ASSESSING THE NATURE CONSERVATION AND OTHER VALUES OF CROWN LANDS WITHIN THE SHIRE OF KENT

Prepared for:

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Prepared by:

ECOSCAPE (AUSTRALIA) PTY LTD
LANDSCAPE ECOLOGISTS, ENVIRONMENTAL CONSULTANTS, MAPPING
21A Pakenham Street, Fremantle Western Australia 6160
Telephone: (08) 9430 8955 Facsimile: (08) 9430 8977
email: ecoscape@wantree.com.au
website: http://www.ecoscape.com.au

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Mal Graham (CALM, Katanning)
Brett Beecham (CALM, Narrogin)
Rachel Meissner (Environmental Biology, Curtin University of Technology)
Nick Jones (Environmental Biology, Curtin University of Technology)
Margaret Collins (UWA, Botany)
Rodney van Procter (WA Herbarium)
Diarmuid Piggot (Merriweb)
Piers Higgs (LandInfo)

SUMMARY

The vegetation, weeds and land-use of 25 Crown Land Reserves within the Shire of Kent, Western Australia were surveyed to enable the assessment of conservation and other values of these Reserves. A total of 31 quadrats were established to undertake this assessment.

The survey was conducted over a three week period in May 2000, using the methods of McDonald *et al.* (1998). In particular, the following features were surveyed:

- Vegetation floristics;
- Vegetation structure;
- Vegetation cover;
- Weed cover;
- Soil and landform characteristics;
- Adjacent land use;
- Significant sites (indigenous and non-indigenous); and
- Reserve features (including natural resource use and man-made features).

A total of 50 vegetation associations were identified based on a combination of structural and floristic information. A total of 23 vascular plant Families and 124 plant species were recorded, of which 106 were identified to at least species level.

Two species of Priority flora were identified. The mallee *Eucalyptus continens*' ms, located in Reserve 29001, Quadrat 8, is a Priority 3 Flora, which means it is a taxon which is known from several populations, at least some of which are not believed to be under threat. The shrub *Melaleuca cliffortioides*, located in Reserve 22683, Quadrat 28, is a Priority 4 Flora, which means it is a taxon which is considered to have been adequately surveyed and which whilst being rare, is not currently threatened by any identifiable factors. Also of note was the presence of Sandalwood (*Santalum spicatum*) in Reserves 23025, 20515 and 10685. Similarly, the Blue Mallet (*Eucalyptus gardneri*) was located in Reserve 22683, Quadrat 28. This species has significance as a source of tan bark, which was widely harvested in the first half of the 20th century.

A total of 50 fauna species were recorded in the Reserves surveyed, of which, none are classified as Priority or Endangered Fauna. However, a pair of Mallee Fowl (*Leipoa ocellata*), which is listed as being Vulnerable (considered rare or likely to become extinct) was sighted near the Chinocup Gypsum Mine on Chinocup Road.

The quadrats were placed in seven different landform element types, representing the range of landforms found within the Shire. These were plains, footslopes, hillslopes, hillcrests, dunecrests, drainage depressions and playas. The soil types encountered were also varied, and included sandy duplexes, deep sands, sandy earths, loamy duplexes, ironstone gravelly soils and non-cracking clays.

The extent of weed infestations was described fro each Reserve. Reserves 9992, 10739, 15296, 16374, 16387, 17526, 19167, 16387, 17526, 19167, 22683, 27660, 23219 and the contiguous Reserves 11519 and 13448 had generally low weed cover; Reserves 9445 and 14502 had moderate levels of weed cover; and Reserves 10685, 10740, 14450, 16428, 19003, 23025, 29001, 32885 and the contiguous Reserves 20515 and20516 had variable weed cover. No Reserve surveyed had consistently high (~80% or more) weed cover throughout the reserve. In general, weed cover varied with the level of disturbance within Reserves, the size of the Reserve and proximity to roadsides and internal tracks.

Four non-indigenous cultural heritage sites were found during fieldwork. These consisted of one soak, two dams and a tank with constructed drainage on a granite outcrop.

SECTION ONE: SURVEY DESCRIPTION

1. INTRODUCTION

Ecoscape (Australia) Pty Ltd was commissioned by the Department of Conservation and Land Management (CALM) to undertake an assessment of the nature conservation and other values of selected Crown Lands in the Shire of Kent within the Wheatbelt Region of Western Australia. Information collected in this survey will assist CALM and other land management agencies to evaluate the relative values of the Crown lands assessed, and to make informed recommendations on future management options.

Over the next five years, a large number of Reserves in agricultural areas will be assessed for changes in purpose and vesting. This is for a range of reasons including:

- Rationalisation of estate by Water Corporation, Water and Rivers Commission, and Office of Water Regulation;
- Continuing work by Department of Land Administration to have all Reserves and unallocated land covered by management orders;
- Rationalisation of estate by agencies preparing for the asset charges that Treasury is intending to levy over Crown lands; and
- Private interest in specific Reserves.

The Reserves assessed in the Shire of Kent form part of this review of bushland Reserves in agricultural areas. CALM is generally asked for comments on land identified as belonging to one of the above four categories. The information gathered in this survey will assist CALM with these comments, and to decide on the best use for unallocated lands, unwanted bushland Reserves and proposed CALM Reserves.

1.1. The Study Area

The Shire of Kent covers an area of 655,200 ha in the southern Wheatbelt region of Western Australia. Local industries in the Shire include the production of wheat and other grains, sheep and pigs. The principal towns include Nyabing in the west of the Shire and Pingrup in the centre of the Shire. Approximately 30 % of the Shire remains covered by original native vegetation, 10% of which is found on private land (Grein, 1994). The Shire has 10 'A' Class Nature Reserves, including Lake Magenta, Lake Chinocup and Lake Bryde Nature Reserves (Grein, 1994).

A total of 25 parcels of Crown Land within the Shire of Kent were assessed, totalling 1,563 ha in area. The Reserves ranged in size between 5 ha and 259 ha. The Reserves surveyed and their purposes are listed in Table 1.

1.2. Climate

The Shire has a Mediterranean climate, with cool moist winters and hot dry summers and an average annual rainfall of 350 mm (Grein, 1994). Average maximum temperatures range from 32.3^{o}C in January to 14.8^{o}C in July, while average minimum temperatures range from 14.4^{o}C in January to 5.3^{o}C in July (Grein, 1994).

Table 1: Crown Reserves surveyed in the Shire of Kent.

Res. No.	Polygon ID No.	Purpose	Area (ha)
9445	661185	Water	39.5
9992	663126	Water	40.4
10685	659567	Water	43.4
10739	644516	Water	35.1
10740	644533	Water	42.3
11519	665493, 665490	Water	51
13448	665487	Water	65.6
14450	661091	Native Flora	19.7
19003	661106	Recreation (Kent Shire)	20.1
14502	661142	Water	40.6
15296	644539	Water	59.4
16374	643768, 643770	Water	30.1
16387	661577, 661573, 661546	Water	41.4
16428	659516	Water & Camping	21.1
17526	660348	Water	43.8
19167	643792	Water	156.4
20115	643793	Quarry Gravel	12.3
20515	659639	Water	4.5
20516	659638	Public Utility	20.9
22683	643879	Water Tank Site	89.3
23025	659694	Water & Public Utility	19.9
23219	660375, 660373	Public Utility	292.8
27660	643869	Govt. Requirements	141.1
29001	645267	Water	25.4
32885	645305	Water	65.1

1.3. Vegetation

The Shire of Kent straddles the boundary between the Avon and Roe Botanical Districts within the South-West Botanical Province (Beard, 1981). Three vegetation systems occur within the study area: the Dumbleyung system within the Avon district, and the Hyden and Chidnup systems in the Roe district. The Dumbleyung system corresponds roughly to the western fifth of the Shire, while the rest of the shire can be approximately divided into the Hyden system in the north, and the Chidnup system in the south (Beard, 1981).

The Hyden system was described generally by Beard (1981) as kwongan (scrub-heath and thicket) on sandplains, mallee on slopes over most of the system, mallee with patches of woodland on upper valley soils, woodland on lower valley soils and in saline areas a mosaic of woodland, shrubland and samphire. The vegetation characteristically forms a mosaic of vegetation types, with plant cover frequently varying in structure and composition every few metres due to the highly variable soil types, a situation which often complicates vegetation mapping (Beard, 1981).

The landscape of the Dumbleyung system on the Yilgarn Plateau is gently undulating, with residual laterite cappings on uplands and salt flats and lakes in the principal valleys (Beard, 1981). The Dumbleyung system was described by Beard (1981) as having a general pattern of *Dryandra*-dominated heath on laterite residuals; woodland and low woodland of the Brown Mallet (*Eucalyptus astringens*), Silver Mallet (*E. falcata*) and Blue Mallet (*E. gardneri*) on degraded laterites and laterite wash; woodland of York gum (*E. loxophleba*), Red Morrel (*E. longicornis*), Salmon gum (*E. salmonophloia*) and Wandoo (*E. wandoo*) on

undulating country, generally with frequent small patches of the mallees Black Marlock (*E. redunca*), Tall Sand Mallee (*E. eremophila*), and Lerp Mallee (*E. incrassata*); teatree and samphire on salt-flats; and scrub-heath and low woodland on low-level sandplains. The boundary between the Dumbleyung system in the west to the Roe Botanical District in the east occurs where mallee becomes predominant in the vegetation (Beard, 1981).

The Chidnup system covers the high ground which forms the watershed between the south coastal rivers and the Swan-Avon basin. Relief is very subdued and the landscape is flat to gently undulating. Scrub heath, usually with Tallerack (*Eucalyptus tetragona*) conspicuous, appears on broad sandy ridges. On laterite, low woodland of Silver Mallet occurs, although frequently burnt back to the stature of mallee. Small patches of woodland of Flat-topped Yate (*E. occidentalis*) and occasional Salmon gum occupy depressions on winter wet grey clays and in swamps, with patches of low forest of Moort (*E. platypus*). Mallee predominates across the system, with a tendency to segregate into *E. eremophila-E. oleosa* and *E. redunca-E. uncinata* associations (Beard, 1981).

Beard (1976) mapped the vegetation of the Shire of Kent at a scale of 1: 250 000, discerning 21 major vegetation types plus granite outcrops. The most abundant vegetation type was mallee of Black Marlock and Tall Sand Mallee over shrubland. Other vegetation types occupying a significant area of land were woodland of Wandoo, York gum and Red Morrel, and mosaic vegetation of the above mallee/shrubland and woodland vegetation types (Beard, 1976).

1.4. Geomorphology and Soils

The geomorphology of the Shire of Kent is a mosaic of salt lake systems, ancient drainage flats, granite domes, flat outcrops and undulating sandplain (Grein, 1994). The western third of the Shire is within the catchment of the Blackwood River, and is drained by the Coblinine River system into Lake Dumbleyung, which overflows into the Blackwood System (Grein, 1994).

There are three chains of salt lakes within Kent Shire, trending north-north west and forming part of the Swan-Avon catchment. The most prominent chain within Shire of Kent occupies the centre of the Shire and includes Lake Chinocup, Lake Pingarnup and Lake Grace (South Lake). To the east of this chain, there is another series of salt lakes including Lake Bryde and East Lake Bryde, freshwater lakes at the head of a salt lake chain. The most easterly chain lies largely outside the Shire, and includes Lake Lockhart, which is part of the Lake Lockhart-Lake Magenta salt lake chain. The salt lake chains occupy broad, flat-floored valleys, which represent the channels of ancient northerly flowing rivers (Thom *et al*., 1984).

The study area encompasses three Plateau systems, which correspond to the vegetation systems: the Hyden Plateau carrying the Hyden vegetation system, the Ongerup Plateau carrying the Chidnup vegetation system, and the Yilgarn Plateau bearing the Dumbleyung vegetation system (Beard, 1981).

Beard (1981) described the landscape of the Hyden Plateau as very gently undulating, with wide flat valleys and long gentle slopes rising to broad interfluves. The interfluves are capped by residual laterite and sand, but there are seldom any definite margins such as breakaways between these areas and valley soils (Beard, 1981). The Ongerup Plateau represents an eastward extension of the Darling Plateau and forms a watershed between the rejuvenated streams of the south coast and the disorganised drainage of the interior. The plateau forms a very gently undulating or almost level plain which tends to become

waterlogged in winter and is dotted with numerous circular depressions containing intermittent lakes or swamps (Beard, 1981). The Yilgarn Plateau is composed of wide, shallow valleys with sluggish drainage and very broad sandplain uplands. The landscape is gently undulating.

The soil systems of the Shire of Kent were described by Grein (1994). The eastern half of the Shire is dominated by hard setting loamy soils with yellow clayey subsoils, while the western half is dominated by hard setting loamy soils with mottled yellow clayey subsoils. The salt lake chain flowing northward through the middle of the Shire occurs on loamy soils of minimal development. There are also small areas of brown calcareous earths and sandy soils with an unbleached A_2 horizon (Grein, 1994). Beard (1981) described the soils of the Hyden Plateau, in the northern half of the Shire, as very variable, reflected in variations to plant structure and composition every few metres over much of the Hyden Plateau.

1.5. Fauna

McKenzie (1973) carried out a fauna survey of five Reserves within the Shire of Kent, but this did not include any of the Reserves in the present study. Animals which are considered to be under threat of extinction sighted in McKenzie's (1973) survey included the Red-Tailed Phascogale (*Phascogale culara*) and Carnaby's Cockatoo (*Calyptorhynchus funereus latirostris*). Priority 4 species sighted included the Western Mouse (*Pseudomys occidentalis*), and the Western Brush Wallaby (*Macropus irma*), and the Conservation Dependent species the Tammar Wallaby (*M. eugenii*). Commonly seen animals include the Western Grey Kangaroo (*M. fuliginosus*), the Western Brush Wallaby, the Echidna (*Tachyglossus aculeatus*) and reptiles including the Bobtail (*Tiliqua rugosa*), the Blue Tongue Lizard (*T. occipitalis*), the Dugite (*Pseudonaja affinis*), the Mulga Snake (*Notechis australis*) and a number of gecko species (Grein, 1994).

2. OBJECTIVES

The general objective of this survey was to provide information on the nature conservation and other values (e.g. water catchment, resource extraction, recreational areas, and indigenous and non-indigenous cultural heritage sites) of Crown Lands within the Kent Shire. The specific objectives of the study were to:

- Describe and characterise vegetation units, noting areas of degraded or modified vegetation and the likely cause(s), and map their occurrence at a scale of 1:5000;
- Describe and map the extent and severity of weed invasion within Reserves at a scale of 1:5000;
- Describe and map human influence and cultural features within Reserves, including: internal vehicle tracks, boundary fence condition, artificial water features, constructed drainage, non-indigenous cultural heritage sites and Aboriginal sites at a scale of 1:5000;
- Assess land use within Reserves, including extractive industries, recreation, water resources and natural resources; and
- Gather detailed data on vegetation, soil and landform characteristics within survey sites (quadrats) considered to be representative of vegetation mapping units.

3. METHODS

3.1. Data Collection

All data collected followed the methods of McDonald *et al*. (1998) (soils and vegetation) and Safstrom (1995) (land use and other Reserve data). The use of these methods ensured that the data collected as part of this study is compatible with previous studies. Both these methods have been used to assess the nature conservation and other values of Reserves in other parts of Western Australia.

Data was collected through field assessment of 25 Reserves and recorded on standard data sheets (refer to Appendix 1). Data management is discussed below.

3.2. Data Storage and Database Structure

A Microsoft® Access 97® relational database was used as the prime means of storing all survey data and a single ESRI® ArcView® 3.2 project containing multiple themes was created as the main interface through which spatial data can be queried. Photos were stored digitally on Kodak® Photo CD®, and were hotlinked to relevant ESRI® ArcView® themes.

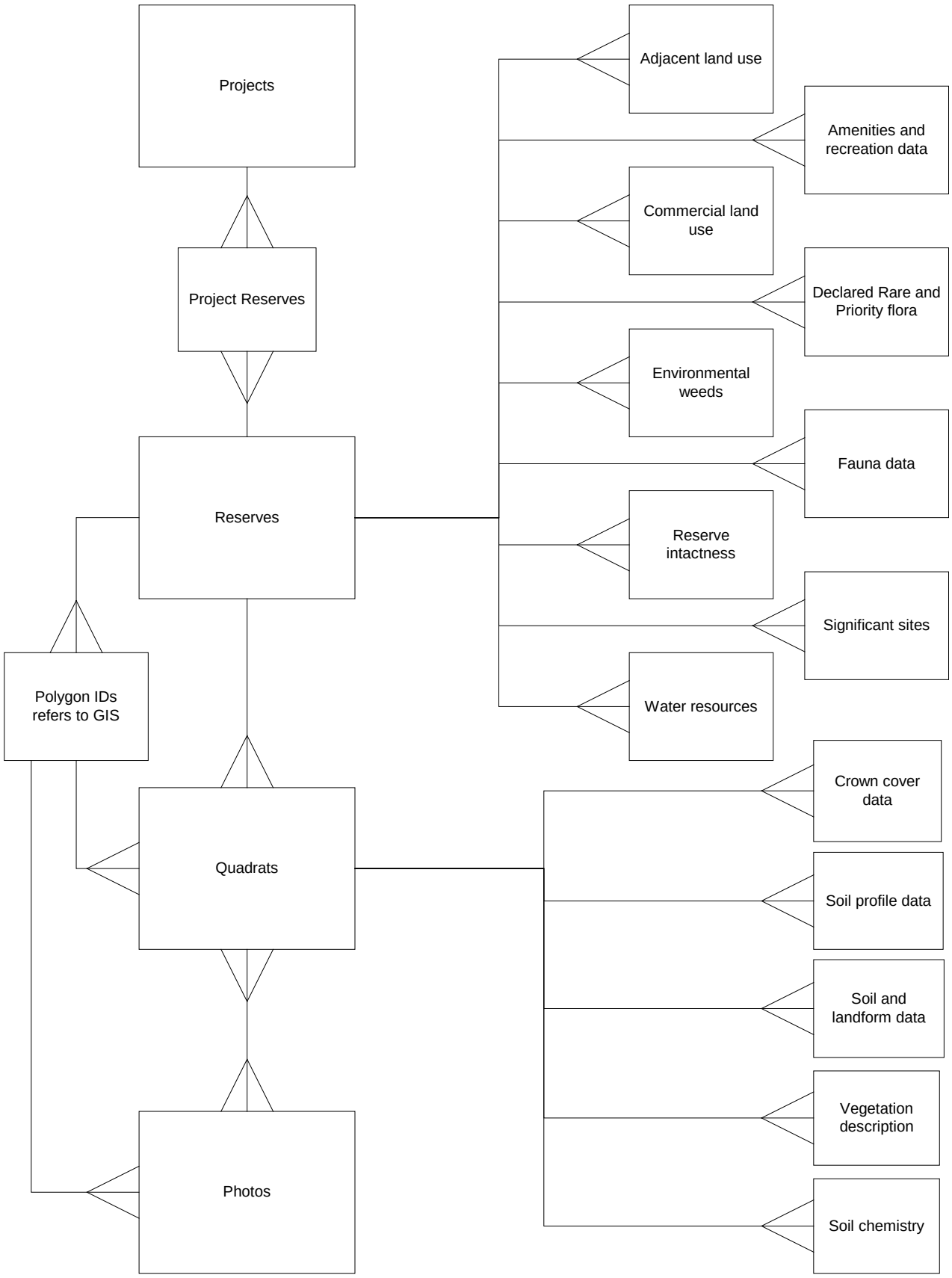
Survey data was entered into the database in the following tables:

- Projects (provides bibliographical information on this (and other) projects);
- Codes (provides the codes for all types of data recorded);
- Polygon Data (provides the corresponding Polygon Identification Numbers for each Reserve);
- Quadrat Descriptions (location and characteristics within Quadrats);
- Vegetation Descriptions (floristic and structural formation data within Quadrats);
- Crown Cover Data (data relating to vegetation cover within Quadrats);
- Soil Profile Data (data relating to soil horizons within Quadrats);
- Soils and Landform Data (data relating landform and soil surface conditions within Quadrats);
- Reserve Details (data on soils and geology within Reserves);
- Reserve Intactness (weeds and degradation within Reserves);
- Fauna Data (fauna data within Reserves);
- Amenity and Recreation Data (access and recreation within Reserves);
- Water Resources (natural and artificial within Reserves);
- Commercial Land Use (timber and wildflower harvesting and extractive industry within Reserves);
- Adjacent Land Use (cropping, grazing and bushland adjacent to Reserves and boundary fence condition);
- Significant Sites (Aboriginal and non-indigenous cultural; sites within Reserves); and
- DRF and Priority Flora (significant flora recorded within Reserves).

Each table was linked via common fields, and each field in each table was linked to a separate Access table in which data codes were defined. The relationship between each table is shown in Figure 1.

The database was constructed as a normalised database, using codes rather than English descriptions. Appendix 2 provides the code descriptions (also found in the database).

Figure 1: Relational Structure of Database.



3.3. Reserves

The 25 Reserves surveyed within the Shire of Kent are listed in Table 1. Figure 2 provides an overview of their location within the Shire of Kent. The following information provides a description of the Reserve-level data collected.

3.3.1. Reserve Details

Each Reserve was located using a combination of maps and cadastral information provided by the Department of CALM. The following information was recorded for each Reserve (where the information was available):

- Shire;
- Reserve number;
- Land district;
- Lot number;
- Location;
- CALM district name and district number;
- Locality or Reserve name;
- Survey date;
- Surveyor name;
- The appropriate 1:25 000 or 1:50 000 Topographic Survey mapsheet name and number;
- The appropriate 1:250 000 Geology mapsheet name and number;
- Underlying Reserve geology and approximate percentage of the Reserve occupied by each geological unit identified;
- The presence of any non-indigenous cultural heritage sites; and
- The presence of any Aboriginal sites.

3.3.2. Vegetation Associations

Vegetation associations within each Reserve were identified and mapped as a series of vegetation units at a scale of 1:5000 (Map 1). Each vegetation unit was depicted as one or more separate and numbered polygons within each Reserve. Preliminary mapping was based on vegetation structural boundaries interpreted from colour aerial photographs, which was further supplemented with information on topographic position and underlying geology. These boundaries were verified and refined in the field during site reconnaissance and weed mapping (see Section 3.3.4 below). Areas of granite outcrop were mapped as a separate vegetation unit. The locations of any new populations of Declared Rare or Priority Flora identified in the field were recorded using GPS, and a voucher specimen collected.

Areas where the original floristic composition or structure of vegetation was significantly degraded or modified were mapped. The map output for this study indicates all such degraded vegetation units as being "Degraded". However, information as to the likely original vegetation type, and the type(s) of degradation or modification visible have been recorded in the accompanying Access database and Arcview files (see Section 3.3.3 below).

3.3.3. Reserve Intactness

The intactness of each Reserve was mapped at a scale of 1:5 000 based on the extent and severity Reserve intactness was indicated by the extent of degraded vegetation units and the level of grazing within Reserves. For each area of degraded vegetation identified, the following information was recorded:

- The type of degradation or modification (presence of salt-tolerant species, salt scalds, bare ground, decline/stress and/or death/loss of overstorey vegetation, decline/stress and/or death/loss of understorey vegetation, all vegetation removed, regenerating vegetation, other)
- The likely cause of degradation or modification (dieback, waterlogging, salinity, clearing for roaded catchment, clearing for gravel/sand extraction, other clearing, fire)

Where the likely cause of degradation or modification was from waterlogging or salinity, it was noted whether the source was rising water tables, discharge from constructed drains or surface run-off.

Degraded vegetation units are shown on Map 1.

3.3.4. Environmental Weeds

Weed infestations within each Reserve was mapped at a scale of 1:5 000 based on the extent and severity of infestations of weeds and exotic grasses and forbs.

Weed cover maps (Map 2) were created by surveying each Reserve, paying particular attention to Reserve edges, drainage lines and sites which had undergone some form of disturbance. A series of cover classes were used (<20%, 20-50%, 50-80% or >80%) to describe the extent of weed cover in each Reserve. Reserves were accessed both by vehicle (where possible) and on foot, and weed assessments were made by walking through areas and mapping changes in weed cover.

The occurrence of any serious environmental weeds incidentally observed was noted. If the infestation was isolated (rather than widespread), the following information was recorded:

- Date observed;
- Location of the approximate centre of infestation using a GPS;
- Duration of GPS averaging;
- Species;
- Degree of infestation at that location; and
- A brief comment.

Where the infestation was widespread, the GPS location could not be sensibly recorded.

Grazing pressure was estimated visually, based on damage to vegetation and soil disturbance.

3.3.5. Social, Cultural and Economic Attributes

Information on a range of social, cultural and economic attributes were gathered for each Reserve, with selected features mapped at a scale of 1:5000 (Map 3). The features identified on these maps, from aerial photograph interpretation and field observation, were:

- Internal vehicle tracks;
- Artificial water features;
- The presence and condition of boundary fences;
- Constructed drains entering or draining into the Reserve; and
- Indigenous and Non-indigenous cultural heritage sites.

Any Aboriginal sites or non-indigenous cultural heritage sites that were incidentally encountered during fieldwork were recorded, photographed and the appropriate forms were completed. The GPS location of these sites and the duration of GPS averaging was also recorded.

Within each Reserve, the presence and attributes of the following uses and values were recorded, on the basis of aerial photo interpretation and field observation:

3.3.5.1 Recreation/Amenity/Tourism

The following information relating to Reserve amenity was recorded:

- Condition of external road access (2WD, 4WD or none) (Map 2);
- Condition of internal vehicle access (2WD, 4WD or none) (Map 2); and
- Current recreation activities

3.3.5.2 Water Resources

The following information relating to water resources was recorded:

- Natural surface water features; and
- Artificial water features (tanks, dams, wells) (Map 2).

3.3.5.3 Extractive Industries

The following information relating to extractive industry was recorded:

- Type of extractive industry;
- Area (ha) occupied by the extractive industry;
- Quantity of the resource remaining (ha), estimated from soil data and general observations

3.3.5.4 Direct Production

The following information relating to direct production was recorded:

- Presence of timber cutting, the intensity in relation to the extent of the desired species, and an estimate of the number of years since the most recent harvest;
- Presence of wildflower harvesting, the intensity in relation to the extent of the desired species, and an estimate of the number of years since the most recent cutting; and
- Sandalwood (*Santalum spicatum*) presence and abundance.

3.3.5.5 Adjacent Land Use

For land uses adjacent to Reserves, the following information was recorded:

- Types of land use (cropping/grazing, agroforestry/plantation, extractive, urban, industrial, remnant vegetation, revegetation, utility/transport (road, rail or easement), water production/conservation, other);
- The percentage of the total Reserve perimeter adjoining each land use identified above;
- The length of boundary fencing for each Reserve that fits into the quality classes of none, poor or good; and
- The presence/absence of any constructed drains that either enter, or terminate at and drain into, the Reserve.

3.3.6. Fauna

Evidence of native and introduced vertebrate fauna was recorded and the type of observation noted (e.g. sighting, hearing, animal remains, tracks, scats and diggings). All animals were identified to species level. Observations made were incidental and not a result of a systematic search of the area. Wherever, possible, fauna were identified to species level (see Appendix 3).

3.4. Quadrats

A total of 31 survey sites or plots were established on Reserves throughout the Shire of Kent to enable detailed assessment of vegetation, soil and landform characteristics in areas representative of each vegetation unit identified.

Survey sites consisted of two quadrats of $100m^2$ (10m x 10m) and $400m^2$ (20m x 20m), with the $100m^2$ quadrat nested within a corner of the $400m^2$ quadrat. Wherever possible, quadrats were aligned north-south and east-west, with the north west corner as the common corner between the two quadrats. Any variations from this orientation were noted. The common corner was marked with a galvanised steel start picket with a stamped aluminium plate to identify the site number. The corners of the 100 m^2 quadrat were marked with galvanised fence droppers. A transect was established that diagonally intersected both nested quadrats, with its origin in the north-west corner. The location of survey quadrats were plotted onto the same map as vegetation associations (Map 1).

3.4.1. Quadrat Location

A quadrat was placed in each vegetation unit identified during preliminary and field mapping of vegetation associations. Quadrats were not placed in significantly degraded or modified vegetation units. Sites were chosen within homogenous areas subjectively considered to be characteristic of the vegetation unit at the selected location. As far as possible, quadrat locations were chosen to avoid vegetation boundaries and areas of local disturbance, such as roads, tracks and gravel pits.

Although disturbed areas were generally avoided, some quadrats were placed in disturbed areas if the vegetation association was not better represented elsewhere. This was to ensure that the true diversity in vegetation associations within the Shire was adequately represented in the survey. Similarly, where vegetation communities had changed from one form to another as a result of some degradation process (e.g. salinisation), the "new" vegetation communities were regarded as a vegetation association in its own right, and not excluded from the survey.

3.4.2. Quadrat Description

Through a combination of office and field based assessments, the following information was recorded for each quadrat:

- Date;
- Surveyor name;
- Unique site identifier (Quadrat number);
- Reserve details as per Section 3.3.1;
- GPS location, including duration of GPS averaging (minutes);
- An air photo reference;
- Aspect (cardinal directions);
- Elevation;
- Disturbance of site, based on the degree of clearing, cultivation and soil disturbance;

- Abundance and size of surface coarse fragments;
- Landform element, slope class and morphological type;
- Vegetation name (both full and brief descriptions);
- Evidence/no evidence of fire, and an estimate of the number of years since the most recent fire;
- Percentage cover of plant litter;
- Percentage cover of bare ground; and
- Any other features of ecological relevance.

The methods and coding of McDonald *et al.* (1998) were used to describe site disturbance, the abundance and size of surface coarse fragments, landform element, slope class and morphological type; and vegetation name.

Evidence of fire was determined through observation of charred wood and vegetation. The period since the fire has occurred was estimated based on the degree of litter present, the degree of decomposition of fallen timber and the height of regrowth vegetation. The degree of litter present was not used as a sole indicator because of variable litter decomposition rates in different vegetation communities and climatic regimes.

A colour photograph was taken of the site from the north west corner of the quadrat looking in a south easterly direction (unless indicated otherwise). Each photograph shows the general appearance of the vegetation at the survey site.

3.4.3. Vegetation Description

Within each quadrat, the floristics, vertical structure and cover of the vegetation were recorded, following the minimum vegetation description guidelines provided in McDonald *et al.* (1998). This information was combined for all strata to give a detailed vegetation name. Vegetation name was determined using the vegetation structural formation, height class and floristic associations in each stratum present within a quadrat.

To determine vegetation floristics, the dominant/co-dominant vascular plant species in each strata within or overhanging the $100m^2$ quadrat, were identified to species and subspecies level (where possible). Additional dominant/co-dominant plant species in the tallest stratum within or overhanging the $400m^2$ quadrat were also identified. The stratum and quadrat in which each species occurred also were recorded.

The vertical structure of the vegetation was determined by recording the growth form, average height, height class and height class name for each of the dominant/co-dominant species in the tallest stratum within the $400m^2$ quadrat, following the method and descriptions of McDonald (1998).

The transect was used to assess the vegetation cover of the tallest strata using the method of McDonald *et al.* (1998). Crown width and the distance between plant crowns within each strata were measured along the transect. Twelve measurements were taken where possible. For some sites, large distances between plants in some strata (e.g. very scattered mallee in heath formations or sparse middle storey under woodlands) meant that it was not possible to take 12 measurements along the transect before intercepting another vegetation type or disturbed area such as an access track.

For the tallest stratum, data gathered was used to calculate the following information using the method of McDonald *et al*. (1998):

- Average crown width and gap;
- Crown separation ratio;
- Percentage crown cover; and
- Crown cover class.

For the remaining strata, the crown cover class of dominant and co-dominant species was visually estimated according to the method of McDonald *et al*. (1998).

Plant nomenclature and taxon identification codes followed the MAX Collecting Book database produced by the Western Australian Herbarium. Duplicate voucher specimens were collected for all dominant/co-dominant species surveyed within quadrats. Voucher specimens were only collected if fertile material (buds, flowers and fruit) were available or if positive identification could be made without fertile material. These voucher specimens were mounted to Herbarium standards for lodgement at CALM Herbaria at Como and Katanning. In addition to the voucher specimens, plant specimens that did not have fertile material were collected for identification purposes. All specimens were identified at the WA Herbarium, with reference to collections and experts as required. A complete flora list is provided in Appendix 4.

Where populations of declared rare or priority flora were identified from voucher specimens and not in the field, their location was estimated using the GPS readings from the quadrat that the specimen originated from.

3.4.4. Soil Description

The A and B horizons of the soil profile were described from a soil pit, or auger hole adjacent to, but outside the common quadrat corner (north-west). Information recorded for each quadrat followed the methods and coding of McDonald (1998) and was as follows:

- Upper and lower depth of each horizon (distance from the soil surface)
- Moist soil colour (using a Munsell Soil Colour Chart);
- Field texture grade;
- Abundance, size and shape of coarse fragments. If segregations of pedogenic origin occurred, their abundance, nature, form and size were recorded;
- Structure (grade of pedality);
- Condition of surface soil when dry;
- Effervescence of carbonates (based on the reaction of HCl added to dry soil); and
- Soil pH.

Soil pH was measured using a portable pH meter. Two measurements were made – the first based on an extract of 5g of soil added to 25mL of pH neutral water, and the second based on the addition of 0.5 mL $CaCl_2$ to the original soil/water mixture. The second measurement is preferable as it more accurately reflects the pH in soil solutions as the addition of $CaCl_2$ releases bound hydrogen in the soil.

Soil Supergroup and Soil Group classifications were identified and coded in accordance with Schoknecht (1999) for each quadrat.

3.5. Map Production and Arcview Themes

The following section describes the methods used in the preparation of the three maps outlined in Sections 3.3.2., 3.3.4. and 3.3.5.

3.5.1. Metadata

Each spatial dataset used information on the following core metadata elements provided. These follow the ANZLIC metadata guidelines:

- Title;
- Custodian;
- Description (abstract);
- Date currency;
- Access (stored data format);
- Projection;
- Datum;
- Data quality (lineage, positional accuracy, attribute accuracy, completeness); and
- Metadata date.

A brief written summary was provided for each dataset. The summary contained information about how it was created, any limitations, and any other information that will assist third parties to access the dataset.

3.5.2. Vegetation Associations Map

Vegetation associations (including degraded areas and granite outcrops) were provided as single ESRI® ArcView® 3.2 shapefiles (polygon themes). Each polygon was attributed with a unique polygon identifier, Reserve number, land district, lot number, class/type/value, area (ha) and perimeter (m) value. All themes were stored in decimal degrees (4 decimal places). Quadrat locations were also included with this map.

Each occurrence of the same vegetation unit within a Reserve was mapped as a separate polygon. However, as each not every vegetation unit was surveyed in each Reserve, each polygon was attributed with features that corresponded to that vegetation unit from elsewhere within the Shire. For each vegetation polygon mapped, the following information was recorded:

- Polygon Number;
- Reserve Number;
- Land District;
- Location Number;
- Lot Number;
- The area of the polygon (ha), and the percentage of the Reserve's area the polygon occupies;
- For degraded or modified vegetation polygons, a name describing the unit in terms of the likely original vegetation and type of degradation;
- For all remaining vegetation polygons, a site identifier (quadrat number) and a vegetation name; and
- A brief comment, where appropriate.

There were 19 vegetation units which were identified within the Shire but not found to contain quadrats. These vegetation units were included in the mapping and database, to ensure all vegetation types are adequately represented. However, these

vegetation units do not have detailed vegetation or soil information associated with them. Instead, they were allocated a nominal quadrat number (non-existent).

3.5.3. Reserve Intactness Map

Weed cover classes were mapped as separate polygons, and each had the following information recorded:

- Reserve Number;
- Land District;
- Location Number;
- Lot Number;
- Weed cover class (<20%, 20-50%, 50-80% or >80%);
- The area of the polygon (ha);
- The percentage of the Reserve's area occupied by that polygon; and
- A brief comment, where appropriate.

3.5.4. Social, Cultural and Economic Attributes Map

Reserve boundary fences, vehicular tracks and drains entering the Reserve or terminating at the boundary were mapped as separate ESRI® ArcView® 3.2 shapefiles (line themes). Each of the line feature themes were attributed with a unique line identifier, Reserve number, land district, lot number, class/type/value and length (m) values.

Water tanks, bores, dams and wells were mapped as single ESRI® ArcView® 3.2 shapefiles (point themes). Each point theme was attributed with a unique identifier, Reserve number, land district, lot number, class/type/value, latitude and longitude (decimal degrees to 4 decimal places). Large dams were mapped as polygons.

3.6. Timing of Survey

The field investigations were undertaken over a three week period, from the 8th May to the 26th May 2000, inclusive.

Figure 2: Location of Reserves Surveyed within the Shire of Kent

4. RESULTS

The following sections provide summary information for each Reserve surveyed within the Shire of Kent, as well as a Species by Site table, which lists the occurrence of species within each Quadrat surveyed.

Complete fauna and flora species lists are provided in Appendices 3 and 4 respectively.

4.1. Species by Site

The distribution of plant species across the survey quadrats is illustrated in Table 2.

4.2. Reserve and Quadrat Descriptions

The end of this report provides a summary description of the features of individual Reserves, along with the following maps:

- Map 1: Vegetation and Quadrat Locations
- Map 2: Weed Cover
- Map 3: Reserve Features

4.2.1. Vegetation Associations

A total of 50 vegetation associations were identified based on a combination of structural and floristic information. Appendix 5 provides brief vegetation descriptions, and individual Reserve reports in Section 2 provide detailed vegetation descriptions.

4.2.2. Flora

A total of 23 vascular plant Families and 124 plant species were recorded, of which 106 were identified to at least species level.

Two species of Priority Flora were located. The mallee *Eucalyptus continens*' ms, located in Reserve 29001, Quadrat 8, is a Priority 3 Flora, which means it is a taxon which is known from several populations, at least some of which are not believed to be under threat. The shrub *Melaleuca cliffortioides*, located in Reserve 22683, Quadrat 28, is a Priority 4 Flora, which means it is a taxon which is considered to have been adequately surveyed and which whilst being rare, is not currently threatened by any identifiable factors. Also of note was the presence of Sandalwood (*Santalum spicatum*) in Reserves 23025, 20515 and 10685. Similarly, the Blue Mallet (*Eucalyptus gardneri*) was located in Reserve 22683, Quadrat 28. This species has significance as a source of tan bark, which was widely harvested in the first half of the 20th century.

A total of 139 vouchers and duplicates were prepared for the WA Herbarium and the Katanning Regional Herbarium, respectively.

4.2.3. Fauna

A total of 50 fauna species were recorded in the Reserves surveyed, of which, none are classified as Priority or Endangered Fauna. However, a pair of Mallee Fowl (*Leipoa ocellata*), which is listed as being Vulnerable (considered rare or likely to become extinct) was sighted near the Chinocup Gypsum Mine on Chinocup Road.

4.2.4. Soils and Landforms

The quadrats were placed in seven different landform element types, representing the range of landforms found within the Shire. These were plains, footslopes, hillslopes, hillcrests, dunecrests, drainage depressions and playas. The soil types encountered were also varied, and included sandy duplexes, deep sands, sandy earths, loamy duplexes, ironstone gravelly soils and non-cracking clays.

4.2.5. Weed Cover

The extent of weed infestations is illustrated in Map 2 for each Reserve. Reserves 9992, 10739, 15296, 16374, 16387, 17526, 19167, 16387, 17526, 19167, 22683, 27660, 23219 and the contiguous Reserves 11519 and 13448 had generally low weed cover; Reserves 9445 and 14502 had moderate levels of weed cover; and Reserves 10685, 10740, 14450, 16428, 19003, 23025, 29001, 32885 and the contiguous Reserves 20515 and20516 had variable weed cover. No Reserve surveyed had consistently high (~80% or more) weed cover throughout the reserve. In general, weed cover varied with the level of disturbance within Reserves, the size of the Reserve and proximity to roadsides and internal tracks.

4.2.6. Heritage Sites

Four non-indigenous cultural heritage sites were found during fieldwork. These consisted of one soak, two dams and a tank with constructed drainage on a granite outcrop. The forms use to record information on these sites are shown in Appendix 6.

Table 2: Presence of Flora Species at Survey Quadrats

Species Name	Quadrat No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Grand Total
Acacia acuminata		1																1	1		1			1	1								**6**
Acacia glaucoptera									1																								**1**
Acacia microbotrya				1											1																		**2**
Acacia undosa' ms														1																			**1**
Allocasuarina acuaria																				1													**1**
Allocasuarina microstachya								1																									**1**
Anarthria egrallata' ms																															1		**1**
Atriplex sp.1																									1								**1**
Austrostipa puberula																		1															**1**
Austrostipa sp.1																					1												**1**
Avena sp.1				1																													**1**
Banksia violacea						1					1																						**2**
Beaufortia micrantha						1																											**1**
Briza maxima																								1									**1**
Callistemon phoeniceus																														1			**1**
Calytrix leschenaultii								1																							1		**2**
Carpobrotus sp.1																1																	**1**
Casuarina obesa																	1																**1**
Chordifex sphacelatus' ms							1													1													**2**
Cryptandra minutifolia														1																			**1**
Daviesia decurrens													1																				**1**
Dianella revoluta		1																															**1**
Dodonaea bursariifolia														1																			**1**
Dodonea viscosa															1																		**1**
Drosera paleacea subsp. *trichocaulis*																				1													**1**
Drosera sp.2							1																										**1**
Dryandra cirsioides																						1											**1**
Dryandra erythrocephala var. *erythrocephala*						1																											**1**
Dryandra pteridifolia						1																											**1**
Eremaea pauciflora						1	1	1			1									1													**5**
Eremaea pauciflora var. *pauciflora*																															1		**1**
Eucalyptus aff. *occidentalis*												1																					**1**
Eucalyptus celastroides subsp. *virella*									1																								**1**
Eucalyptus conglobata									1				1																				**2**
Eucalyptus continens' ms									1																								**1**

Species Name	Quadrat No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Grand Total
Eucalyptus flocktoniae									1																								**1**
Eucalyptus gardneri																													1				**1**
Eucalyptus incrassata																															1		**1**
Eucalyptus kondininensis										1																							**1**
Eucalyptus leptocalyx																																1	**1**
Eucalyptus longicornis																			1														**1**
Eucalyptus loxophleba				1													1	1			1												**4**
Eucalyptus loxophleba subsp. *loxophleba*		1																														1	**2**
Eucalyptus occidentalis																			1											1			**2**
Eucalyptus olivina																																1	**1**
Eucalyptus phaenophylla									1				1	1								1	1										**5**
Eucalyptus phaenophylla subsp. *phaenophylla*										1																							**1**
Eucalyptus phenax														1																			**1**
Eucalyptus platypus												1																					**1**
Eucalyptus platypus subsp. *platypus*																													1				**1**
Eucalyptus salmonophloia			1												1										1	1							**4**
Eucalyptus salubris					1																												**1**
Eucalyptus sp.22										1																							**1**
Eucalyptus sp.8																															1		**1**
Eucalyptus spathulata													1																				**1**
Eucalyptus suggrandis subsp. *alipes*									1																								**1**
Eucalyptus tetragona											1																						**1**
Eucalyptus transcontinentalis										1											1												**2**
Eucalyptus xanthonema													1																				**1**
Gahnia lanigera			1										1		1																		**3**
Gahnia sp.L (K.R. Newbey 7888)																												1				1	**2**
Gastrolobium parviflorum													1										1										**2**
Grevillea huegelii										1																							**1**
Hakea corymbosa																														1			**1**
Hakea cygna						1	1																										**2**
Hakea cygna subsp. *cygna*					1						1																						**2**
Hakea laurina															1																		**1**
Hakea lissocarpha																															1		**1**
Hakea obliqua subsp. *parviflora*																				1													**1**
Hakea pandanicarpa subsp. *crassifolia*					1																												**1**
Halosarcia lepidosperma																1	1																**2**

Species Name	Quadrat No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Grand Total
Lasiopetalum rosmarinifolium										1																							**1**
Lepidosperma brunonianum																						1			1								**2**
Lepidosperma gracile																										1				1			**2**
Lepidosperma sp.1																	1																**1**
Lepidosperma sp.A2 Island Flat (Keighery 7000)										1													1									1	**3**
Lepidosperma sp.K Boorabbin (K.L. Wilson 2579)											1																						**1**
Lepidosperma viscidum						1																											**1**
Leptospermum erubescens							1													1		1											**3**
Leptospermum roei											1																						**1**
Leucopogon constephiodes var. 1											1																						**1**
Lichen sp.1																					1					1							**2**
Lomandra effusa																		1	1														**2**
Lomandra rupestris																														1			**1**
Lyginia sp.1																				1													**1**
Melaleuca acuminata		1							1														1										**3**
Melaleuca adnata									1																				1				**2**
Melaleuca bracteosa																						1											**1**
Melaleuca brophyi' ms																														1		1	**2**
Melaleuca cliffortioides																													1				**1**
Melaleuca depauperata													1																				**1**
Melaleuca halmaturorum																											1	1					**2**
Melaleuca lateriflora																1																	**1**
Melaleuca laxiflora													1																				**1**
Melaleuca pauperiflora							1	1				1																			1		**4**
Melaleuca pentagona								1																									**1**
Melaleuca pungens																											1					1	**2**
Melaleuca societatis' ms																													1				**1**
Melaleuca subtrigona																				1												1	**2**
Melaleuca uncinata			1							1			1	1								1	1			1							**7**
Mesomelaena stygia subsp. *stygia*						1		1																									**2**
Moss sp.1		1		1					1			1	1	1	1			1			1					1	1		1				**12**
Olearia dampiera subsp. *eremicola*				1														1															**2**
Olearia muelleri					1				1																								**2**
Olearia revoluta															1										1								**2**
Orchidaceae sp.1																									1								**1**
Patersonia occidentalis																														1			**1**

Species Name	Quadrat No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Grand Total
Petrophile squamata																															1		**1**
Phebalium filifolium										1																							**1**
Phebalium tuberculosum									1																								**1**
Poaceae sp.1																									1								**1**
Poaceae sp.2		1																						1	1								**3**
Rhagodia baccata subsp. *dioica*																			1														**1**
Santalum acuminatum							1																										**1**
Sedge sp.10											1																						**1**
Sedge sp.6																												1					**1**
Stipa elegantissima			1		1																												**2**
Templetonia sulcata			1																														**1**
Unknown sp.1																												1					**1**
Verticordia oxylepis																				1													**1**
Weed sp.1																														1			**1**
Weed sp.2																														1			**1**
Wilsonia humilis			1																														**1**
Xanthorrhoea sp.1						1																											**1**
Grand Total		**6**	**6**	**5**	**3**	**10**	**7**	**7**	**12**	**9**	**8**	**4**	**11**	**7**	**7**	**3**	**4**	**6**	**5**	**9**	**6**	**6**	**5**	**3**	**8**	**5**	**3**	**4**	**6**	**9**	**8**	**8**	**200**

5. DISCUSSION OF METHODS

Although the survey methods are well established and based on McDonald *et al*. (1998), there were some areas which could possibly be improved for future surveys. The following is a brief discussion of these areas.

5.1. Crown Cover Measurements

The method of McDonald *et al*. (1998) treats all plants within a stratum as a single species for the measurement of Crown Cover. This method posed some problems for the field staff. The method failed if the overstorey was sparse as there were large distances between trees.

The method also may provide overestimates of crown cover. This is particularly so for the large variety of Western Australian plants with mallee growth forms which have a sparse but wide canopy. We suggest that an alternative method of measuring crown cover be used for future surveys.

5.2. Survey Timing

The survey was carried out in late May, and so there were a number of species which were not yet in flower, making field identification of flora more difficult. Caution must be applied if undertaking analysis of data at a later date. This is because the annual species recorded would represent a very small subset of the true annual species diversity, and so any data analyses will exhibit a large amount of "noise".

Similarly, the estimation of weed cover classes may be significantly different if undertaken during spring.

5.3. Vegetation Surveys

Not all of the vegetation associations identified during the mapping of Reserves were able to have a quadrat placed within them. Two factors contributed to this result:

- The relatively short time-frame over which this project was to be carried out precluded a greater number of quadrats being established and surveyed; and
- Although the aerial photographs for this study were relatively recent, it was not possible to discern the subtle shifts in community composition which are readily discernible in the field. Therefore, what may appear as a single vegetation association on an aerial photograph may in reality encompass several quite different (floristically and structurally) associations.

However, we have created "Nominal Quadrats" in the database for these vegetation associations, which could be used as a starting point for future surveys.

Similarly, it may be helpful to define the level detail required in the survey of vegetation associations. Although the vegetation maps have been produced at a scale of 1:5,000, the scale of data capture from aerial photographs is 1:25,000. Field verification was successful in providing a finer level of detail except in the case of large Reserves which were not readily accessible.

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APPENDIX ONE: EXAMPLE DATA SHEETS

Insert Quadrat Vegetation data sheet

Insert Quadrat Soils data sheet

Insert Reserve data sheet

APPENDIX TWO: DATABASE CODE DESCRIPTIONS

Database Table	Field	Code	Description
Adjacent Land Use	Adjacent Land Use	1	cropping/grazing
Adjacent Land Use	Adjacent Land Use	2	agroforestry/plantation
Adjacent Land Use	Adjacent Land Use	3	extractive
Adjacent Land Use	Adjacent Land Use	4	urban
Adjacent Land Use	Adjacent Land Use	5	industrial
Adjacent Land Use	Adjacent Land Use	6	remnant vegetation
Adjacent Land Use	Adjacent Land Use	7	revegtation
Adjacent Land Use	Adjacent Land Use	8	utility/ transport
Adjacent Land Use	Adjacent Land Use	9	water conservation
Adjacent Land Use	Adjacent Land Use	10	other
Adjacent Land Use	Fence Condition	G	good
Adjacent Land Use	Fence Condition	N	none
Adjacent Land Use	Fence Condition	P	poor
Commercial Land Use	Extent Cut	H	High
Commercial Land Use	Extent Cut	L	Low
Commercial Land Use	Extent Cut	M	Moderate
Commercial Land Use	Extractive Industry	1	gravel
Commercial Land Use	Extractive Industry	2	sand
Commercial Land Use	Extractive Industry	3	gypsum
Commercial Land Use	Extractive Industry	4	other
Commercial Land Use	Sandalwood Abundance	1	isolated
Commercial Land Use	Sandalwood Abundance	2	scattered
Commercial Land Use	Sandalwood Abundance	3	moderately abundant
Commercial Land Use	Sandalwood Abundance	4	abundant
Commercial Land Use	Years Since Cut	1	<1 year
Commercial Land Use	Years Since Cut	3	1-5 years
Commercial Land Use	Years Since Cut	5	>5 years
Cover	Cover Class	D	closed or dense (crowns touching/overlapping)
Cover	Cover Class	I	isolated plants (trees>100m apart, shrubs 25m apart)
Cover	Cover Class	L	isolated clumps (clump of 2-4 plants >200m apart)
Cover	Cover Class	M	mid-dense (crowns touching/slightly separated)
Cover	Cover Class	S	sparse (crowns clearly separated)
Cover	Cover Class	V	very sparse (crowns well separated)
Fauna	Fauna Observation Type	B	bones
Fauna	Fauna Observation Type	D	digging
Fauna	Fauna Observation Type	H	hearing
Fauna	Fauna Observation Type	S	scats
Fauna	Fauna Observation Type	T	tracks
Fauna	Fauna Observation Type	V	visual sighting
Intactness	Degradation Cause	1	dieback
Intactness	Degradation Cause	2	clearing-roaded catchement
Intactness	Degradation Cause	3	clearing-gravel/sand extraction
Intactness	Degradation Cause	4	other clearing
Intactness	Degradation Cause	5	fire
Intactness	Degradation Cause	6	waterlogging
Intactness	Degradation Cause	7	salinity
Intactness	Degradation Cause	8	other
Intactness	Degraded Vegetation	1	salt-tolerant plants
Intactness	Degraded Vegetation	2	salt scalds
Intactness	Degraded Vegetation	3	bare ground
Intactness	Degraded Vegetation	4	decline/stress overstorey

Database Table	Field	Code	Description
Intactness	Degraded Vegetation	5	death/loss overstorey
Intactness	Degraded Vegetation	6	decline/loss understorey
Intactness	Degraded Vegetation	7	death/loss understorey
Intactness	Degraded Vegetation	8	all removed
Intactness	Degraded Vegetation	9	regenerating vegetation
Intactness	Degraded Vegetation	10	other
Intactness	Grazing Pressure	1	light
Intactness	Grazing Pressure	2	moderate
Intactness	Grazing Pressure	3	severe
Intactness	Waterlogging/Salinity	1	rising water-table
Intactness	Waterlogging/Salinity	2	drain discharge
Intactness	Waterlogging/Salinity	3	surface run=off
Intactness	Waterlogging/Salinity	4	other
Intactness	Weed Infestation	1	one/few
Intactness	Weed Infestation	2	scattered
Intactness	Weed Infestation	3	moderate density
Intactness	Weed Infestation	4	dense
Project	Project Code	465 5/00	Conservation and other Values of Crown Land in the Shire of Kent
Quadrat	Collector	WEGJ	Juliet Wege
Quadrat	Disturbance	0	none
Quadrat	Disturbance	1	grazing
Quadrat	Disturbance	2	limited clearing
Quadrat	Disturbance	3	extensive clearing
Quadrat	Disturbance	4	complete clearing, not cultivated
Quadrat	Disturbance	5	complete clearing, cultivated
Quadrat	Disturbance	6	cultivation, rain-fed
Quadrat	Disturbance	7	cultivation, irrigated
Quadrat	Disturbance	8	highly disturbed
Quadrat	Geology	Agb	Biotite adamellite & granite; medium & coarse-grained, equigranular, allotriomorphic
Quadrat	Geology	Agg	Adamellite & granodiorite - granoblastic texture, strongly foliated; foliation defined by entrainment & alignment of biotite (rarely hornblende)
Quadrat	Geology	Agv	Variable textured adamellite; medium & coarse-grained, commonly seriate, microcline phenocrysts up to 60 mm
Quadrat	Geology	Amf	Metamorphosed agmatite - granoblastic or gneissic palaeosome consisting of Agg, minor paragneiss &/or amphibolite, enclosed by granoblastic leucocrativ granite & adamallite Anf (granoblastic gneiss or granofels)
Quadrat	Geology	Cza	Alluvium - silt & sand in broad valley flats; extensively reworked by present drainage
Quadrat	Geology	Czb	Silcrete - subvitreous siliceous rock with angular quartz grains
Quadrat	Geology	Czg	Reworked sandplain with undulating surface - contains yellow to white sand & clay, gravel & minor laterite outcrop
Quadrat	Geology	Czk	Calcrete in layers or nodules, adjacent to playa lakes
Quadrat	Geology	Czl	Laterite - limonite nodules in cemented matrix; Grades into Czb and Czs (sandplain) & downwards into weathered bedrock
Quadrat	Geology	Czo	Deeply weathered rock - kaolinised, subsequently ferruginised and silicified

Database Table	Field	Code	Description
Quadrat	Geology	Czs	Reworked sandplain - yellow and white sand; contains locally abundant limonite pebbles
Quadrat	Geology	Qa	Alluvium - silt, sand and gravel in stream channels
Quadrat	Geology	Qc	Colluvium and minor alluvium - Derived mainly from Czs (sandplain) and Czg
Quadrat	Geology	Qd	Gypsiferous sand and silt in dunes adjacent to playa lakes; ancient drainage flats; commonly contain calcrete nodules
Quadrat	Geology	Ql	Saline and gypsiferous clay and silt in playa lake deposits
Quadrat	Geology	Qz	Mixed sheetwash deposit, colluvium and alluvium - red-brown sandy and clayey loam on valley slopes
Quadrat	Geology	Tl	Laterite and silcrete - grades upwards into Ts and downward into weathered bedrock
Quadrat	Geology	Ts	Sand, yellow-white - commonly contains limonite nodules. Remnant of Tertiary sandplain
Quadrat	Vegetation Condition	1	near natural, minor weed invasion
Quadrat	Vegetation Condition	2	slightly disturbed
Quadrat	Vegetation Condition	3	moderately disturbed
Quadrat	Vegetation Condition	4	very disturbed
Quadrat	Vegetation Condition	5	highly disturbed, signif. weed invasion
Recreation-Amenity-Tourism	External Access	0	None
Recreation-Amenity-Tourism	External Access	1	Unsealed
Recreation-Amenity-Tourism	External Access	2	Sealed
Recreation-Amenity-Tourism	External Access	3	Sealed and unsealed
Recreation-Amenity-Tourism	Internal Access	0	None
Recreation-Amenity-Tourism	Internal Access	2	2 WD
Recreation-Amenity-Tourism	Internal Access	4	4 WD
Recreation-Amenity-Tourism	Internal Access	5	Both 2WD and 4WD
Recreation-Amenity-Tourism	Recreation Activity	B	bird watching
Recreation-Amenity-Tourism	Recreation Activity	C	camp site
Recreation-Amenity-Tourism	Recreation Activity	F	fishing
Recreation-Amenity-Tourism	Recreation Activity	P	picnic area
Recreation-Amenity-Tourism	Recreation Activity	S	swimming
Recreation-Amenity-Tourism	Recreation Activity	W	walk trail
Soil Landforms	Landform Element	BEA	beach
Soil Landforms	Landform Element	BER	berm
Soil Landforms	Landform Element	BKP	backplain
Soil Landforms	Landform Element	DDE	drainage depression
Soil Landforms	Landform Element	DUC	dunecrest
Soil Landforms	Landform Element	FOO	footslope
Soil Landforms	Landform Element	HCR	hillcrest
Soil Landforms	Landform Element	HSL	hillslope
Soil Landforms	Landform Element	LUN	lunette
Soil Landforms	Landform Element	PED	pediment
Soil Landforms	Landform Element	PLA	plain
Soil Landforms	Landform Element	PLY	playa
Soil Landforms	Landform Element	S	simple slope
Soil Landforms	Landform Element	VLF	valley flat
Soil Landforms	Landform Modal Slope	CL	cliffed
Soil Landforms	Landform Modal Slope	GE	gently inclined
Soil Landforms	Landform Modal Slope	LE	level
Soil Landforms	Landform Modal Slope	MO	moderately inclined
Soil Landforms	Landform Modal Slope	PR	precipitous

Database Table	Field	Code	Description
Soil Landforms	Landform Modal Slope	ST	steep
Soil Landforms	Landform Modal Slope	VG	very gently inclined
Soil Landforms	Landform Modal Slope	VS	very steep
Soil Landforms	Landform Morphology	C	crest
Soil Landforms	Landform Morphology	D	closed depression
Soil Landforms	Landform Morphology	F	flat
Soil Landforms	Landform Morphology	H	hillock
Soil Landforms	Landform Morphology	L	lower slope
Soil Landforms	Landform Morphology	M	mid-slope
Soil Landforms	Landform Morphology	R	ridge
Soil Landforms	Landform Morphology	S	simple slope
Soil Landforms	Landform Morphology	U	upper slope
Soil Landforms	Landform Morphology	V	open depression (vale)
Soil Landforms	Soil Supergroup	100	wet or water logged soils
Soil Landforms	Soil Supergroup	200	rocky or stony soils
Soil Landforms	Soil Supergroup	300	ironstone gravelly soils
Soil Landforms	Soil Supergroup	400	sandy duplexes
Soil Landforms	Soil Supergroup	420	shallow sands
Soil Landforms	Soil Supergroup	440	deep sands
Soil Landforms	Soil Supergroup	460	sandy earths
Soil Landforms	Soil Supergroup	500	loamy duplexes
Soil Landforms	Soil Supergroup	520	shallow loams
Soil Landforms	Soil Supergroup	540	loamy earths
Soil Landforms	Soil Supergroup	600	cracking clays
Soil Landforms	Soil Supergroup	620	non-cracking clays
Soil Landforms	Surface Boulder Abundance	A	abundant, 50-90%
Soil Landforms	Surface Boulder Abundance	C	common, 10-20%
Soil Landforms	Surface Boulder Abundance	F	few, 2-10%
Soil Landforms	Surface Boulder Abundance	M	many, 20-50%
Soil Landforms	Surface Boulder Abundance	N	no coarse fragments, 0%
Soil Landforms	Surface Boulder Abundance	T	very abundant, >90%
Soil Landforms	Surface Boulder Abundance	V	very few, <2%
Soil Landforms	Surface Condition	C	surface crust
Soil Landforms	Surface Condition	F	firm
Soil Landforms	Surface Condition	G	cracking
Soil Landforms	Surface Condition	H	hard setting
Soil Landforms	Surface Condition	L	loose
Soil Landforms	Surface Condition	M	self-mulching
Soil Landforms	Surface Condition	S	soft
Soil Landforms	Surface Condition	X	surface flake
Soil Landforms	Surface Gravel Abundance	A	abundant, 50-90%
Soil Landforms	Surface Gravel Abundance	C	common, 10-20%
Soil Landforms	Surface Gravel Abundance	F	few, 2-10%
Soil Landforms	Surface Gravel Abundance	M	many, 20-50%
Soil Landforms	Surface Gravel Abundance	N	no coarse fragments, 0%
Soil Landforms	Surface Gravel Abundance	T	very abundant, >90%
Soil Landforms	Surface Gravel Abundance	V	very few, <2%
Soil Landforms	Surface Segregation Abundance	A	abundant, >50%
Soil Landforms	Surface Segregation Abundance	C	common, 10-20%
Soil Landforms	Surface Segregation Abundance	F	few, 2-10%
Soil Landforms	Surface Segregation Abundance	M	many, 20-50%
Soil Landforms	Surface Segregation Abundance	N	no segregations
Soil Landforms	Surface Segregation Abundance	V	very few, <2%
Soil Landforms	Surface Segregation Form	C	concretions
Soil Landforms	Surface Segregation Form	F	fragments
Soil Landforms	Surface Segregation Form	L	laminae
Soil Landforms	Surface Segregation Form	N	nodules

Database Table	Field	Code	Description
Soil Landforms	Surface Segregation Form	R	root linings
Soil Landforms	Surface Segregation Form	S	soft segregations
Soil Landforms	Surface Segregation Form	T	tubules
Soil Landforms	Surface Segregation Form	V	veins
Soil Landforms	Surface Segregation Form	X	crystals
Soil Landforms	Surface Segregation Nature	E	earthy
Soil Landforms	Surface Segregation Nature	F	ferruginous
Soil Landforms	Surface Segregation Nature	G	ferruginous- organic
Soil Landforms	Surface Segregation Nature	H	organic (Humified)
Soil Landforms	Surface Segregation Nature	K	calcerous
Soil Landforms	Surface Segregation Nature	L	argillaceous
Soil Landforms	Surface Segregation Nature	M	manganiferous
Soil Landforms	Surface Segregation Nature	N	ferromanganiferous
Soil Landforms	Surface Segregation Nature	O	other
Soil Landforms	Surface Segregation Nature	S	sulphurous
Soil Landforms	Surface Segregation Nature	U	unidentified
Soil Landforms	Surface Segregation Nature	Y	gypseous
Soil Landforms	Surface Segregation Nature	Z	saline (visible salt)
Soil Landforms	Surface Segregation Size	C	Coarse (6-20mm)
Soil Landforms	Surface Segregation Size	E	Extremely coarse (>60mm)
Soil Landforms	Surface Segregation Size	F	Fine (<2mm)
Soil Landforms	Surface Segregation Size	L	Very coarse, large (20-60mm)
Soil Landforms	Surface Segregation Size	M	Medium (2-6mm)
Soil Landforms	Surface Stone Abundance	A	abundant, 50-90%
Soil Landforms	Surface Stone Abundance	C	common, 10-20%
Soil Landforms	Surface Stone Abundance	F	few, 2-10%
Soil Landforms	Surface Stone Abundance	M	many, 20-50%
Soil Landforms	Surface Stone Abundance	N	no coarse fragments, 0%
Soil Landforms	Surface Stone Abundance	T	very abundant, >90%
Soil Landforms	Surface Stone Abundance	V	very few, <2%
Soil Profile	Carbonates	H	highly calcareous, moderately visible
Soil Profile	Carbonates	M	moderately calcareous, audible and slightly visible
Soil Profile	Carbonates	N	non-calcareous, no fizz
Soil Profile	Carbonates	S	slightly calcareous, lightly audible but not visible
Soil Profile	Carbonates	V	very highly calcareous, strong visible fizz
Soil Profile	Coarse Fragments Abundance	A	abundant, 50-90%
Soil Profile	Coarse Fragments Abundance	C	common, 10-20%
Soil Profile	Coarse Fragments Abundance	F	few, 2-10%
Soil Profile	Coarse Fragments Abundance	M	many, 20-50%
Soil Profile	Coarse Fragments Abundance	N	no coarse fragments, 0%
Soil Profile	Coarse Fragments Abundance	T	very abundant, >90%
Soil Profile	Coarse Fragments Abundance	V	very few, <2%
Soil Profile	Coarse Fragments Size	1	2-6mm
Soil Profile	Coarse Fragments Size	2	6-20mm
Soil Profile	Coarse Fragments Size	3	20-60mm
Soil Profile	Coarse Fragments Size	4	60-200mm
Soil Profile	Coarse Fragments Size	5	200-600mm
Soil Profile	Coarse Fragments Size	6	600mm-2m
Soil Profile	Coarse Fragments Size	7	>2m
Soil Profile	Field Texture Grade	CL	Clay loam
Soil Profile	Field Texture Grade	CS	Clayey sand, ribbon 5-15mm
Soil Profile	Field Texture Grade	HC	Heavy clay
Soil Profile	Field Texture Grade	L	Loam
Soil Profile	Field Texture Grade	LC	Light clay
Soil Profile	Field Texture Grade	LMC	Light medium clay

Database Table	Field	Code	Description
Soil Profile	Field Texture Grade	LS	Loamy sand, ribbon 5mm
Soil Profile	Field Texture Grade	MC	Medium clay
Soil Profile	Field Texture Grade	S	Sand, no ribbon
Soil Profile	Field Texture Grade	SC	Sandy clay
Soil Profile	Field Texture Grade	SCL	Sandy clay loam
Soil Profile	Field Texture Grade	SCL	Sandy clay loam
Soil Profile	Field Texture Grade	SL	Sandy loam, ribbon 15-25mm
Soil Profile	Field Texture Grade	ZC	Silty clay
Soil Profile	Field Texture Grade	ZCL	Silty clay loam
Soil Profile	Field Texture Grade	ZL	Silt loam
Soil Profile	Horizon	A	First horizon
Soil Profile	Horizon	B	Second horizon
Soil Profile	Horizon	C	Third horizon
Soil Profile	Horizon	D	Fourth horizon
Soil Profile	Horizon Boundary Distinctness	A	abrupt (5-20mm
Soil Profile	Horizon Boundary Distinctness	C	clear (20-50mm)
Soil Profile	Horizon Boundary Distinctness	D	diffuse (>100m)
Soil Profile	Horizon Boundary Distinctness	G	gradual (50-100mm)
Soil Profile	Horizon Boundary Distinctness	S	sharp (<5mm)
Soil Profile	Horizon Boundary Shape	B	broken
Soil Profile	Horizon Boundary Shape	I	irregular
Soil Profile	Horizon Boundary Shape	S	smooth
Soil Profile	Horizon Boundary Shape	T	tongued
Soil Profile	Horizon Boundary Shape	W	wavy
Soil Profile	Layer	1	Layer One
Soil Profile	Layer	2	Layer Two
Soil Profile	Layer	3	Layer Three
Soil Profile	Layer	4	Layer Four
Soil Profile	Layer	5	Layer Five
Soil Profile	Segregation Abundance	A	abundant, >50%
Soil Profile	Segregation Abundance	C	common, 10-20%
Soil Profile	Segregation Abundance	F	few, 2-10%
Soil Profile	Segregation Abundance	M	many, 20-50%
Soil Profile	Segregation Abundance	N	no segregations
Soil Profile	Segregation Abundance	V	very few, <2%
Soil Profile	Segregation Form	C	concretions
Soil Profile	Segregation Form	F	fragments
Soil Profile	Segregation Form	L	laminae
Soil Profile	Segregation Form	N	nodules
Soil Profile	Segregation Form	R	root linings
Soil Profile	Segregation Form	S	soft segregations
Soil Profile	Segregation Form	T	tubules
Soil Profile	Segregation Form	V	veins
Soil Profile	Segregation Form	X	crystals
Soil Profile	Segregation Nature	A	aluminuos
Soil Profile	Segregation Nature	E	earthy
Soil Profile	Segregation Nature	F	ferruginous
Soil Profile	Segregation Nature	G	ferruginous- organic
Soil Profile	Segregation Nature	H	organic (Humified)
Soil Profile	Segregation Nature	K	calcerous
Soil Profile	Segregation Nature	L	argillaceous
Soil Profile	Segregation Nature	M	manganiferous
Soil Profile	Segregation Nature	N	ferromanganiferous
Soil Profile	Segregation Nature	O	other
Soil Profile	Segregation Nature	S	sulphurous
Soil Profile	Segregation Nature	U	unidentified
Soil Profile	Segregation Nature	Y	gypseous

Database Table	Field	Code	Description
Soil Profile	Segregation Nature	Z	saline (visible salt)
Soil Profile	Segregation Size	C	Coarse (6-20mm)
Soil Profile	Segregation Size	E	Extremely coarse (>60mm)
Soil Profile	Segregation Size	F	Fine (<2mm)
Soil Profile	Segregation Size	L	Very coarse, large (20-60mm)
Soil Profile	Segregation Size	M	Medium (2-6mm)
Soil Profile	Structure	G	single grain (apedal)
Soil Profile	Structure	M	moderately pedal
Soil Profile	Structure	S	strongly pedal
Soil Profile	Structure	V	massive (apedal)
Soil Profile	Structure	W	weakly pedal
Soil Profile	Type of Soil Observation	A	auger boring
Soil Profile	Type of Soil Observation	C	relatively undisturbed soil core
Soil Profile	Type of Soil Observation	D	dual auger and pit
Soil Profile	Type of Soil Observation	E	existing vertical exposure
Soil Profile	Type of Soil Observation	P	soil pit
Vegetation	Growth Form	A	cycad
Vegetation	Growth Form	C	chenopod shrub
Vegetation	Growth Form	D	sod grass
Vegetation	Growth Form	E	fern
Vegetation	Growth Form	F	forb
Vegetation	Growth Form	G	tussock grass
Vegetation	Growth Form	H	hummock grass
Vegetation	Growth Form	L	vine
Vegetation	Growth Form	M	tree mallee
Vegetation	Growth Form	N	lichen
Vegetation	Growth Form	O	moss
Vegetation	Growth Form	P	palm
Vegetation	Growth Form	R	rush
Vegetation	Growth Form	S	shrub
Vegetation	Growth Form	T	tree
Vegetation	Growth Form	V	sedge
Vegetation	Growth Form	W	liverwort
Vegetation	Growth Form	X	Xanthorrhoea
Vegetation	Growth Form	Y	mallee shrub
Vegetation	Growth Form	Z	heath shrub
Vegetation	Height Class	1	<0.25m
Vegetation	Height Class	2	0.26-0.5m
Vegetation	Height Class	3	0.51-1m
Vegetation	Height Class	4	1.01-3m
Vegetation	Height Class	5	3.01-6m
Vegetation	Height Class	6	6.01-12m
Vegetation	Height Class	7	12.01-20m
Vegetation	Height Class	8	20.01-35m
Vegetation	Height Class	9	>35.01m
Vegetation	Height Class Name	Dwarf	T4, M1, S1, Y1, Z1, C1
Vegetation	Height Class Name	Extremely tall	T9, M6, S6, Y6, Z6, C6, H5, G5, F5, R5, V5, E5, D3, X3, N3, W3
Vegetation	Height Class Name	Low	T5, M2, S2, Y2, Z2, C2, H1, G1, F1, R1, V1, E1, D1, X1, N1, W1
Vegetation	Height Class Name	Mid-high	T6, M3, S3, Y3, Z3, C3, H2, G2, F2, R2, V2, E2
Vegetation	Height Class Name	Tall	T7, M4, S4, Y4, Z4, C4, H3, G3, F3, R3, V3, E3, D2, X2, N2, W2
Vegetation	Height Class Name	Very tall	T8, M5, S5, Y5, Z5, C5, H4, G4, F4, R4, V4, E4

Database Table	Field	Code	Description
Vegetation	Stratum	0	emergent, trees above tallest dominant stratum, up to 5% of total crown cover
Vegetation	Stratum	1	upper, tallest dominant statum, av. distance between crowns overlapping to 20 times crown size
Vegetation	Stratum	2	middle, all layers between upper layer & 1m in height
Vegetation	Stratum	3	lower stratum, all vegetation up to 1m tall
Vegetation	Stratum	4	non-woody ground stratum
Vegetation	Stratum	2A	middle (upper)
Vegetation	Stratum	2B	middle (lower)
Water Resources	Art Water Features	1	constructed drainage
Water Resources	Art Water Features	2	dam
Water Resources	Art Water Features	3	tank
Water Resources	Art Water Features	4	roaded catchment
Water Resources	Art Water Features	5	bore/well
Water Resources	Art Water Features	6	other
Water Resources	Natural Water Features	1	natural drainage line
Water Resources	Natural Water Features	2	wetland
Water Resources	Natural Water Features	3	seeps/soaks
Water Resources	Natural Water Features	4	saltpan
Water Resources	Natural Water Features	5	other

APPENDIX THREE: FAUNA LIST

COMMON NAME	TAXONOMIC NAME	STATUS
Birds		
Australian Magpie	*Gymnorhina tibicen*	
Australian Raven	*Corvus coronoides*	
Australian Ringneck	*Barnardius zonarius*	
Australian Shelduck	*Tadorna tadornoides*	
Black-faced Cuckoo-shrike	*Coracina novaehollndiae*	
Black-faced Woodswallow	*Artamus cinereus*	
Brown-headed Honeyeater	*Melithreptus albogularis*	
Common Bronzewing	*Phaps chalcoptera*	
Crested Pigeon	*Ocyphaps lophotes*	
Dusky Woodswallow	*Artamus cyanopterus*	
Elegant Parrot	*Neophema elegans*	
Galah	*Cacatua roseicapilla*	
Golden Whistler	*Pachycephala pectoralis*	
Grey Butcherbird	*Cracticus torquatus*	
Grey Currawong	*Strepera versicolor*	
Grey Fantail	*Rhipidura fuliginosa*	
Grey Shrike-thrush	*Colluricincla harmonica*	
Laughing Kookaburra	*Dacelo novaeguineae*	Introduced
Magpie-lark	*Grallina cyanoleuca*	
Mallee Fowl	*Leipoa ocellata*	Vulnerable
New Holland Honeyeater	*Phylidonyris novaehollandiae*	
Peregrine Falcon	*Falco peregrinus*	
Pied Butcherbird	*Cracticus nigrogularis*	
Red Wattlebird	*Anthochaera carunculata*	
Red-capped Robin	*Petroica goodenovii*	
Regent Parrot	*Polytelis anthopeplus*	
Rufous Whistler	*Pachycephala rufiventris*	
Southern Scrub-robin	*Drymodes brunneopygia*	
Splendid Fairy-wren	*Malurus spendens*	
Striated Pardalote	*Pardalotus striatus*	
Stubble Quail	*Coturnix pectoralis*	
Tree Martin	*Hirundo nigricans*	
Varied Sittella	*Daphoenositta chrysoptera*	
Wedge-tailed Eagle	*Aquila audax*	
Weebill	*Smicrornis brevirostris*	
Welcome Swallow	*Hirundo neoxena*	
Western Yellow Robin	*Eopsaltria griseogularis*	
White-browed Babbler	*Pomatostomus superciliosus*	
White-browed Scrubwren	*Sericornis frontalis*	
White-eared Honeyeater	*Lichenostomus leucotis*	
Willie Wagtail	*Rhipidura leucaphrys*	
Yellow-throated Miner	*Manorina flavigula*	

COMMON NAME	TAXONOMIC NAME	STATUS
Mammals and Monotremes		
Common Brushtail Possum	*Trichosurus vulpecula*	
European Rabbit	*Oryctolagus cuniculus*	Introduced
European Red Fox	*Vulpes vulpes*	Introduced
Sheep	*Ovis aries*	Introduced
Short-beaked Echidna	*Tachyglossus aculeatus*	
Western Grey Kangaroo	*Macropus fuliginosus*	
Reptiles and Amphibians		
Bobtail	*Tiliqua rugosa*	
Dugite	*Pseudonaja affinis*	
Monitor	*Varanus* sp.	

APPENDIX FOUR: FLORA LIST

Family	Species Name
Aizoaceae	*Carpobrotus* sp.1
Asteraceae	*Olearia dampiera* subsp. *eremicola* *Olearia muelleri* *Olearia revoluta*
Casuarinaceae	*Allocasuarina acuaria* *Allocasuarina microstachya* *Casuarina obesa*
Chenopodiaceae	*Atriplex* sp.1 *Halosarcia lepidosperma* *Rhagodia baccata* subsp. *dioica*
Convolvulaceae	*Wilsonia humilis*
Cyperaceae	*Gahnia lanigera* *Gahnia* sp.L (K.R. Newbey 7888) *Lepidosperma brunonianum* *Lepidosperma gracile* *Lepidosperma* sp.1 *Lepidosperma* sp.A2 Island Flat (Keighery 7000) *Lepidosperma* sp.K Boorabbin (K.L. Wilson 2579) *Lepidosperma viscidum* *Mesomelaena stygia* subsp. *stygia*
Dasypogonaceae	*Lomandra effusa* *Lomandra rupestris*
Droseraceae	*Drosera paleacea* subsp. *trichocaulis* *Drosera* sp.2
Epacridaceae	*Leucopogon constephiodes* var. 1
Iridaceae	*Patersonia occidentalis*
Mimosaceae	*Acacia acuminata* *Acacia glaucoptera* *Acacia microbotrya* *Acacia undosa*' ms
Myrtaceae	*Beaufortia micrantha* *Callistemon phoeniceus* *Calytrix leschenaultii* *Eremaea pauciflora* *Eremaea pauciflora* var. *pauciflora* *Eucalyptus* aff. *occidentalis* *Eucalyptus celastroides* subsp. *virella* *Eucalyptus conglobata* *Eucalyptus continens*' ms *Eucalyptus flocktoniae* *Eucalyptus gardneri* *Eucalyptus incrassata* *Eucalyptus kondininensis* *Eucalyptus leptocalyx* *Eucalyptus longicornis* *Eucalyptus loxophleba* *Eucalyptus loxophleba* subsp. *loxophleba* *Eucalyptus occidentalis*

Family	**Species Name**
Myrtaceae (cont.)	*Eucalyptus olivina*
	Eucalyptus phaenophylla
	Eucalyptus phaenophylla subsp. *phaenophylla*
	Eucalyptus phenax
	Eucalyptus platypus
	Eucalyptus platypus subsp. *platypus*
	Eucalyptus salmonophloia
	Eucalyptus salubris
	Eucalyptus sp.22
	Eucalyptus sp.8
	Eucalyptus spathulata
	Eucalyptus suggrandis subsp. *alipes*
	Eucalyptus tetragona
	Eucalyptus transcontinentalis
	Eucalyptus xanthonema
	Leptospermum erubescens
	Leptospermum roei
	Melaleuca acuminata
	Melaleuca adnata
	Melaleuca bracteosa
	Melaleuca brophyi' ms
	Melaleuca cliffortioides
	Melaleuca depauperata
	Melaleuca halmaturorum
	Melaleuca lateriflora
	Melaleuca laxiflora
	Melaleuca pauperiflora
	Melaleuca pentagona
	Melaleuca pungens
	Melaleuca societatis' ms
	Melaleuca subtrigona
	Melaleuca uncinata
	Verticordia oxylepis
Papilionaceae	*Daviesia decurrens*
	Gastrolobium parviflorum
	Templetonia sulcata
Phormiaceae	*Dianella revoluta*
Orchidaceae	Unknown sp.1
Poaceae	*Austrostipa puberula*
	Austrostipa sp.1
	Avena sp.1
	Briza maxima
	Stipa elegantissima
	Unknown sp.1
	Unknown sp.2
Proteaceae	*Banksia violacea*
	Dryandra cirsioides
	Dryandra erythrocephala var. *erythrocephala*
	Dryandra pteridifolia
	Grevillea huegelii

Family	**Species Name**
Proteaceae (cont.)	*Hakea corymbosa*
	Hakea cygna
	Hakea cygna subsp. *cygna*
	Hakea laurina
	Hakea lissocarpha
	Hakea obliqua subsp. *parviflora*
	Hakea pandanicarpa subsp. *crassifolia*
	Petrophile squamata
Restionaceae	*Anarthria egrallata*' ms
	Chordifex sphacelatus' ms
	Lyginia sp.1
Rhamnaceae	*Cryptandra minutifolia*
Rutaceae	*Phebalium filifolium*
	Phebalium tuberculosum
Santalaceae	*Santalum acuminatum*
Sapindaceae	*Dodonaea bursariifolia*
	Dodonea viscosa
Sterculiaceae	*Lasiopetalum rosmarinifolium*
Xanthorrhoeaceae	*Xanthorrhoea* sp.1
Unknown	Lichen sp.1
Unknown	Moss sp.1
Unknown	Sedge sp.6
Unknown	Sedge sp.10
Unknown	Unknown sp.1
Unknown	Weed sp.1
Unknown	Weed sp.2

APPENDIX FIVE: VEGETATION ASSOCIATIONS

Quadrat	Brief Vegetation Description
KS0001	Tall open forest of *Eucalyptus loxophleba*
KS0002	Tall closed forest of *Eucalyptus salmonophloia* and *E. capillosa* subsp. *polyclada*
KS0003	Tall open forest of *Eucalyptus loxophleba*
KS0004	Tall closed forest of *Eucalyptus salubris*
KS0005	Tall heathland of *Hakea pandanicarpa* subsp. *crassifolia*, *Hakea cygna* subsp. *cygna* and *Dryandra erythrocephala* var. *erythrocephala*
KS0006	Tall mallee shrubland of *Eremaea pauciflora* with dwarf isolated emergent trees of *Hakea cygna* and *Santalum acuminatum*
KS0007	Open heath of tall *Eremaea pauciflora* and *Hakea cygna* and mid-high *Melaleuca pentagona* over low heathland of *Allocasuarina microstachya*, *Calytrix leschenaultii* and *Melaleuca pauperiflora*
KS0008	Very tall closed mallee forest of *Eucalyptus celastroides* subsp. *virella*, *Eucalyptus phaenophylla*, *Eucalyptus continens*' ms, *Eucalyptus flocktoniae*, *Eucalyptus conglobata* and *Eucalyptus suggrandis* subsp. *alipes*
KS0009	Very tall open mallee forest of *Eucalyptus phaenophylla* subsp. *phaenophylla*, *Eucalyptus transcontinentalis*, *Eucalyptus kondininensis* and *Eucalyptus* sp.22
KS0010	Mid-high woodland of *Eucalyptus tetragona* over mid-high sparse shrubland of *Leptospermum roei* over mid-high heathland of *Banksia violacea*, *Hakea cygna* subsp. *cygna* and *Eremaea pauciflora* over low sparse heath of *Leucopogon constephiodes* var. 1
KS0011	Mid-high isolated emergent trees of *Eucalyptus* aff. *occidentalis* over low open forest of *Eucalyptus platypus*
KS0012	Very tall mallee woodland of *Eucalyptus phaenophylla*, *Eucalyptus xanthonema*, *Eucalyptus conglobata* and *Eucalyptus spathulata*
KS0013	Very tall open mallee forest of *Eucalyptus phaenophylla* and *Eucalyptus phenax*
KS0014	Very tall closed forest of *Eucalyptus salmonophloia*
KS0015	Chenopod shrubland of mid-high *Halosarcia lepidosperma* and low *Carpobrotus* sp with very tall isolated emergent shrubs of *Melaleuca lateriflora* subsp. *lateriflora*
KS0016	Mid-high closed forest of *Eucalyptus loxophleba* and *Casuarina obesa*
KS0017	Tall open forest of *Eucalyptus loxophleba*
KS0018	Very tall closed forest of *Eucalyptus longicornis* and *Eucalyptus occidentalis*
KS0019	Tall open heath of *Leptospermum erubescens*, *Hakea obliqua* subsp. *parviflora*, *Allocasuarina acuaria* and *Eremaea pauciflora* over open heath of mid-high *Verticordia oxylepis* and low *Melaleuca subtrigona* and *Chordifex sphacelatus*
KS0020	Tall closed forest of *Eucalyptus loxophleba* and *Eucalyptus transcontinentalis*
KS0021	Tall open heath of *Melaleuca bracteosa*, *Leptospermum erubescens*, *Dryandra cirsioides* and tall open shrubland of *Melaleuca uncinata* with very tall isolated emergent mallee trees of *Eucalyptus phaenophylla*.
KS0022	Very tall mallee woodland of *Eucalyptus phaenophylla*
KS0023	Low shrubland of *Acacia acuminata*
KS0024	Very tall closed forest of *Eucalyptus salmonophloia*
KS0025	Very tall closed forest of *Eucalyptus salmonophloia*
KS0026	Tall shrubland of *Melaleuca halmaturorum* and *Melaleuca pungens*
KS0027	Mid-high closed heathland of *Melaleuca halmaturorum*
KS0028	Low woodland of *Eucalyptus platypus* subsp. *platypus* and very tall mallee woodland of *Eucalyptus gardneri*
KS0029	Very tall open forest of *Eucalyptus occidentalis*
KS0030	Extremely tall open mallee forest of *Eucalyptus incrassata* and *Eucalyptus* sp.8
KS0031	Tall open forest of *Eucalyptus loxophleba*
KS0032#	Chenopod shrubland of *Carpobrotus* sp
KS0033#	Mid-high open mallee forest of *Eucalyptus* sp over tall isolated shrubs of *Santalum acuminatum*
KS0034#	Mid-high open mallee forest of *Eucalyptus platypus*
KS0035#	Mid-high shrubland of *Acacia acuminata* and *Acacia microbotrya*
KS0036#	Mid-high shrubland of *Acacia acuminata* and *Allocasuarina campestris*
KS0037#	Mid-high shrubland of *Melaleuca uncinata* and *Callistemon phoeniceus* and *Acacia acuminata*
KS0038#	Mid-high closed shrubland of *Melaleuca* spp and *Acacia acuminata*
KS0039#	Mid-high closed shrubland of *Melaleuca uncinata*
KS0040#	Low closed shrubland of *Allocasuarina acuaria*
KS0041#	Sedgeland of *Ptilotus* sp.

Quadrat	Brief Vegetation Description
KS0042#	Tall woodland of *Eucalyptus salmonophloia* and *E. longicornis*
KS0043#	Tall open forest of *Eucalyptus salmonophloia*, *E. longicornis* and *E. capillosa* subsp. *polyclada*
KS0044#	Tall woodland of *Eucalyptus sheathiana* and *E. occidentalis* subsp *occidentalis*
KS0045#	Tall open forest of *Eucalyptus salmonophloia* and mallee *Eucalyptus loxophleba*
KS0046#	Mid-high open forest of *Melaleuca strobophylla*
KS0047#	Tall woodland of *Eucalyptus longicornis*
KS0048#	Low woodland of *Casuarina obesa*
KS0049#	Tall open forest of *Eucalyptus longicornis* and *E. loxophleba* subsp *loxophleba*
KS0050#	Tall open forest of *Eucalyptus salmonophloia* and *E. occidentalis* subsp. *occidentalis*

Note: # = nominal quadrat (not surveyed)

APPENDIX SIX: HERITAGE SITE ASSESSMENT SHEETS

insert sheet 1

insert sheet 2

insert sheet 3

insert sheet 4

SECTION TWO: RESERVE AND QUADRAT DESCRIPTIONS

Reserve Name:		**Purpose:**	Water
Reserve #:	9445	**Area:** 39.5 ha	**Perimeter:** 2517.6 m
Shire:	Kent	**Polygon Identification Number:**	661185
Location:	9328	**CALM District:** Katanning	**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 25% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 75%

Fauna: Australian Magpie, Australian Raven, Australian Shelduck, European Rabbit, Galah, Grey Butcherbird, Grey Fantail, Laughing Kookaburra, Regent Parrot, Welcome Swallow, Willie Wagtail, Yellow-throated Miner.

Water Resources: Natural drainage line, seeps/soaks, dam.

Weed Cover:

Area <20%:	8.4%	**Area 50-80%:**	47.2%
Area 20-50%:	25.1%	**Area >80%:**	19.4%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 70% **Utility/transport:** 26%
Remnant Vegetation: 4%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: None

Comments:
Non-indigenous cultural heritage site consisting of a soak found within Reserve.
Gimlet (*Eucalyptus salubris*) has been cut for timber production at a low extent, with one stand cut less than one year ago and one cut more than five years ago. Jam (*Acacia acuminata*) cut at a low extent within the Reserve, more than five years ago.
2 quadrats in this Reserve.

Heritage Site - Soak

Reserve 9445
Quadrat KS0023 Low open forest of *Acacia acuminata* over mid-high grassland of *Briza maxima* and low grassland, on acid shallow duplex soil.
Quadrat KS0024 Very tall closed forest of *Eucalyptus salmonophloia* over dwarf open woodland of *Acacia acuminata* and tall sparse shrubland of *Olearia revoluta* over low open chenopod shrubland of *Atriplex* sp. and open forbland of orchids over tall and low grassland, on yellow/brown shallow sandy duplex soil.

Map 1: Reserve 9445.

Map 2: Reserve 9445.

Map 3: Reserve 9445.

Reserve Name:		**Purpose:**	Water	
Reserve #:	9992	**Area:** 40.4 ha	**Perimeter:** 2545	
Shire:	Kent	**Polygon Identification Number:**		663126
Location:	9992	**CALM District:** Katanning		**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 26% **Fence in Poor Condition:** 24% **Fence in Good Condition:** 50%				
Fauna: Australian Ringneck, Australian Raven, Australian Magpie, Grey Fantail, Regent Parrot, Grey Butcherbird, Western Grey Kangaroo.				
Water Resources: Natural drainage line, dam.				
Weed Cover: **Area <20%:** 46.7% **Area 50-80%:** 18.2% **Area 20-50%:** 34.9% **Area >80%:** 0.2%				
Adjacent Land Use (% of Reserve Perimeter): **Cropping/grazing:** 76% **Remnant Vegetation:** 24%				
Grazing Pressure: None				
Access: No external or internal access.				
Degraded Vegetation: None				
Comments: Jam (*Acacia acuminata*) cut for production at a low extent, more than five years ago. 1 quadrat in this Reserve.				

Reserve 9992

Quadrat KS0020

Tall closed forest of *Eucalyptus loxophleba* and *Eucalyptus transcontinentalis* over tall woodland of *Acacia acuminata* over mid-high sparse grassland of *Austrostipa* sp. and low sparse mossland with lichen, on deep sandy gravel.

Map 1: Reserve 9992

Map 2: Reserve 9992.

Map 3: Reserve 9992.

Reserve Name:		**Purpose:**	Water	
Reserve #:	10685	**Area:** 43.4 ha	**Perimeter:** 2637.1 m	
Shire:	Kent	**Polygon Identification Number:**		659567
Location:		**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 50% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 50%

Fauna: Australian Magpie, Australian Ringneck, Elegant Parrot, Laughing Kookaburra, European Rabbit, Red Wattlebird, Bobtail, Monitor Lizard, Welcome Swallow, Sheep.

Water Resources: Natural drainage line, constructed drainage, dam.

Weed Cover:

Area <20%:	25.6%	**Area 50-80%:**	38.6%
Area 20-50%:	21.0%	**Area >80%:**	14.8%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 74% **Utility/transport:** 26%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: None

Comments:
Gimlet (*Eucalytpus salubris*) cut for timber production at a low extent, more than five years ago.
Sandalwood (*Santalum spicatum*) present as isolated plants.
1 quadrat in this Reserve.

Reserve 10685

Quadrat KS0002

Tall closed forest of *Eucalyptus salmonophloia* and *Eucalyptus capillosa* subsp. *polyclada* over tall open shrubland of *Melaleuca uncinata* over mid-high open shrubland of *Templetonia sulcata* over tall open grassland of *Stipa elegantissima* and mid-high open sedgeland of *Gahnia lanigera* and low open forbland of *Wilsonia humilis*, on grey shallow sandy duplex soil.

Map 1: Reserve 10685.

Map 2: Reserve 10685

Map 3: Reserve 10685.

Reserve Name:		**Purpose:**	Water	
Reserve #:	10739	**Area:** 35.1 ha	**Perimeter:** 2281.8 m	
Shire:	Kent	**Polygon Identification Number:**		644516
Location:		**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 100% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 0%

Fauna: Stubble Quail, Crested Pigeon, Australian Ringneck, Splendid Fairy-wren, Australian Magpie.

Water Resources: Constructed drainage.

Weed Cover:

Area <20%:	66.7%	**Area 50-80%:**	18.2%
Area 20-50%:	11.1%	**Area >80%:**	4.0%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 31% **Utility/transport:** 25%
Remnant Vegetation: 43%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: None

Comments:
Gravel extraction present within the Reserve.
1 quadrat in this Reserve.

Reserve 10739

Quadrat KS0005

Tall shrubland of *Hakea pandanicarpa* subsp. *crassifolia*, *Hakea cygna* subsp. *cygna* and *Dryandra erythrocephala* var *erythrocephala* over extemely tall *Xanthorrhoea* sp. and midhigh heathland of *Eremaea pauciflora* and low heathland of *Dryandra pteridifolia*, *Beaufortia micrantha* and *Banksia violacea* over low open sedgeland of *Mesomelaena stygia* subsp. *stygia* and *Lepidosperma viscidum*, on deep sandy gravel.

Map 1: Reserve 10739.

Map 2: Reserve 10739.

Map 3: Reserve 10739.

Reserve Name:	Water Reserve	**Purpose:**	Water	
Reserve #:	10740	**Area:** 42.3 ha	**Perimeter:** 2612 m	
Shire:	Kent	**Polygon Identification Number:**		644533
Location:		**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 23% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 77%

Fauna: Western Grey Kangaroo, Australian Ringneck, European Rabbit, Galah, Grey Fantail, Brown-headed Honeyeater, Willie Wagtail, European Red Fox.

Water Resources: Natural drainage line, constructed drainage.

Weed Cover:

Area <20%:	19.7%	**Area 50-80%:**	6.1%
Area 20-50%:	33.3%	**Area >80%:**	40.9%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 76% **Utility/transport:** 23%
Remnant Vegetation: 1%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: Death/loss of overstorey vegetation due to unknown causes, possibly grazing.

Comments:
1 quadrat in this Reserve.

Reserve 10740

Quadrat KS0006

Dwarf isolated emergent trees of *Hakea cygna* and *Santalum acuminatum* over tall mallee shrubland of *Eremaea pauciflora* and midhigh heathland of *Leptospermum erubescens* and low open heath of *Melaleuca pauperiflora* over low closed sedgeland of *Chordifex sphacelatus* and forbland of *Drosera* sp., on pale deep sand.

Map 1: Reserve 10740

Map 2: Reserve 10740

Map 3: Reserve 10740

Reserve Name:		**Purpose:**	Water
Reserve #:	11519 & 13448	**Area:** 116.6 ha	**Perimeter:** 6973 m
Shire:	Kent	**Polygon Identification Numbers:**	665496, 665490 & 665487
Location:	7849, 7346 & 6124	**CALM District:** Katanning	**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 65.7% **Fence in Poor Condition:** 25.2% **Fence in Good Condition:** 9.1%

Fauna: Australian Magpie, Australian Raven, Australian Ringneck, Common Brushtail Possum, Dugite, European Rabbit, Galah, Grey Butcherbird, Grey Currawong, Grey Fantail, Magpie-lark, Pied Butcherbird, Red-capped Robin, Sheep, Welcome Swallow, Western Grey Kangaroo, White-browed Babbler.

Water Resources: Natural drainage line, saltpan, dam.

Weed Cover:

Area <20%:	93.1%	**Area 50-80%:**	0.0%
Area 20-50%:	6.9%	**Area >80%:**	0.0%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 25.8% **Utility/transport:** 20.3%
Remnant Vegetation: 53.9%

Grazing Pressure: Severe

Access: Unsealed 4WD external, 4WD internal

Degraded Vegetation: Salt tolerant plants present, due to salinity from a rising water table.

Comments:
Non-indigenous cultural heritage site consisting of a dam found within the Reserve 13448.
Jam (*Acacia acuminata*) has been cut for production at a moderate extent, more than five years ago.
Contiguous with Reserve 13448.
5 quadrats (3 in 11519 and 2 in 13448).

Reserve Name:		**Purpose:**	Water
Reserve #:	11519	**Area:** 51 ha	**Perimeter:** 3935.9 m
Shire:	Kent	**Polygon Identification Numbers:**	665496 & 665490
Location:	7849 & 7346	**CALM District:** Katanning	**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 68% **Fence in Poor Condition:** 16% **Fence in Good Condition:** 16%			
Fauna: Australian Magpie, Australian Raven, Australian Ringneck, Common Brushtail Possum, Dugite, European Rabbit, Galah, Grey Butcherbird, Grey Currawong, Grey Fantail, Magpie-lark, Pied Butcherbird, Red-capped Robin, Sheep, Welcome Swallow, Western Grey Kangaroo, White-browed Babbler.			
Water Resources: Natural drainage line, saltpan, dam.			
Weed Cover: See weed cover classes for Reserve 13448 – contiguous with this Reserve.			
Adjacent Land Use (% of Reserve Perimeter): **Cropping/grazing:** 24% **Utility/transport:** 22% **Remnant Vegetation:** 54%			
Grazing Pressure: Severe			
Access: No external or internal access.			
Degraded Vegetation: Salt tolerant plants present, due to salinity from a rising water table.			
Comments: Jam (*Acacia acuminata*) has been cut for production within the Reserve at a moderate extent, more than five years ago. Contiguous with Reserve 13448. 3 quadrats in this Reserve.			

Reserve 11519

Quadrat KS0015

Very tall isolated emergent shrubs of *Melaleuca lateriflora* subsp. *lateriflora* over open chenopod shrubland of mid-high *Halosarcia lepidosperma* and low *Carpobrotus* sp., on grey non-cracking clay.

Quadrat KS0016

Mid-high closed forest of *Eucalyptus loxophleba* and *Casuarina obesa* over low sparse chenopod shrubland of *Halosarcia lepidosperma* over mid-high sparse sedgeland of *Lepidosperma* sp., on pale sandy earth.

Reserve 11519 (cont.)

Quadrat KS0017

Tall open forest of *Eucalyptus loxophleba* over mid-high woodland of *Acacia acuminata* over mid-high open forbland of *Olearia dampieri* subsp. *eremicola* over mid-high rushland of *Lomandra effusa* and low grassland of *Austrostipa puberula* and mossland, on grey deep sandy duplex soil.

Heritage Site - Dam

Reserve Name:		**Purpose:**	Water	
Reserve #:	13448	**Area:** 65.6 ha	**Perimeter:** 6327.6 m	
Shire:	Kent	**Polygon Identification Number:**		665487
Location:	6124	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 70% **Fence in Poor Condition:** 30% **Fence in Good Condition:** 0%

Fauna: Australian Magpie, Australian Raven, Australian Ringneck, Common Brushtail Possum, Dugite, European Rabbit, Galah, Grey Butcherbird, Grey Currawong, Grey Fantail, Magpie-lark, Pied Butcherbird, Red-capped Robin, Welcome Swallow, Western Grey Kangaroo, White-browed Babbler.

Water Resources: Natural drainage line, saltpan.

Weed Cover: Note that weed cover % are for the combined areas of Reserves 13448 and 11519.

Area <20%:	93.1%	**Area 50-80%:**	0.0%
Area 20-50%:	6.9%	**Area >80%:**	0.0%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 2% **Utility/transport:** 39%
Remnant Vegetation: 59%

Grazing Pressure: Severe

Access: Unsealed 4WD external, 4WD internal.

Degraded Vegetation: Salt tolerant plants present due to salinity from a rising water table.

Comments:
Non-indigenous cultural heritage site consisting of a dam found within the Reserve.
Jam (*Acacia acuminata*) cut for production at a moderate extent, more than five years ago.
Contiguous with Reserve 11519.
2 quadrats in this Reserve.

Reserve 13448

Quadrat KS0018

Very tall closed forest of *Eucalyptus longicornis* and *Eucalyptus occidentalis* over mid-high isolated trees of *Acacia acuminata* over low sparse chenopod shrubland of *Rhagodia baccata* subsp. *dioica* over mid-high sparse rushland of *Lomandra effusa*, on grey deep sandy duplex.

Quadrat KS0019

Tall open heath of *Leptospermum erubescens*, *Hakea obliqua* subsp. *parviflora*, *Allocasuarina acuaria* and *Eremaea pauciflora* over open heath of mid-high *Verticordia oxylepis* and low *Melaleuca subtrigona* and *Chordifex sphacelatus* over mid-high sparse sedgeland of *Lyginia* sp and low sparse forbland of *Drosera paleacea* subsp. *trichocaulis*, on pale deep sand.

Map 1: Reserves 11519 and 13448

Map 2: Reserves 11519 and 13448

Map 3: Reserves 11519 and 13448

Reserve Name:		**Purpose:**	Native Flora & Recreation (Shire of Kent)	
Reserve #:	14450 & 19003	**Area:** 39.8 ha	**Perimeter:** 3,552 m	
Shire:	Kent	**Polygon Identification Number:**		661091 & 661106
Location:	6702 & 8420	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 48% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 52%

Fauna: Galah, Australian Raven, Australian Magpie, Western Grey Kangaroo, Splendid Fairy-wren, New Holland Honeyeater, Common Bronzewing, Wedge-tailed Eagle, Australian Ringneck, White-browed Scrubwren, Grey Currawong, Welcome Swallow, Yellow-throated Miner.

Water Resources: Natural drainage line.

Weed Cover:

Area <20%:	20.3%	**Area 50-80%:**	10.3%
Area 20-50%:	57.2%	**Area >80%:**	12.2%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 59% **Utility/transport:** 24%
Remnant Vegetation: 17%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: Decline/stress of understorey vegetation due to clearing.

Comments:
Gimlet (*Eucalyptus salubris*) cut for production at a moderate extent in Reserve 14450, more than five years ago.
Gravel extraction present within Reserve 14450.
1 quadrat in this Reserve 19003.

Reserve Name:		**Purpose:**	Native Flora	
Reserve #:	14450	**Area:** 19.7 ha	**Perimeter:** 1952.8 m	
Shire:	Kent	**Polygon Identification Number:**		661091
Location:	6702	**CALM District:** Katanning		**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 62% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 38%				
Fauna: Australian Ringneck, Galah, Australian Raven, Yellow-throated Miner, Australian Magpie, Western Grey Kangaroo.				
Water Resources: Natural drainage line.				
Weed Cover: **Area <20%:** 11.6% **Area 50-80%:** 20.7% **Area 20-50%:** 42.9% **Area >80%:** 24.7%				
Adjacent Land Use (% of Reserve Perimeter): **Cropping/grazing:** 65% **Utility/transport:** 21% **Remnant Vegetation:** 14%				
Grazing Pressure: None				
Access: Unsealed external, 2WD internal.				
Degraded Vegetation: Decline/stress of understorey vegetation due to clearing.				
Comments: Gimlet (*Eucalyptus salubris*) cut for production at a moderate extent, more than five years ago. Gravel extraction present within Reserve. Contiguous with Reserve 19003. No quadrats in this Reserve.				

Reserve Name:		**Purpose:**	Recreation (Kent Shire)	
Reserve #:	19003	**Area:** 20.1 ha	**Perimeter:** 1869.6 m	
Shire:	Kent	**Polygon Identification Number(s):**		661106
Location:	8420	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 34% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 66%

Fauna: Splendid Fairy-wren, Australian Magpie, Australian Raven, New Holland Honeyeater, Common Bronzewing, Wedge-tailed Eagle, Australian Ringneck, Western Grey Kangaroo, Galah, White-browed Scrubwren, Grey Currawong, Welcome Swallow, Yellow-throated Miner.

Water Resources: Natural drainage line.

Weed Cover:

Area <20%:	37.3%	**Area 50-80%:**	2.5%
Area 20-50%:	40.3%	**Area >80%:**	19.9%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 52% **Utility/transport:** 27%
Remnant Vegetation: 20%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: Decline/stress in understorey vegetation due to clearing.

Comments:
Contiguous with Reserve 14450.
1 quadrat in this Reserve.

Reserve 19003

Quadrat KS0012

Very tall mallee woodland of *Eucalyptus phaenophylla*, *Eucalyptus xanthonema*, *Eucalyptus conglobata* and *Eucalyptus spathulata* over tall mallee shrubland of *Melaleuca uncinata*, *Melaleuca depauperata* and *Melaleuca laxiflora* over mid-high open heath of *Daviesia decurrens* and *Gastrolobium parviflorum* over mid-high sparse sedgeland of *Gahnia lanigera* and low sparse mossland, on grey shallow sandy duplex soil.

Map 1: Reserves 14450 and 19003

Map 2: Reserves 14450 and 19003

Map 3: Reserves 14450 and 19003

Reserve Name:		**Purpose:**	Water	
Reserve #:	14502	**Area:** 40.6 ha	**Perimeter:** 2619.4 m	
Shire:	Kent	**Polygon Identification Number:**		661142
Location:	255	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 50% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 50%

Fauna: Grey Butcherbird, Willie Wagtail, Australian Raven, Australian Magpie, Grey Fantail, Magpie Lark, Yellow-throated Miner, Australian Ringneck.

Water Resources: Natural drainage line.

Weed Cover:

Area <20%:	5.0%	**Area 50-80%:**	32.5%
Area 20-50%:	54.6%	**Area >80%:**	7.8%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 45% **Utility/transport:** 50%
Remnant Vegetation: 5%

Grazing Pressure: None

Access: Sealed external, 2WD internal.

Degraded Vegetation: None

Comments:
Gravel extraction present within the Reserve.
1 quadrat in this Reserve.

Reserve 14502

Quadrat KS0011

Mid-high isolated emergent trees of *Eucalyptus* aff. *occidentalis* over low open forest of *Eucalyptus platypus* over tall mallee shrubland of *Melaleuca pauperiflora* over low sparse mossland, on grey non-cracking clay.

Map 1: Reserve 14502

Map 2: Reserve 14502

Map 3: Reserve 14502

Reserve Name:	Water Reserve	**Purpose:**	Water	
Reserve #:	15296	**Area:** 59.4 ha	**Perimeter:** 3704.6 m	
Shire:	Kent	**Polygon Identification Number:**		644539
Location:		**CALM District:** Katanning		**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 64% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 36%				
Fauna: Australian Magpie, Australian Raven, White-browed Babbler, European Rabbit, Willie Wagtail, Red Wattlebird, Grey Butcherbird, Western Grey Kangaroo, frog (*Crinia* species).				
Water Resources: Constructed drainage, tank, constructed catchment on granite outcrop.				
Weed Cover: **Area <20%:** 84.5% **Area 50-80%:** 2.7% **Area 20-50%:** 11.5% **Area >80%:** 1.3%				
Adjacent Land Use (% of Reserve Perimeter): **Remnant Vegetation:** 56% **Utility/transport:** 44%				
Grazing Pressure: None				
Access: Unsealed external, no internal.				
Degraded Vegetation: None				
Comments: Non-indigenous cultural heritage site consisting of a tank and a constructed drainage area on a granite outcrop found within the Reserve. 1 quadrat in this Reserve.				

Reserve 15296

Heritage Site – Tank and Constructed Catchment

Reserve 15296

Quadrat KS0007

Open heath of tall *Eremaea pauciflora* and *Hakea cygna* and mid-high *Melaleuca pentagona* over low heathland of *Allocasuarina microstachya*, *Calytrix leschenaultii* and *Melaleuca pauperiflora* over mid-high sedgeland of *Mesomelaena stygia* subsp. *stygia*, on duplex sandy gravel.

Map 1: Reserve 15296

Map 2: Reserve 15296

Map 3: Reserve 15296

Reserve Name:		**Purpose:**	Water
Reserve #:	16374	**Area:** 30.1 ha	**Perimeter:** 4214.4 m
Shire:	Kent	**Polygon Identification Numbers:**	6437678, 643770
Location:	509	**CALM District:** Katanning	**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 71% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 29%

Fauna: Grey Fantail, Red Wattlebird, Australian Raven, Western Grey Kangaroo, Australian Ringneck, Galah.

Water Resources: Natural drainage line, dam, roaded catchment.

Weed Cover:

Area <20%:	71.1%	**Area 50-80%:**	6.6%
Area 20-50%:	18.3%	**Area >80%:**	4.0%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 43% **Utility/transport:** 11%
Remnant Vegetation: 45%

Grazing Pressure: None

Access: Sealed and unsealed external, 2WD internal.

Degraded Vegetation: None

Comments:
Gravel extraction present within Reserve.
1 quadrat in this Reserve.

Reserve 16374

Quadrat KS0009

Very tall open mallee forest of *Eucalyptus phaenophylla* subsp. *phaenophylla*, *Eucalyptus transcontinentalis*, *Eucalyptus kondininensis* and *Eucalyptus* sp. over tall mallee shrubland of *Melaleuca uncinata* over mid-high open shrubland of *Phebalium filifolium* and *Lasiopetalum rosmarinifolium* and low open heath of *Grevillea huegelii* over mid-high open sedgeland of *Lepidosperma* spA2 Island Flat (Keighery 7000), on grey shallow sandy duplex soil.

Map 1: Reserve 16374

Map 2: Reserve 16374

Map 3: Reserve 16374

Reserve Name:		**Purpose:**	Water
Reserve #:	16387	**Area:** 41.4 ha	**Perimeter:** 3892.8 m
Shire:	Kent	**Polygon Identification Numbers:**	661577, 661573 & 661546
Location:	6390 & 9147	**CALM District:** Katanning	**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 42% **Fence in Poor Condition:** 6% **Fence in Good Condition:** 52%			
Fauna: Australian Ringneck, Common Bronzewing, Western Yellow Robin, Willie Wagtail, Grey Shrike-thrush, Grey Currawong, White-eared Honeyeater, Varied Sittella.			
Water Resources: Constructed drainage, dam, roaded catchment.			
Weed Cover: **Area <20%:** 50.8% **Area 50-80%:** 11.4% **Area 20-50%:** 37.8% **Area >80%:** 0.0%			
Adjacent Land Use (% of Reserve Perimeter): **Cropping/grazing:** 47% **Utility/transport:** 53%			
Grazing Pressure: None			
Access: Unsealed external, 2WD internal.			
Degraded Vegetation: Areas of vegetation have been completely cleared for gravel extraction.			
Comments: Gravel extraction present within the Reserve. 2 quadrats in this Reserve.			

Reserve 16387
Quadrat KS0021 Very tall isolated emergent mallee trees of *Eucalyptus phaenophylla* over tall open heath of *Melaleuca bracteosa*, *Leptospermum erubescens*, *Dryandra cirsioides* and tall open shrubland of *Melaleuca uncinata* over mid-high sparse sedgeland of *Lepidosperma brunonianum*, on shallow gravel.
Quadrat KS0022 Very tall mallee woodland of *Eucalyptus phaenophylla* over tall mallee shrubland of *Melaleuca uncinata* and *Melaleuca acuminata* over mid-high sparse heath of *Gastrolobium parviflorum* over mid-high sparse sedgeland of *Lepidosperma* spA2 Island Flat (Keighery 7000), on duplex sandy gravel.

Map 1: Reserve 16387

Map 2: Reserve 16387

Map 3: Reserve 16387

Reserve Name:		**Purpose:**	Water and Camping	
Reserve #:	16428	**Area:** 21.1 ha	**Perimeter:** 1837.8 m	
Shire:	Kent	**Polygon Identification Number:**		659516
Location:	11522	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 53% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 47%

Fauna: Australian Magpie, Australian Raven, Australian Ringneck, European Rabbit, Golden Whistler, Grey Butcherbird, Grey Fantail, Rufous Whistler, Western Grey Kangaroo, Western Yellow Robin, White-browed Babbler, Willie Wagtail.

Water Resources: Natural drainage line.

Weed Cover:

Area <20%:	33.2%	**Area 50-80%:**	52.9%
Area 20-50%:	2.4%	**Area >80%:**	11.5%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 91% **Utility/transport:** 4%
Remnant Vegetation: 5%

Grazing Pressure: None

Access: Unsealed external, no internal.

Degraded Vegetation: None

Comments:
1 quadrat in this Reserve.

Reserve 16428

Quadrat KS0001

Extremely tall open mallee forest of *Eucalyptus loxophleba* subsp. *loxophleba* over tall mallee shrubland of *Melaleuca acuminata* over tall sparse shrubland of *Acacia acuminata*, over tall sparse forbland of *Dianella revoluta* and grassland and mossland, on yellow/brown shallow loamy duplex soil.

Map 1: Reserve 16428

Map 2: Reserve 16428

Map 3: Reserve 16428

Reserve Name:		**Purpose:**	Water	
Reserve #:	17526	**Area:** 43.8 ha	**Perimeter:** 2831.7 m	
Shire:	Kent	**Polygon Identification Number(s):**		660348
Location:	11971	**CALM District:** Katanning		**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 35% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 65%				
Fauna: Short-beaked Echidna, Australian Raven, Australian Shelduck, Australian Ringneck, Grey Butcherbird, White-browed Babbler				
Water Resources: Constructed drainage, dam.				
Weed Cover: **Area <20%:** 68.2% **Area 50-80%:** 14.3% **Area 20-50%:** 15.7% **Area >80%:** 1.8%				
Adjacent Land Use (% of Reserve Perimeter): **Cropping/grazing:** 84% **Utility/transport:** 16%				
Grazing Pressure: None				
Access: Unsealed external, 2WD internal				
Degraded Vegetation: Decline/stress of understorey vegetation due to fire.				
Comments: 1 quadrat in this Reserve.				

Reserve 17526
Quadrat KS0004 Tall closed forest of *Eucalyptus salubris* over mid-high open heath of *Olearia muelleri* over tall open grassland of *Stipa elegantissima*, on alkaline grey shallow loamy duplex soil.

Map 1: Reserve 17526

Map 2: Reserve 17526

Map 3: Reserve 17526

Reserve Name:		**Purpose:**	Water & Quarry Gravel	
Reserve #:	19167 & 20115	**Area:** 168.7 ha	**Perimeter:** 6103 m	
Shire:	Kent	**Polygon Identification Number(s):**		643792 & 643793
Location:	976 & 1816	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 32.1% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 67.9%

Fauna: Australian Ringneck, Black-faced Woodswallow, Crested Pigeon, Dusky Woodswallow, Elegant Parrot, European Rabbit, European Red Fox, Grey Shrike-thrush, Monitor Lizard, Peregrine Falcon, Red Wattlebird, Short-beaked Echidna, Striated Pardalote, Tree Martin, Weebill, Western Grey Kangaroo, White-browed Babbler, Willie Wagtail.

Water Resources: Dam, roaded catchment.

Weed Cover:

Area <20%:	86.6%	**Area 50-80%:**	5.5%
Area 20-50%:	8.0%	**Area >80%:**	0.0%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 62.8% **Utility/transport:** 37.2%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: Areas of vegetation have been completely cleared for a roaded catchment and agriculture.

Comments:
All native vegetation has been removed from Reserve 20115 and replaced with crops.
Gimlet (*Eucalyptus salubris*) and Jam (*Acacia acuminata*) have been cut for production at a low extent for Gimlet and at a moderate extent for Jam, more than five years ago.
Contiguous with Reserve 20115.
2 quadrats in this Reserve.

Reserve Name:		**Purpose:**	Water	
Reserve #:	19167	**Area:** 156.4 ha	**Perimeter:** 5448.8 m	
Shire:	Kent	**Polygon Identification Number(s):**		643792
Location:	976	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 24% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 76%

Fauna: Australian Ringneck, Black-faced Woodswallow, Crested Pigeon, Dusky Woodswallow, Elegant Parrot, European Rabbit, European Red Fox, Grey Shrike-thrush, Monitor Lizard, Peregrine Falcon, Red Wattlebird, Short-beaked Echidna, Striated Pardalote, Tree Martin, Weebill, Western Grey Kangaroo, White-browed Babbler, Willie Wagtail.

Water Resources: Dam, roaded catchment.

Weed Cover:

Area <20%:	86.6%	**Area 50-80%:**	5.5%
Area 20-50%:	8.0%	**Area >80%:**	0.0%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 59% **Remnant Vegetation:** 32%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: Areas of vegetation have been completely cleared for a roaded catchment.

Comments:
Gimlet (*Eucalyptus salubris*) and Jam (*Acacia acuminata*) have been cut for production at a low extent for Gimlet and at a moderate extent for Jam, more than five years ago.
Contiguous with Reserve 20115.
2 quadrats in this Reserve.

Reserve 19167

Quadrat KS0010

Mid-high woodland of *Eucalyptus tetragona* over mid-high sparse shrubland of *Leptospermum roei* over mid-high heathland of *Banksia violacea*, *Hakea cygna* subsp. *cygna* and *Eremaea pauciflora* over low sparse heath of *Leucopogon constephiodes* var. 1 over mid-high sparse sedgeland of *Lepidosperma* sp.K Boorabbin (K.L. Wilson 2579) and sedge sp., on acid yellow sandy earth.

Quadrat KS0014

Very tall closed forest of *Eucalyptus salmonophloia* over low woodland of *Hakea laurina* and *Acacia microbotrya* over tall sparse shrubland of *Dodonea viscosa* and *Olearia revoluta* over low open sedgeland of *Gahnia lanigera* and low open mossland, on alkaline grey shallow sandy duplex.

Reserve Name:		**Purpose:**	Quarry Gravel	
Reserve #:	20115	**Area:** 12.3 ha	**Perimeter:** 1406.8 m	
Shire:	Kent	**Polygon Identification Number(s):**		643793
Location:	1816	**CALM District:** Katanning		**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 72% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 28%				
Fauna: None observed				
Water Resources: N/A				
Weed Cover: N/A – All native vegetation removed.				
Adjacent Land Use (% of Reserve Perimeter): **Cropping/grazing:** 50% **Utility/transport:** 22% **Remnant Vegetation:** 28%				
Grazing Pressure: None				
Access: No external or internal access.				
Degraded Vegetation: All vegetation removed due to clearing.				
Comments: All native vegetation has been removed from the Reserve and replaced with crops. Contiguous with Reserve 19167. No quadrats in this Reserve.				

Map 1: Reserves 20115 and 19167

Map 2: Reserves 20115 and 19167

Map 3: Reserves 20115 and 19167

Reserve Name:		**Purpose:**	Water & Public Utility	
Reserve #:	20515 & 20516	**Area:** 25.4 ha	**Perimeter:** 2,165 m	
Shire:	Kent	**Polygon Identification Number(s):**		659639 & 659638
Location:	8270 & 8283	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 34.9% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 65.1%

Fauna: European Rabbit, Australian Raven, Australian Magpie, Western Grey Kangaroo, Magpie-lark, Australian Ringneck, Monitor Lizard, Yellow-throated Miner, Crested Pigeon, Red Wattlebird, Black-faced Woodswallow.

Water Resources: Natural drainage line, dam.

Weed Cover:

Area <20%:	25.9%	**Area 50-80%:**	23.1%
Area 20-50%:	25.1%	**Area >80%:**	25.9%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 60.4% **Utility/transport:** 34.9%
Remnant Vegetation: 4.7%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: Decline/stress in understorey vegetation due to clearing.

Comments:
Scattered Sandalwood (*Santalum spicatum*) present within Reserve 20515.
Salmon Gum (*Eucalyptus salmonophloia*) cut for timber production to a high extent in Reserve 20516, more than five years ago.
1 quadrat in Reserve 20516.

Reserve Name:		**Purpose:**	Water	
Reserve #:	20515	**Area:** 4.5 ha	**Perimeter:** 835.8 m	
Shire:	Kent	**Polygon Identification Number(s):**		659639
Location:	8270	**CALM District:** Katanning		**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 74% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 26%				
Fauna: European Rabbit, Australian Raven, Australian Magpie, Western Grey Kangaroo, Magpie-lark, Australian Ringneck, Monitor Lizard, Yellow-throated Miner, Crested Pigeon, Red Wattlebird, Black-faced Woodswallow.				
Water Resources: Natural drainage line, dam.				
Weed Cover: See weed cover classes for Reserve 20516 – contiguous with this Reserve.				
Adjacent Land Use (% of Reserve Perimeter): **Cropping/grazing:** 10% **Utility/transport:** 25% **Remnant Vegetation:** 64%				
Grazing Pressure: None				
Access: Unsealed external, 2WD internal.				
Degraded Vegetation: Decline/stress in understorey vegetation due to clearing.				
Comments: Scattered Sandalwood (*Santalum spicatum*) present within the Reserve. Contiguous with Reserve 20516. No quadrats in this Reserve.				

Reserve Name:		**Purpose:**	Public Utility	
Reserve #:	20516	**Area:** 20.9 ha	**Perimeter:** 2162 m	
Shire:	Kent	**Polygon Identification Number(s):**		659638
Location:	8283	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 34% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 66%

Fauna: European Rabbit, Australian Raven, Australian Magpie, Western Grey Kangaroo, Magpie-lark, Australian Ringneck, Australian Ringneck, Monitor Lizard Lizard, Yellow-throated Miner, Crested Pigeon, Red Wattlebird, Black-faced Woodswallow.

Water Resources: Natural drainage line.

Weed Cover: Note that weed cover areas are for the combined areas of Reserves 20515 and 20516.

Area <20%:	25.9%	**Area 50-80%:**	23.1%
Area 20-50%:	25.1%	**Area >80%:**	25.9%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 29% **Utility/transport:** 51%
Remnant Vegetation: 20%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: Decline/stress in understorey vegetation due to clearing.

Comments:
Salmon Gum (*Eucalyptus salmonophloia*) cut for timber production to a high extent, more than five years ago.
Contiguous with Reserve 20515.
1 quadrat in this Reserve.

Reserve 20516
Quadrat KS0025 Very tall open forest of *Eucalyptus salmonophloia* over very tall mallee shrubland of *Melaleuca uncinata* over mid-high open sedgeland of *Lepidosperma gracile* and low mossland with lichen, on grey shallow sandy duplex soil.

Map 1: Reserves 20515 and 20516

Map 2: Reserves 20515 and 20516

Map 3: Reserves 20515 and 20516

Reserve Name:		**Purpose:**	Water Tank Site	
Reserve #:	22683	**Area:** 89.3 ha	**Perimeter:** 3796 m	
Shire:	Kent	**Polygon Identification Number(s):**		643879
Location:	1178	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 27% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 73%

Fauna: Western Yellow Robin, Grey Fantail, Welcome Swallow, Western Grey Kangaroo, Crested Pigeon, Australian Magpie, Australian Ringneck, Willie Wagtail, European Red Fox, Red Wattlebird.

Water Resources: Constructed drainage, dam, roaded catchment.

Weed Cover:

Area <20%:	89.2%	**Area 50-80%:**	8.3%
Area 20-50%:	1.8%	**Area >80%:**	0.8%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 72% **Utility/transport:** 27%
Remnant Vegetation: 1%

Grazing Pressure: None

Access: Unsealed external, 2WD internal.

Degraded Vegetation: Areas of vegetation have been completely cleared for gravel extraction.

Comments:
Non-indigenous cultural heritage site consisting of a dam found within the Reserve.
Gravel extraction present within Reserve.
Priority 4 species *Melaleuca cliffortioides* found within Reserve.
1 quadrat in this Reserve.

Reserve 22683
Quadrat KS0028 Low woodland of *Eucalyptus platypus* subsp. *platypus* and very tall mallee woodland of *Eucalyptus gardneri* over tall mallee shrubland of *Melaleuca adnata, Melaleuca cliffortioides* and *Melaleuca societatis* over low sparse mossland, on grey shallow sandy duplex soil.
Heritage Site – Dam and drainge channel

Map 1: Reserve 22683

Map 2: Reserve 22683

Map 3: Reserve 22683

Reserve Name:		**Purpose:**	Water and Public Utility	
Reserve #:	23025	**Area:** 19.9 ha	**Perimeter:** 1795.2 m	
Shire:	Kent	**Polygon Identification Number(s):**		659694
Location:	11300	**CALM District:** Katanning		**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 22% **Fence in Poor Condition:** 57% **Fence in Good Condition:** 22%				
Fauna: White-browed Babbler, Australian Ringneck, Sheep, Western Grey Kangaroo, Willie Wagtail.				
Water Resources: Natural drainage line, constructed drainage.				
Weed Cover: **Area <20%:** 59.8% **Area 50-80%:** 7.0% **Area 20-50%:** 0.0% **Area >80%:** 33.2%				
Adjacent Land Use (% of Reserve Perimeter): **Cropping/grazing:** 65% **Utility/transport:** 22% **Remnant Vegetation:** 13%				
Grazing Pressure: Light				
Access: Unsealed external, no internal.				
Degraded Vegetation: Decline/stress in understorey vegetation vegetation, due to clearing. Salinity due to rising water table.				
Comments: Salmon Gum (*Eucalyptus salmonophloia*) cut for timber production at a low extent, more than five years ago. 1 quadrat in this Reserve.				

Reserve 23025

Quadrat KS0003

Tall open forest of *Eucalyptus loxophleba* over extremely tall sparse shrubland of *Acacia microbotrya* over low closed forbland of *Olearia dampiera* subsp. e*remicola* over low open grassland and mossland, on yellow/brown shallow sandy duplex.

Map 1: Reserve 23025

Map 2: Reserve 23025

Map 3: Reserve 23025

Reserve Name:		**Purpose:**	Public Utility
Reserve #:	23219	**Area:** 292.8 ha	**Perimeter:** 8016.1 m
Shire:	Kent	**Polygon Identification Numbers:**	660375, 660373
Location:	8894	**CALM District:** Katanning	**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 64% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 36%

Fauna: Australian Magpie, Australian Raven, Australian Ringneck, Black-faced Cuckoo-shrike, Black-faced Woodswallow, Bobtail, Common Bronzewing, Crested Pigeon, European Rabbit, European Red Fox, Golden Whistler, Grey Butcherbird, Grey Currawong, Grey Fantail, Grey Shrike-thrush, Monitor Lizard, Red Wattlebird, Short-beaked Echidna, Southern Scrub-robin, Striated Pardalote, Stubble Quail, Wedge-tailed Eagle, Welcome Swallow, Western Grey Kangaroo, Western Yellow Robin, Willie Wagtail, Yellow-throated Miner.

Water Resources: Natural drainage line, constructed drainage.

Weed Cover:

Area <20%:	95.8%	**Area 50-80%:**	1.6%
Area 20-50%:	2.5%	**Area >80%:**	0.0%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 34% **Utility/transport:** 27%
Remnant Vegetation: 39%

Grazing Pressure: None

Access: Unsealed external, 4WD internal.

Degraded Vegetation: None

Comments:
Sandalwood (*Santalum spicatum*) present as isolated plants within Reserve.
1 quadrat in this Reserve.

Reserve 23219

Quadrat KS0013

Very tall open mallee forest of *Eucalyptus phaenophylla* and *Eucalyptus phenax* over tall closed mallee shrubland of *Melaleuca uncinata* over sparse heath of mid-high *Acacia undosa* and dwarf *Dodonaea bursariifolia* and *Cryptandra minutifolia* over low mossland, on grey shallow sandy duplex soil.

Map 1: Reserve 23219

Map 2: Reserve 23219

Map 3: Reserve 23219

Reserve Name:		**Purpose:**	Government Requirements	
Reserve #:	27660	**Area:** 141.1 ha	**Perimeter:** 4960.6 m	
Shire:	Kent	**Polygon Identification Number:**		643869
Location:	1810	**CALM District:** Katanning		**#:** 32
Fence Condition (% of Reserve Perimeter): **No Fence:** 64% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 36%				
Fauna: Splendid Fairy-wren, Australian Magpie, Grey Butcherbird, Western Grey Kangaroo, White-browed Babbler, Willie Wagtail.				
Water Resources: Natural drainage line, saltpan.				
Weed Cover: **Area <20%:** 92.0% **Area 50-80%:** 3.4% **Area 20-50%:** 3.3% **Area >80%:** 1.3%				
Adjacent Land Use (% of Reserve Perimeter): **Cropping/grazing:** 51% **Remnant Vegetation:** 49%				
Grazing Pressure: Light				
Access: Unsealed external, no internal.				
Degraded Vegetation: Death/loss of overstorey vegetation due to salinity from a rising water table.				
Comments: 2 quadrats in this Reserve.				

Reserve 27660

Quadrat KS0027

Mid-high closed heathland of *Melaleuca halmaturorum* over mid-high open sedgeland of *Gahnia* sp.L (Newbey 7888) and sedge sp. and low open forbland, on grey non-cracking clay.

Quadrat KS0031

Extremely tall open mallee forest of *Eucalyptus loxophleba* subsp. *loxophleba*, *Eucalyptus leptocalyx* and *Eucalyptus olivina* over tall open shrubland of *Melaleuca pungens* over mid-high shrubland of *Melaleuca brophyi* and *Melaleuca subtrigona* over mid-high sparse sedgeland of *Gahnia* sp.L (Newbey 7888) and *Lepidosperma* sp.A2 Island Flat (Keighery 7000), on grey deep sandy duplex.

Map 1: Reserve 27660

Map 2: Reserve 27660

Map 3: Reserve 27660

Reserve Name:	Water Reserve	**Purpose:**	Water	
Reserve #:	29001	**Area:** 25.4 ha	**Perimeter:** 2213 m	
Shire:	Kent	**Polygon Identification Number:**		645267
Location:	1976	**CALM District:** Katanning		**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 22% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 78%

Fauna: Red Wattlebird, Australian Raven, Australian Ringneck, Magpie-lark, Crested Pigeon, Southern Scrub-robin, Willie Wagtail, Yellow-throated Miner, Galah, Australian Magpie, Grey Butcherbird.

Water Resources: Natural drainage line, constructed drainage.

Weed Cover:

Area <20%:	70.9%	**Area 50-80%:**	18.9%
Area 20-50%:	10.2%	**Area >80%:**	0.0%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 43% **Utility/transport:** 21%
Remnant Vegetation: 35%

Grazing Pressure: None

Access: Unsealed external, no internal.

Degraded Vegetation: None

Comments:
Priority 3 species *Eucalyptus continens*' ms present within Reserve.
1 quadrat in this Reserve.

Reserve 29001

Quadrat KS0008

Very tall closed mallee forest of *Eucalyptus celastroides* subsp. *virella*, *Eucalyptus phaenophylla*, *Eucalyptus continens*' ms, *Eucalyptus flocktoniae*, *Eucalyptus conglobata* and *Eucalyptus suggrandis* subsp. *alipes* over tall sparse shrubland of *Melaleuca acuminata* over tall shrubland of *Melaleuca adnata* over dwarf open shrubland of *Acacia glaucoptera* and low open heath of *Phebalium tuberculosum* and *Olearia muelleri* over low open mossland, on alkaline grey shallow loamy duplex soil.

Map 1: Reserve 29001

Map 2: Reserve 29001

Map 3: Reserve 29001

Reserve Name:		**Purpose:**	Water
Reserve #:	32885	**Area:** 65.1 ha	**Perimeter:** 3225.4 m
Shire:	Kent	**Polygon Identification Number(s):**	645305
Location:		**CALM District:** Katanning	**#:** 32

Fence Condition (% of Reserve Perimeter):
No Fence: 25% **Fence in Poor Condition:** 0% **Fence in Good Condition:** 75%

Fauna: Grey Currawong, Yellow-throated Miner, Elegant Parrot, Red Wattlebird, Australian Ringneck, Grey Butcherbird, Australian Magpie, Magpie-lark, European Red Fox, Western Grey Kangaroo, Striated Pardalote, Wedge-tailed Eagle.

Water Resources: Natural drainage line.

Weed Cover:

Area <20%:	66.9%	**Area 50-80%:**	25.1%
Area 20-50%:	7.6%	**Area >80%:**	0.5%

Adjacent Land Use (% of Reserve Perimeter):
Cropping/grazing: 37% **Utility/transport:** 25%
Remnant Vegetation: 38%

Grazing Pressure: Light

Access: Unsealed external, no internal access.

Degraded Vegetation: None

Comments:
2 quadrats in this Reserve.

Reserve 32885

Quadrat KS0029

Very tall open forest of *Eucalyptus occidentalis* over tall open mallee woodland of *Melaleuca brophyi* over tall open shrubland of *Callistemon phoeniceus* and *Hakea corymbosa* over mid-high open forbland of *Patersonia occidentalis* over mid-high sedgeland of *Lepidosperma gracile* and sparse rushland and weeds, on yellow/brown deep sandy duplex soil.

Quadrat KS0030

Extremely tall open mallee forest of *Eucalyptus incrassata* and *Eucalyptus* sp. over mid-high sparse heath of *Eremaea pauciflora* var. *pauciflora*, *Hakea lissocarpha* and *Petrophile squamata* over open heath of low *Melaleuca pauperiflora* and dwarf *Calytrix leschenaultii* over low sparse sedgeland of *Anarthria egrallata*, on grey deep sandy duplex soil.

Map 1: Reserve 32885

Map 2: Reserve 32885

Map 3: Reserve 32885