

DESCRIPTION AND EVALUATION
OF MAJOR RESOURCE UNITS IN
SYSTEM 6 FOR RECREATION

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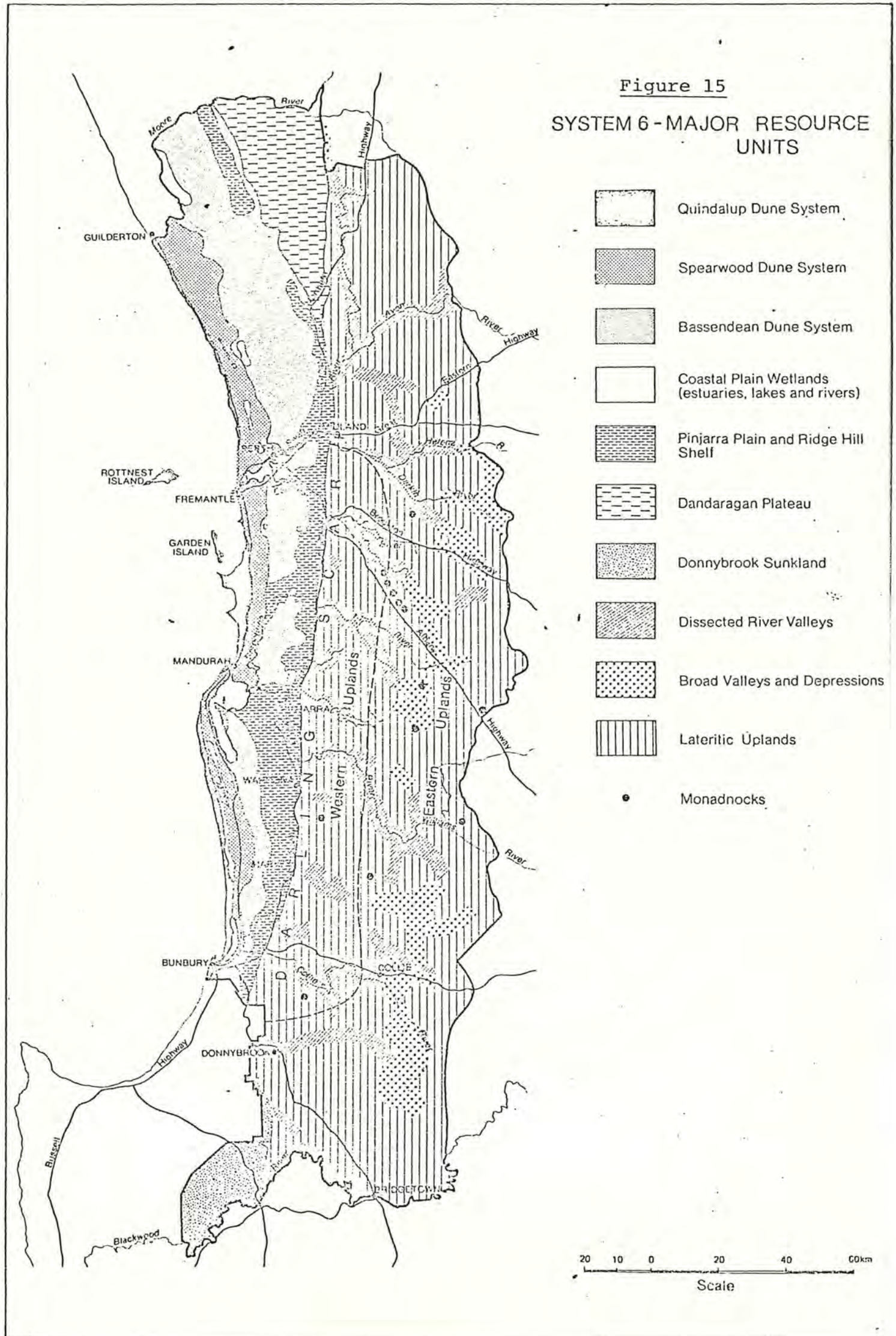
Within System 6, existing and potential recreation open space is found in a wide variety of physical settings, ranging from exposed ocean beaches, rolling coastal dunes, broad estuaries and wetlands to dissected river valleys, forested uplands and small granite peaks. As shown in Figure 15, the region has been divided into 13 distinctive resource units primarily on the basis of landform, soil and surface hydrology patterns.

These units are briefly described in terms of the environmental and cultural factors previously outlined and a general assessment is made as to their relative suitability for nature-based recreation. This assessment is subsequently used as a guide for making recommendations concerning the acquisition, reservation and management of recreation open space throughout System 6.

The description and assessment of the various resource units is based on information contained in publications by Bettenay, McArthur and Hingston (1960), Havel (1975), Havel and Batini (1973), Mulcahy, Churchward and Dimmock (1972), Seddon (1972) and the W.A. Forests Department (1975, 1976).

Figure 15

SYSTEM 6 - MAJOR RESOURCE UNITS



LANDSCAPE ZONE/UNIT: QUINDALUP DUNE SYSTEM

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - unconsolidated calcareous dunes occurring as a series of elongated sand ridges parallel to the coastline. Dunes are sensitive to human use and subject to wind erosion. Sand is high in lime and low in soluble salts.</p> <p><u>Vegetation</u> - main species are wattles (<u>Acacia cyclopsis</u> and <u>A. rostellifera</u>), Swan River cypress and Rottnest Island tea-tree. Unlike the Spearwood and Bassendean Dunes, the Quindalup Dunes do not support eucalypts or banksias.</p> <p><u>Hydrology</u> - most of the coastline within System 6, the western edge of Lake Preston and Leschenault Inlet and both Rottnest and Garden Islands are included in this landform.</p>	<p>Because of the adjacent water resources, this landform is highly attractive for a variety of land and water based recreational activities. Unit is very sensitive to uncontrolled development and use; substantial areas of coastline have incurred widespread damage as a result. Need to carefully control traffic to avoid erosion problems and sand blowouts.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - mixture of private and public ownership.</p> <p><u>Land use</u> - primary uses are for water-based recreation and residential development, (Yanchep, Mandurah, Rockingham, etc.). Some existing areas set aside as National Parks. Future use will intensify as residential development continues to expand along the coast north and south of Perth.</p> <p><u>Accessibility</u> - numerous roads which penetrate the dunes and provide access to the ocean. Access is much more restricted north of Yanchep and south of Mandurah.</p>	<p>One of the major recreational attractions of this landform is its location relative to the major population centres in System 6. Increasing use pressures emphasise the need for an environmental protection policy on the coastal zone as outlined by the E.P.A.</p>

LANDSCAPE ZONE/UNIT: SPEARWOOD DUNE SYSTEM

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - system of rolling dunes situated to the east of the Quindalup Dune System. Soils range from yellow and brown sands high in iron to outcrops of limestone. Sands are older and deeper to the east.</p> <p><u>Vegetation</u> - tall open stands of tuart, jarrah and marri on deeper sands. Tuart becomes increasingly dominant to the west on the shallower soils.</p> <p><u>Hydrology</u> - numerous small lakes and swamps located in the depressions between dunes. Unit has no external drainage. The boundary between this unit and the Bassendean System to the east is marked by a series of swamps and lakes.</p>	<p>Combination of lakes and wetlands, limestone outcrops, rolling topography and varied vegetation all contribute to aesthetic value of this dune system. Suitable for passive activities such as picnicking, nature study and walking. Areas around wetlands are sensitive to intensive development and use.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - primarily in private ownership with limited areas of National Park (Yanchep and Lake Clifton areas) and State Forest.</p> <p><u>Land use</u> - major use is for residential development in the metropolitan region. Extensive areas developed as market gardens around Wanneroo and Jandakot. Further to the north and south, large areas have been cleared as pasture land. Recreational use has centred around the small lakes situated throughout this unit.</p> <p><u>Accessibility</u> - much of the population of Perth lives on this landform. Outside the metropolitan area, principle road access is via the Old Coast Highway and Lancelin Road.</p>	<p>A major recreation resource for the residents of Perth because of location. The fact that this landform is also attractive for other urban uses makes it imperative that extensive areas be reserved as recreation open space. Need to set aside more resource based areas to compliment existing activity - based areas and man-made parks.</p>

LANDSCAPE ZONE/UNIT: BASSENDAN DUNE SYSTEM

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - low hills of grey siliceous sands with swamps in the interdunal depressions. Soils are infertile and deficient in calcium, iron and most other minerals.</p> <p><u>Vegetation</u> - open forest of banksia, coastal blackbutt and sheoak and diverse understorey of shrubs. As rainfall decreases to the north of Perth, the open forest gives way to low forest and heathland in both the Bassendean and Spearwood Dune Systems. Extensive areas of dieback infection.</p> <p><u>Hydrology</u> - poorly drained depressions and swamps which are situated over organic hardpans. Low quartz-sand ridges are excessively drained.</p>	<p>Value as a scenic resource relatively low in comparison to other landscape units. High conservation value where vegetation is largely undisturbed. Unit is suited to a range of recreational uses, subject to conservation constraint in undisturbed areas. Provision for the increased recreational use of plantations (such as at Gnangara) needs to be investigated.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - mainly private property to the south of the metropolitan region with a large area of State Forest to the north. Moore River National Park is located adjacent to the northern boundary of System 6.</p> <p><u>Land use</u> - variety of uses including sand quarrying, low cost housing, light industry, farming, and service corridors for utilities. Extensive pine plantations on the northern coastal plain. Recreational use has been minimal in the past.</p> <p><u>Accessibility</u> - outside the metropolitan region, large areas of this unit are relatively inaccessible to the public as a result of private ownership.</p>	<p>Unit subject to considerable human disruption, particularly in the metropolitan region.</p> <p>Need to ensure that potential recreation open space areas are not lost or destroyed by future low cost housing and industrial developments.</p>

LANDSCAPE ZONE/UNIT: PINJARRA PLAIN AND RIDGE HILL SHELF

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - broad alluvial plain (up to 12km in width near Pinjarra) and narrow adjacent ridge of rolling hills at the foot of the Darling Scarp. Land slopes gently westward and is dissected by numerous streams. Soils range from laterite overlying sandstone on the ridges to unconsolidated sediments on the Plain. Despite marked deficiencies of phosphate, zinc, copper, cobalt and other elements, soils are relatively fertile in comparison to other areas of the Coastal Plain.</p> <p><u>Vegetation</u> - originally mixed jarrah and marri. Large areas cleared for agriculture; some marri retained as open grassed woodland. Wandoo occurs on clay flats and swamp sheoak on the more poorly drained saline soils and flooded gum along the watercourses.</p> <p><u>Hydrology</u> - numerous seasonal swamps and waterlogged areas on the Plain. South of Perth, a number of streams cross this unit and empty into the Peel and Leschenault Inlets.</p>	<p>Principle recreation value is as a scenic resource. Low, rolling hills, parklike stands of marri, remaining uncleared stands of vegetation and farm structures provide an attractive backdrop to South Western and Great Northern Highways. Unit suited to intensive resource-based development such as at Serpentine National Park.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - largely in private ownership.</p> <p><u>Land use</u> - principle use is for agriculture with extensive areas cleared for pasture. Most densely settled portion of the coastal plain outside of the metropolitan reas; unit contains several small farming communities. The higher ridge areas are being increasingly lost to residential development and small hobby farms to the south of Perth. Recreational use, with the exception of Serpentine National Park, is minimal.</p> <p><u>Accessibility</u> - public access is restricted due to private ownership. Much of the unit is readily accessible by road, with the Great Northern and South Western Highways traversing the unit in a N-S direction.</p>	<p>Major problems are the lack of public ownership and loss of scenic values due to subdivision of farming properties. Need to purchase additional areas and insure, through zoning, the retention of scenic corridors along major roadways.</p>

LANDSCAPE ZONE/UNIT: DANDARAGAN PLATEAU

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - low plateau situated to the north of Perth between the Bassendean Dune System and Darling Plateau. Topography is variable, ranging from lateritic breakaways to low rises, shallow valleys, swamps and extensive sandplain areas. Soils are chiefly grey and yellow sands with some areas of red earthy sands, black earths, lateritic gravels and duricrust.</p> <p><u>Vegetation</u> - areas of closed heath and low open forest with various admixtures of marri, jarrah, wandoo, coastal blackbutt and banksia species.</p> <p><u>Hydrology</u> - number of swamps (some of which have permanent water) particularly on the eastern portion of the Plateau. The Moore River which forms the northern boundary of System 6, crosses the Plateau from east to west.</p>	<p>Unit has considerable scenic value, particularly to the north where clearing has not been as extensive. Plateau is primarily suited to activities which are compatible with the conservation of fauna and flora. Off-road vehicle activity should be directed to other, less sensitive units. Moore River is suited to water based activities such as canoeing.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - largely private property with some vacant crown land in the northern portion.</p> <p><u>Land use</u> - principle use is for agriculture. Extensive areas of the Plateau have been cleared for pasture, particularly in the southern half.</p> <p><u>Accessibility</u> - as Perth continues to expand northwards, distance of the Plateau from large concentrations of people is decreasing. Principle road access to the unit is via the Great Northern Highway to the east, the Bindoon-Moora Road and the Gingin-Dandaragan Road to the west.</p>	<p>Suitability as a future recreation resource is high if population continues to shift northwards. Property acquisition required to overcome access problem.</p>

LANDSCAPE ZONE/UNIT: DONNYBROOK SUNKLANDS

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - low, undulating plateau 100 to 180m above sea level. Unit slopes from east to west and from north to south. Soils range from infertile sandy lateritic gravels on ridge tops, to sandy depressions which are poorly drained and waterlogged for much of the year.</p> <p><u>Vegetation</u> - extensive areas of open jarrah with marri as a minor component. Some open flats supporting grass trees and shrubby jarrah. Unit is heavily infected with dieback; estimated that 60% of Sunklands may eventually become infected.</p> <p><u>Hydrology</u> - Unit is dissected by Blackwood River and 3 smaller rivers flowing north and west; 2 of these are intermittent streams flowing only in winter and spring months. Large underground aquifers.</p>	<p>The unit lacks diversity in terms of topography. The Blackwood River and St John's Brook are attractive focal points. Area is suited to range of active and passive uses. Main physical limitations are the presence of dieback (need to minimise future spread) and the sensitivity of river and stream banks to heavy and repetitive use loads.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - predominantly State Forest. Little land was alienated for agricultural use as a result of the infertile soils.</p> <p><u>Land use</u> - hardwood production; current proposal is to convert extensive areas of dieback infected or threatened forest to pine. Large areas of native vegetation to be retained for purposes of conservation of fauna and flora and recreation. Present recreation use centres mainly on the Blackwood River (marroning, canoeing, swimming, etc.).</p> <p><u>Accessibility</u> - unit is located approximately 50km from Bunbury. Principle road access is via the Vasse and Brockman Highways.</p>	<p>Major limitation is isolation of this unit with respect to large population centres. Potential conflict between recreation and protection of plantation areas from fire; can be minimised by channelling development and use away from plantations.</p>

LANDSCAPE ZONE/UNIT: DARLING SCARP

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and Soils</u> - Prominent N-S escarpment which rises approximately 300m above coastal plain. Unit is characterised by steep slopes and is dissected by number of sharply incised river valleys. Shallow podsolic soils overlying fresh country rock. Large areas of exposed granite. Surface classified as erosional.</p> <p><u>Vegetation</u> - mixture of marri, jarrah, mountain marri, salmon white gum and butterbark. Varied shrub layer. Moderate incidence of dieback. Unit considered to be non-protectable from further spread. Vegetation subject to periodic severe wildfires.</p> <p><u>Hydrology</u> - in western high rainfall zone. High rate of surface runoff as a result of shallow soils, steep slopes and large areas of rock exposure. Numerous rivers and smaller streams dissect the unit before entering the coastal plain; several waterfalls.</p>	<p>Elevated landform, steep slopes, rock outcrops, varied flora and deep river valleys all contribute to unit's value as a scenic resource. Scarp is particularly suited to non-motorised active uses such as bushwalking and rock climbing. Steep slopes and erodible soils preclude motorised use. Numerous scenic vistas and potential picnic areas (either at the base or top of the escarpment).</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - much of this unit is in private ownership. Some areas of National Park (e.g. John Forrest, Serpentine) and State Forest.</p> <p><u>Land use</u> - extensive areas cleared for pasture. Increasing amount of housing development as well as several quarries in the metropolitan region. Additional visual disruption caused by various utility and service corridors (SEC transmission lines, water pipelines, Alcoa conveyor line). Recreational use largely limited to existing National Parks and areas of State Forest.</p> <p><u>Accessibility</u> - close proximity to population centres. Unit is criss-crossed by and accessible from a number of all weather roads.</p>	<p>Unit is particularly attractive for recreation due to its proximity to large numbers of people. Major limitation is large amount of unit presently in private property. Potential conflict if and when smaller pipehead dams are constructed downstream of existing storage areas.</p>

LANDSCAPE ZONE/UNIT: DISSECTED RIVER VALLEYS

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - steeply sloping valleys, often with small areas of exposed granite. Valleys broaden out to the east, Soils are fertile red to brown earths which are subject to erosion. Low salt storage in this portion of the plateau.</p> <p><u>Vegetation</u> - marri with jarrah as the minor component. Some stands of blackbutt. Relatively dense understorey vegetation in comparison to uplands. Low dieback occurrence apparently due to the inability of the fungus to invade these soils.</p> <p><u>Hydrology</u> - area of rapid runoff and high water production per unit area. With the exception of the Avon and the Murray, all major rivers have been dammed before they reach the escarpment.</p>	<p>Scenic and recreational value is very high due to the steep terrain and presence of water. Valleys (downstream of dams and those still undammed) are suited to a range of water and land based activities. Careful control of vehicles required because of risk of erosion (no off road vehicle activity should be permitted). Need to zone valleys to separate incompatible uses.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - all of the major valleys south of the Helena are in State Forest; some scattered private holdings. Combination of National park, vacant crown land, timber reserves, private property, etc. along Avon River.</p> <p><u>Land use</u> - principle use is for water production. Recreation is excluded from active catchment areas, but permitted downstream of dams and in undammed valleys such as the Murray. Conservation of fauna and flora also important in undammed valleys.</p> <p><u>Accessibility</u> - limited to areas downstream of dams and undammed valleys. Long sections of the Murray readily accessible by road.</p>	<p>Apparent future conflict as valleys downstream of existing dams are utilised for water production. Need to weight additional costs of water treatment against advantages of permitting certain recreational activities on proposed pipehead and major dams.</p>

LANDSCAPE ZONE/UNIT: LATERITIC UPLANDS - WESTERN HIGH RAINFALL AREA

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - south western portion of the Great Plateau. Broadly undulating terrain 300 to 400m above sea level. Soils are lateritic sandy gravels over an ironstone cap; underlain at depth by kaolinite (clay) developed from decomposed rock. Surface is classified as stable. Low to moderate salt storage in the profile.</p> <p><u>Vegetation</u> - mixture of jarrah and marri with a second storey of bull banksia and sheoak. Occurrence of dieback is high as a result of past logging, road construction and mining activity. High position in landscape means many areas can be protected from further natural spread.</p> <p><u>Hydrology</u> - most of this unit south of the Helena is in active catchments. Water yield is only moderate due to well drained soils and high evapotranspiration rates.</p>	<p>No outstanding landscape attractions. Unit has physical capacity to absorb intensive activities and uses such as picnicking and trail and trial bike riding in selected locations (e.g. former bauxite pits). Number of former mill sites provide attractive focal points for development.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - combination of private land (mainly north of the metropolitan region) and State Forest.</p> <p><u>Land use</u> - uses include water production (catchment protection), hardwood production and, more recently, bauxite mining. Some agricultural clearing has occurred mainly north of Perth. All of this unit which is in State Forest north of Collie is currently held under mineral lease for bauxite.</p> <p><u>Accessibility</u> - portion in State Forest is well roaded. Vehicular access presently restricted, as the result of dieback quarantine regulations.</p>	<p>Most uses are currently prohibited as the result of catchment regulations and/or quarantine restrictions on access. However, a few areas have been developed with the consent of water supply authorities. The suitability of this unit (within State Forest) for future recreational development is made more uncertain by the future land use needs associated with mining and hardwood production.</p>

LANDSCAPE ZONE/UNIT: LATERITIC UPLANDS - INTERMEDIATE AND EASTERN LOW RAINFALL AREAS

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - generally similar to western uplands. Laterite mantled uplands characterised by gentle slopes. Soils have much higher accumulations of salt; bauxite deposits more limited in size.</p> <p><u>Vegetation</u> - predominantly jarrah and some marri with wandoo on the dissected lateritic slopes. Second storey of banksia and sheoak present in western uplands is largely missing; shrub layer is low and forest has a much more open appearance. Dieback occurrence low and unit considered to be protectable.</p> <p><u>Hydrology</u> - area of low water yield per unit area due to gentle landform and high evapotranspiration. Few surface water resources.</p>	<p>Uplands are suited to extensive recreational activities such as bushwalking and orienteering. Areas of agricultural clearing interspersed among open woodland add variety to the landscape and provide numerous panoramic vistas which are ideal for scenic drives. Greatest environment risk is the further spread of dieback by off-road vehicular activity. Erosion risk is minimal.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - mixture of State Forest and private property. Much of the unit north of the Great Eastern Highway and along the eastern boundary of System 6 is in private ownership.</p> <p><u>Land use</u> - major uses include the production of timber and water. Much of the unit is in active catchment and therefore most recreational activities are not permitted. Extensive areas to the north and east have been cleared for agriculture (primarily for sheep and grain production).</p> <p><u>Accessibility</u> - there are few all-weather roads. Large portions of this unit are currently off-limits to vehicular access as a result of quarantine regulations.</p>	<p>Under present catchment management policy, recreational activities other than hiking are not permitted. Unit is considerable distance from population centres and therefore is likely to be subject to fewer use pressures than are the more western landscape units.</p>

LANDSCAPE ZONE/UNIT: BROAD VALLEYS AND DEPRESSIONS - INTERMEDIATE AND EASTERN LOW RAINFALL AREAS

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - broad valleys and low undulating divides with gentle slopes; this landform includes Collie coal basin. Soils range from sands overlying mottled clays on the valley floors to grey and yellow sands on the low divides. Soils tend to be deeper in eastern valleys. Salt accumulation high in the valleys. Surface classified as depositional.</p> <p><u>Vegetation</u> - open woodland of flooded gum and wandoo and areas of treeless shrubland on valley floors. Woodland of jarrah, marri and banksia in various mixtures on sandy divides. Dieback occurrence low in the east to moderate in the intermediate rainfall zone. Unit considered to be non-protectable.</p> <p><u>Hydrology</u> - seasonally waterlogged valley floors. Low water yield per unit area.</p>	<p>Attractive landscape, particularly where open forest is interspersed with farmland. Unit is best suited to low intensity recreational activities such as bushwalking or sightseeing along major roads. Vehicular activity needs to be carefully controlled to minimise spread of dieback and to protect fauna and flora values.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - primarily State Forest with large blocks of private property to the east and north of System 6.</p> <p><u>Land use</u> - major uses are hardwood production and coal mining in State Forest and sheep and grain production on agricultural land. A portion of this landform falls within the eastern boundaries of existing catchment areas.</p> <p><u>Accessibility</u> - area remote from major population centres and serviced by few all-weather roads. Access is further restricted by quarantine regulations within State Forest.</p>	<p>Present recreational activity restricted as a result of catchment and quarantine regulations in State Forest and private ownership elsewhere. Considerable scope for managing selected road corridors as scenic drives.</p>

LANDSCAPE ZONE/UNIT: MONADNOCKS

RESOURCE EVALUATION FACTORS	LANDSCAPE DESCRIPTION	SUITABILITY FOR RECREATION
ENVIRONMENTAL FACTORS	<p><u>Landform and soils</u> - residual granite outcrops rising several hundred metres above the Darling Plateau. Steep slopes with shallow loamy soils and large areas of exposed granite. Surface classified as erosional.</p> <p><u>Vegetation</u> - mixed jarrah and marri with minor component of wandoo and butterbark. Diverse understorey, both in terms of number of species and structure. Dieback occurrence presently low. Unit is considered to be protectable from further natural spread due to elevated position and limited road access.</p> <p><u>Hydrology</u> - Rapid surface runoff and high water yield per unit area as result of steep topography and shallow soils.</p>	<p>The monadnocks provide outstanding views of the surrounding countryside. This is a highly attractive landform due to large rock outcrops, varied flora and steep topography. Unit is best suited to non-motorised, low intensity recreational activities, such as bushwalking, which are compatible with the conservation of fauna and flora. Additional road access should be excluded to minimise the problem of erosion and dieback spread.</p>
CULTURAL FACTORS	<p><u>Land ownership</u> - State Forest.</p> <p><u>Land use</u> - major uses include water production (catchment protection), recreation and conservation of fauna and flora. With the exception of Mt Dale Picnic Area, recreational use of this landform has been largely confined to dispersed activities such as bushwalking and rock climbing.</p> <p><u>Accessibility</u> - most of the monadnocks are situated close to the Albany Highway and within 80km of Perth. Road access within this unit is generally restricted to the surrounding uplands (two exceptions are Eagle Hill and Mount Dale). Area is presently within quarantine boundaries.</p>	<p>Unit is subject to water supply regulations governing the recreational use of catchments. Other areas are better suited (both from an environmental and land use standpoint) to more intensive developments and activities such as picnicking.</p>

A PROCEDURE FOR THE PREPARATION OF REGIONAL
AND DIVISIONAL RECREATION WORKING PLANS

