATHA COASTAL PLAIN
24 ASHBURTON PLAIN
25 HAMERSLEY RANGES
- 25.1 ASHBURTON VALLEY

26 GASCOYNE RANGES
- 26.1 TUNNEL CREEK HILLS

27 NORTH WEST CAPE RANGES
28 WOORAMEL PLAIN
29 MURCHISON PLATEAU
- 29.1 KENNEDY RANGES
- 29.2 MACADAM HILLS

30 SHARK BAY PENINSULAS
31 MEEKATHARRA PLATEAU
32 GERALDTON PLAIN
33 SWAN COASTAL PLAIN
34 DARLING PLATEAU
- 34.1 DARLING UPLANDS
- 34.2 BLACKWOOD PLATEAU

35 LEEUWIN-NATURALISTE COAST
36 SCOTT COASTAL PLAIN
37 WHEATBELT PLATEAU
- 37.1 DRYANDRA UPLANDS
- 37.2 MERREDIN PLATEAU
- 37.3 ESPERANCE PLAIN

38 KALGOORLIE PLAIN

BONAPARTE ARCHIPELAGO
BUCCANEER ARCHIPELAGO
DAMPIER ARCHIPELAGO
BARROW ISLAND
DIRK HARTOG ISLAND
HOUTMAN ABROLHOS
WYNDHAM
KUNUNURRA
DERBY
FITZROY CROSSING
HALLS CREEK
KARRATHA
ONSLOW
EXMOUTH
NEWMAN
CARNARVON
WILUNA
LEONORA
KALGOORLIE
NORTHAM
PERTH
NARROGIN
BUNBURY
AUGUSTA
ALBANY
ESPERANCE
GREAT AUSTRALIAN BIGHT

SCALE 1:3 000 000
0 50 100 150 200 250
N

*APPROXIMATE BOUNDARIES ONLY