



GAIA RESOURCES
ENVIRONMENTAL
TECHNOLOGY
CONSULTANTS

Conservation Commission

Western Australia

Land Management Unit

Initial Analysis

2012



Conservation Commission WA LMU Analysis

SUBJECT: Processing steps
DATE: 27/02/2012

Project Overview

Gaia Resources was engaged by Conservation Commission WA to quantify some of the values within the various Land Management Units (LMUs) across the forested area of the south-west of Western Australia, and compare them against one another. This includes assessing the presence, and prevalence, of values on aspects such as biodiversity, heritage (especially indigenous heritage), social use, and resource use (such as forest production). This initial project was considered a process and not a finalised product. The outputs of this process would be used to facilitate discussion regarding future requirements for finalised products and outcomes.

The process agreed upon was broken down into the following steps:

- Create a final dataset listing (15 datasets in total)
- Source datasets
- Standardise and assemble datasets (data to be projected into MGA Zone 50)
- Produce spatial intersections
- Produce related statistics
- Produce map outputs
 - 15 data analysis maps (per LMU)
 - 2 heat maps (per LMU)
- Create a document detailing the process

Data requirements

Datasets to be used were provided by Carol Dymond from the CCWA. Requirements for data for this stage of the project were:

- To be easily accessible (so outputs could be completed within the project timeframes)
- Must provide a good coverage of data over all the LMUs
- Must cover over on topics such as Social and Economic, Heritage and Biodiversity and threats.

More details on the data and its related metadata can be found in:

- 00_DATA/CCWA_Data_Analysis_List_20120228.xls

A data dictionary detailing all data used for the whole project (including background map data) can be found in:

- 00_DATA/CCWA_Data_Dictionary_20120228.xls

Data sourcing

Final data details can be found below:

Custodian:	Department of Environment and Conservation
Data licensed:	Yes, via CCWA, project specific.
Data contact:	Geoff Banks, Spatial Database Administrator (GIS)
Email:	Geoffrey.Banks@dec.wa.gov.au
Phone:	08 9334 0347
NOTE:	All data can be sourced on the CCWA GIS Corporate data structure.

No.	Common Name	Data name	Diss_Type	Comments
	Land Management Units (LMU)	landscape_conservation_units.shp		Boundary to be used in analysis. Also referred to as "Landscape Conservation Units".
1	Remnant Vegetation	remnant_vegetation_mga50.shp	n/a	
2	Forest Management Plan (FMP)	fmp2004_2013_tenure_mga50.shp	Category	Ensure proposed tenure is used in analysis.
3	Environmentally Sensitive Areas (ESA)	esa_mga50.shp	All fields	All ESA categories to be used. Covers areas such as wetlands, Ramsar sites and TECs.
4	Heritage Commission Sites	heritage_commission_sites_mga50.shp	Name	May not be very helpful, very few points within LMU boundaries.
5	Public Drinking Water Protection Zones (PDWPZ)	public_drinking_water_protection_zones_mga50.shp	Display + Act	Originally Department of Water dataset. Current DEC version may not be the most up to date version.
6	Public Drinking Water Source Areas (PDWSA)	public_drinking_water_supply_areas_mga50.shp	Type + Display + ACT	Originally Department of Water dataset. Current DEC version may not be the most up to date version. Also referred to as "Supply Areas".
7	Fire Frequency	DEC_Fire_Frequency_mga50.shp	Selection Frequency	Data needs excessive cleaning to be able to ascertain good outputs.
8	Fauna Habitat Zones	fauna_habitat_zones_mga50.shp	Description	
9	Declared Rare and Priority Flora (DEFL)	defl.shp	Conservation Code + WA Rank	Not to be released to the public. Confidential data.
10	Threatened Fauna	threatened_fauna_mga50.shp	Class Name + Ranking	

11	Rainfall Isohyets	isohyets_mga50.shp	Rainfall MM	Line dataset needs to be converted to polygon data for area analysis. Salinity Risk usually occurs between 900 to 1100mm.
12	Forest Disease Risk Areas (DRA)	dra_mga50.shp	Text	
13	Recreation and Tourism Information System (RATIS)	RATIS_sites_mga50.shp	Primary Function	Points not all ground-truthed so outputs may be highly inaccurate.

Custodian: Department of Indigenous Affairs

Data licensed: Yes, via website. Non project specific.

Data contact: Not applicable, direct website download.

Website: <http://www.dia.wa.gov.au>

No.	Common Name	Data name	Diss_Type	Comments
14	Aboriginal Heritage Sites	Sites.shp	Site Type	

Custodian: South Coast Natural Resources Management

Data licensed: Yes, project specific.

Data contact: John Bloor, Spatial Information Officer

Email: johnb@southcoastnrm.com.au

Phone: 08 9845 8537

No.	Common Name	Data name	Diss_Type	Comments
15	South Coast NRM dieback	Southcoast_2_5ha_GDA94_20090513.shp	Interp	Category 1 - 3: Infested, Category 4: Unmappable, Category 5: Uninterpretable, Category 6 - 8: Uninfested, Category 9: Not interpreted.
15	South West NRM dieback	SW_2_5ha_GDA94_20090513.shp	Interp	Category 1 - 3: Infested, Category 4: Unmappable, Category 5: Uninterpretable, Category 6 - 8: Uninfested, Category 9: Not interpreted.
15	Swan Avon NRM dieback	SwanAvon_2_5ha_GDA94_20090513.shp	Interp	Category 1 - 3: Infested, Category 4: Unmappable, Category 5: Uninterpretable, Category 6 - 8: Uninfested, Category 9: Not interpreted.
15	North Agricultural Region NRM dieback	NAR_2_5ha_GDA94_20090513.shp	Interp	Category 1 - 3: Infested, Category 4: Unmappable, Category 5: Uninterpretable, Category 6 - 8: Uninfested, Category 9: Not interpreted.

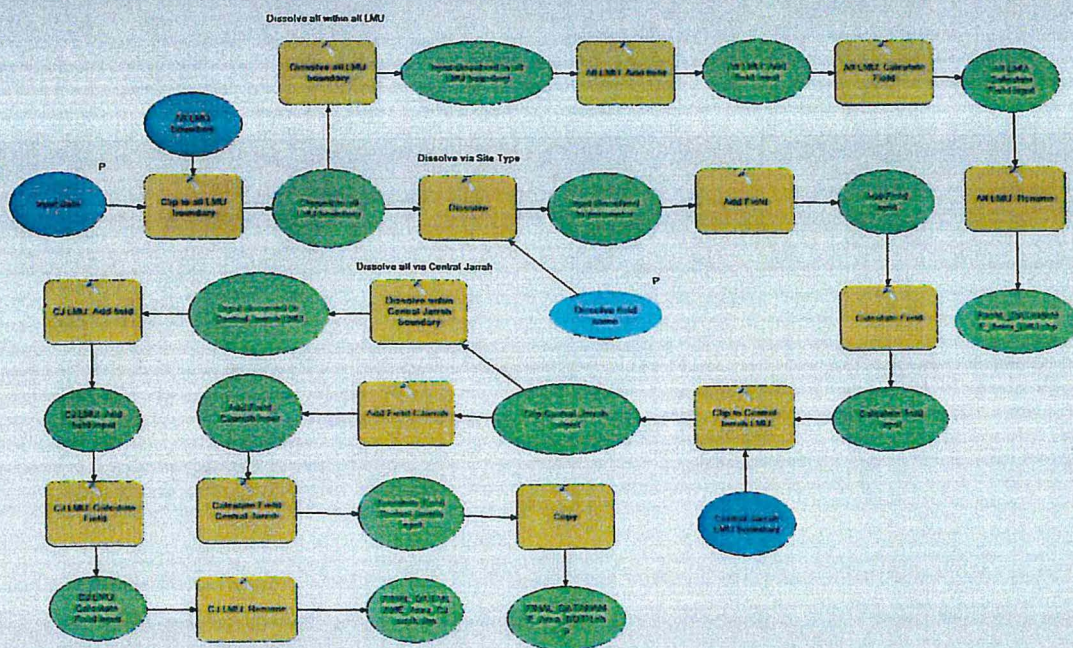
Data processing

- All data was checked and reprojected (if required) to the project projection of MGA Zone 50.
- A new column was added to all data called "Diss_Type". This column was used for further analysis into attribute categories. (i.e. Aboriginal Sites was dissolved using its Site Type attributes)
- Using Model Builder in ArcGIS, the following simple model was built to clip and analysis data. The basic processes have been defined below:

Polygon data

1. Overall LMU area
 - Clip data to whole LMU region
 - Dissolve
 - Add field and calculate area in hectares
2. Specific LMU area
 - Clip data to specific LMU region (i.e. Central Jarrah)
 - Dissolve
 - Add field and calculate area in hectares
3. Analysis on categories
 - Clip data to whole LMU region
 - Dissolve via categories (Diss_Type)
 - Add field and calculate area in hectares
 - Clip data to specific LMU region (i.e. Central Jarrah)
 - Add field and calculate area in hectares

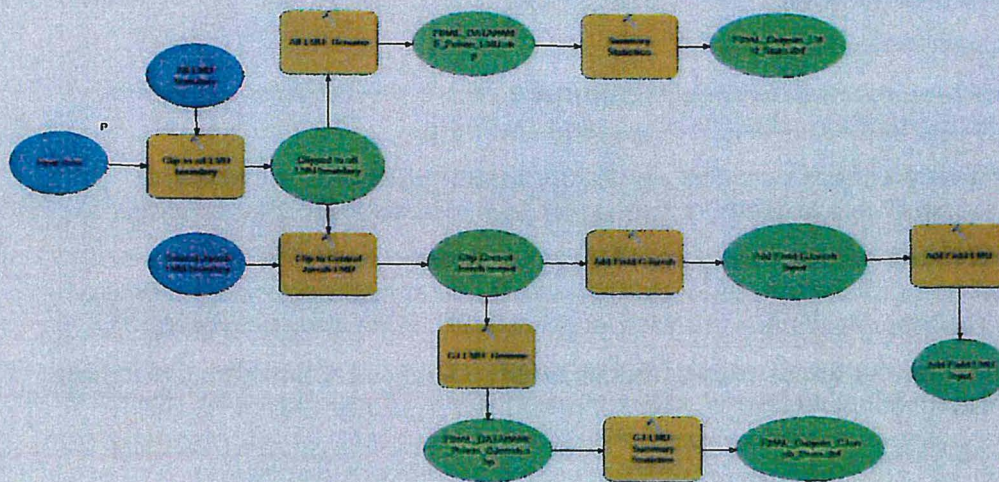
A workflow of the model builder for Central Jarrah has been added below:



Point data

1. Overall LMU area
 - Clip data to whole LMU region
 - Export out summary statistics based on categories
 - Count total number of points
2. Specific LMU area
 - Clip data to specific LMU region (ie Central Jarrah)
 - Export out summary statistics based on categories
 - Count total number of points
3. Analysis on categories
 - Using the above outputs, review the number of points based on categories

A workflow of the model builder for Central Jarrah has been added below:



Map outputs

Map outputs were structured to show the following information:

- Overall data spatial distribution
- Overview of all the LMUs
- Legend showing the specific LMU and the categories of the dataset
- General details regarding the map
- Statistics based on general LMU information, specific data information and specific data category information.

Data Statistics

A breakdown of statistics used in the output maps are as follows:

All LMUs: This is in reference to the boundary that encapsulates all 31 LMUs.

LMU: This is in reference to the specific LMU boundary used for the analysis. For this project, both Central Jarrah and Northern Karri were used.

All data was initially clipped to the All LMU boundary. This data was then again clipped to either the Central Jarrah LMU or the Northern Karri LMU and statistics were derived from these outputs.

Using the Aboriginal Heritage Sites Map output for Central Jarrah, an explanation of these statistics can be found below:

1) General overall statistics:

LMU Details

- **Total area of all LMUs (Ha)** - the total area of All LMUs (total of 31 LMUs) in hectares.
- **Total area of the Central Jarrah LMU only (Ha)** - the total area of the Central Jarrah LMU in hectares.
- **Central Jarrah LMU within all LMUs (%)** - percentage of the total area of the Central Jarrah LMU compared to the total area of All LMUs (*i.e. Total area of Central Jarrah LMU only/Total area of all LMUs*)

2) Specific data statistics pertaining to LMU:

Aboriginal Heritage Sites

- **Total area of data covering all LMUs (Ha)** - the total area of Aboriginal Heritage Sites located in the All LMUs in hectares.
- **Total area of data covering Central Jarrah LMU (Ha)** - the total area of Aboriginal Heritage Sites located in the Central Jarrah LMU in hectares
- **Total area of data covering all LMUs (%)** - percentage of the total area of Aboriginal Heritage Sites found within all LMUs compared to the total area of All LMUs (*i.e. Total area of data covering all LMUs/Total area of all LMUs*)
- **Total area of data covering Central Jarrah LMU (%)** - percentage of the total area of Aboriginal Heritage Sites found within the Central Jarrah LMU compared to the total area of the Central Jarrah LMU (*i.e. Total area of data covering Central Jarrah LMU/Total area of Central Jarrah LMU only*)

For point data, the statistics were based on a total number of points per LMU.

3) Specific data category statistics pertaining to LMU and all LMUs:

Data was then broken down into further categories (if there was sufficient information available). For this example, Aboriginal Heritage sites were categorised further into Site Types:

Aboriginal Site Type Details

- **Central Jarrah LMU Area (Ha)** - Per category, the total area located in the Central Jarrah LMU in hectares.
- **% of Central Jarrah Area LMU (%)** - Per category, the percentage of the total area of the category within the Central Jarrah LMU compared to the total area of the Central Jarrah LMU. (*i.e. Central Jarrah LMU Area (Ha)/Total area of data covering Central Jarrah LMU (Ha)*)
- **All LMU Area (Ha)** - Per category, the total area covering All LMUs in hectares
- **% total LMU Area (%)** - Per category, the percent of the total area of All LMUs in comparison to the total area of the Central Jarrah LMU (*i.e. All LMU Area (Ha)/Central Jarrah LMU Area (Ha)*)

NOTE: For point data, the statistics were based on a total number of points per LMU.

For point data, the statistics were based on a total number of points per LMU.

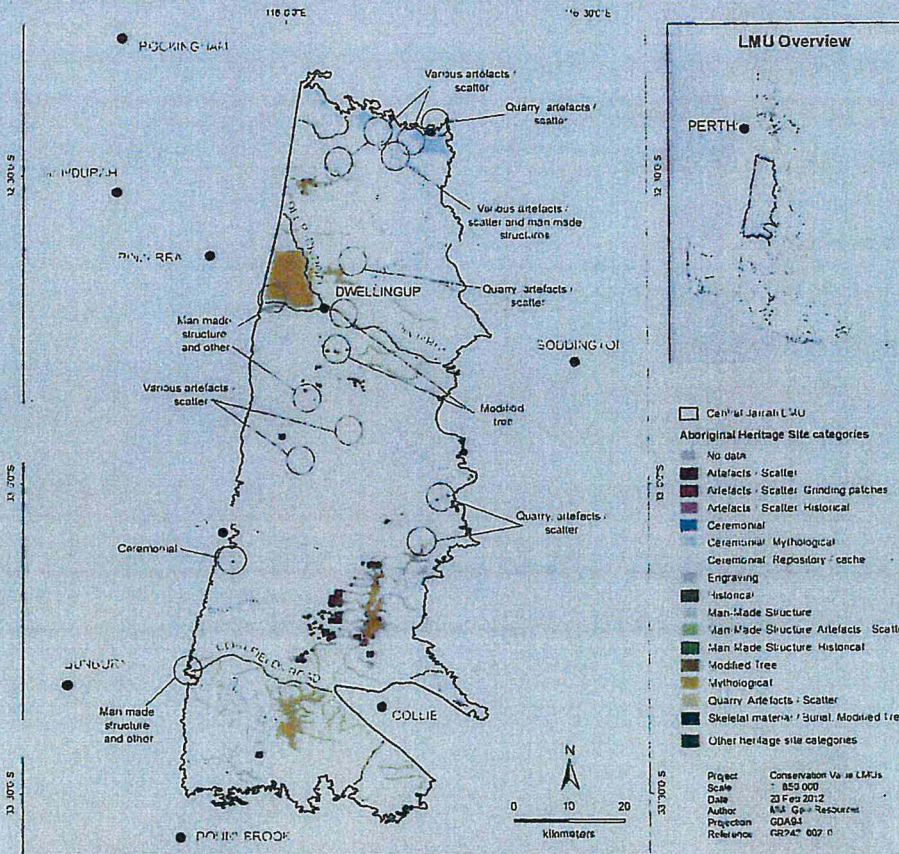
4) Pie chart outputs

- The pie-chart is based on the Central Jarrah LMU Area (Ha) column and indicates the percentage of data categories within the LMU. (i.e. Category A of the data totals 10% of all categories of the data found in the Central LMU).

The statistics and pie-chart spreadsheet can be found in:

- 03_STATS/CJarrah_Map_Stats_Output_20120228.xlsx
- 03_STATS/NKarri_Map_Stats_Output_20120228.xlsx

Central Jarrah Land Management Unit
Aboriginal Heritage Sites



Title of primary dataset used in map.

Spatial location of primary dataset. Smaller areas were circled to indicate location.

Data statistics.

1) General overview statistics.

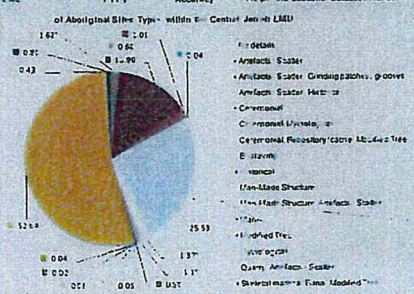
2) Specific data statistics pertaining to LMU.

3) Specific data category statistics pertaining to LMU and all LMUs.

Data category name.

Any additional data information or category details

Parameter	Area (Ha)	% of LMU	Percentage (%)	
Total area of all LMUs	4222980.43		8.30%	
Total area of Central Jarrah LMU only	383608.07			
Aboriginal Heritage Sites	Area (Ha)	Aboriginal Heritage Sites	Percentage (%)	
Total area of data covering all LMUs	33872224	Total area of data covering all LMUs	8.00%	
Total area of data covering Central Jarrah LMU	77878.56	Total area of data covering Central Jarrah LMU	7.15%	
Aboriginal Site Type Category	Central Jarrah LMU Area (Ha)	% of LMU	Total LMUs Area (Ha)	% of LMUs
Artefacts - Scatter	472.71	0.1216%	23800.69	0.38%
Artefacts - Scatter - Grinding patches - grooves	412.14	0.1047%	38279.74	10.66%
Artefacts - Scatter - Historical	302.11	0.0763%	37.71	3.41%
Artefacts - Scatter - Mythological	302.41	0.0769%	437.18	45.84%
Ceremonial	12.77	0.0032%	2458.65	0.57%
Ceremonial - Mythological	1523.89	0.3911%	18762.44	10.31%
Ceremonial Repository - cache	101.36	0.1022%	306.36	100.00%
Engraving - Historical	350.81	0.0891%	491.53	11.37%
Engraving - Mythological	174.54	0.0443%	1057.94	16.58%
Man-Made Structure	13.65	0.0035%	1090.52	0.12%
Man-Made Structure - Artefacts - Scatter	7.86	0.0020%	153.98	5.11%
Man-Made Structure - Historical	1.16	0.0018%	0.57	67.70%
Modified Tree	12.89	0.0033%	2935.83	0.43%
Mythological	15376.09	0.3972%	78833.54	19.51%
Quarry Artefacts - Scatter	117.75	0.0305%	986.95	12.07%
Skeletal material - Burial - Modified Tree	22.474	0.0058%	815.18	31.31%
Total	79587.86	7.5	281627	



LMU Overview showing location of LMU within South-West Australia.

Legend showing categories of primary dataset used in map.

General map details.

Metadata details of data.

4) Pie-chart outputs showing the percentage of data categories within the LMU. (i.e. Category A totals 10% of this data found in the LMU).

Percentage over all the LMUs total area or total number of points.

Heat Maps outputs

Two types of heat maps were produced to show Biodiversity Values and Cultural Values.

Data was added to the map at 55% transparency to show areas of more abundant biodiversity or cultural data as showing in a darker in colour.

The data used for each map was:

Biodiversity Value Heat Map

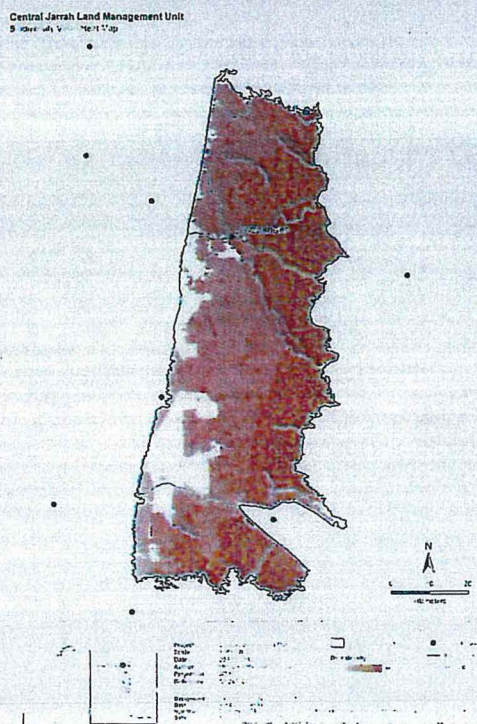
- Rainfall Isohyets (900 to 1100mm) *risk of Salinity as per Carols advice
- Forest Management Plan Areas
- Threatened Fauna sites
- Dieback (Uninfested: Categories 6 to 8)
- Fauna Habitat Zones
- Forest Disease Risk Areas
- Declared Rare Flora populations
- Environmentally Sensitive Areas

Cultural Value Heat Map

- Recreation and Tourism Information System
- Aboriginal Heritage Sites
- Heritage Commission Sites
- Public Drinking Water Protection Zones
- Public Drinking Water Source Areas

NOTE: Fire Frequency was not included in the heat maps.

An example of a Biodiversity Heat Map output can be seen below:



CGWA FMP 1 MU analysis
 Dataset to be included in the analysis
 Base dataset for analysis
 Although available through DEC, data can be downloaded directly from the custodian.

Folder	Common Name	Rank	No.	Reliability	Data Name (e.g. if data split over region)	Included in analysis	Comments	Link to DEC data structure	Dissolve Field	Comments on dataset	Processing notes	Description	Beginning date	Completion date	Publication date	Scale	Position Accuracy	Lineage
Vegetation	Land Management Units	1		Good	landscapa_conservation_units.shp	Yes	Have already received. Basis of analysis. Note: Also named LCU at DEC.	E:\GIS1-Corporate\Data\Vegetation\Land_Management_Units		Already obtained from DEC.		The delineation of Land Management Units is usually the third stage of the process undertaken by Muller and Havel to describe and map the forests and riparian non-forest areas of the southern part of Western Australia. In order to produce maps with content suitable for planning and management at regional scale the vegetation complexes were re-interpreted. The resulting 24 Landscape Conservation Units assemble the land systems of Christian and Stewart (1953) that reflect historical patterns of land use and vegetation. For more information on the history of the Landscape Conservation Units with the vegetation complexes and the ecology of vegetation refer to Muller and Havel Land Consultants, May 2002 "Delineation of Landscape Conservation Units in South-West Region of Western Australia". Landscape Conservation Units are already in use for such purposes as prediction of susceptibility to dieback (Strelem) and mapping of land characteristics and occurrence of Rare and Priority Flora species. They have also been used on a limited scale for the assessment of the integrity of conservation of management units affected by the logging moratorium (IFS and Havel Land Consultants) and in the representation of the Vegetation Complexes in the CAR Reserve system. The Commonwealth of Australia and the State of Western Australia.	1998	Current		Regional		
Vegetation	Remnant Vegetation	1	1	Good	e.g. remnant_vegetation_mga50.shp	Yes	Could use as base dataset. Would need to include areas that cover the Southwest, SouthCoast, Warren and Swan, Goldfields, Wheatbelt, Midwest may need to be used for map reference	E:\GIS1-Corporate\Data\Vegetation\Remnant		Could be used to clip LMU data to give indication of current extent. For the stage of project - Central Jarrah (Swan, South West), and Northern Karri (Swan and Warren)		A data set containing vegetation extent polygons from the mapping of remnant vegetation in Western Australia. This was originally compiled as part of the vegetation theme of the National Land and Water Resource Audit (NLWA). The dataset has been progressively updated by the Department of Agriculture and Food post-NLWA with assistance of the Department of Environment and Conservation. This has been carried out using digital aerial photography (orthophotos) acquired 19-10-2011.	1995	1/05/2011		1:20,000 to 1:100,000	+/- 20m and +/- 10m. The mapping is available for use below 1:20,000 and 1:100,000 in the ILZ depending on the use maps. Areas mapped from the orthophoto images listed under Lineage are suitable for use at 1:20,000. All other areas are suitable for use at 1:100,000.	The data for the extensive landscape zone (ELZ) in south western Australia was originally derived from 1995 Landsat TM satellite imagery and has been corrected using digital aerial photography (orthophotos) acquired from 1996 to 2000. Mapping has recently been updated to 1:20,000 using digital orthophotography. There are still some areas of the western wheatbelt derived from 1995 Landsat TM imagery at a scale of 1:100,000. Areas of clearing have been removed from the ELZ. A dataset of cleared areas including areas cleared within town boundaries was created in November 2007. The areas revealed from 1:20,000 were re-projected from pre 2007 imagery. When no orthophotography was available for the mapping of cleared areas, the Australian Geospatial Office (AGO) 2002 Landsat imagery was used. For a list of images used for the ELZ refer to data Dictionary. In 2011 mapping of cleared areas in the extensive landscape zone (ELZ) was carried out within 100 kilometres of the town sites of Onslow, Koolberr, Port Hedland, Tom Price, Newman, Broomie, Derby, Kunenarra, Freely Crossing, Halls Creek, and sites for the most irrigated regions of Kunenarra and Gormanville. Edge rounding to ILZ and ELZ dataset was conducted for the NLWRA to a tolerance of six metres. The resultant dataset has been progressively updated by the Department of Agriculture, Forestry and Fisheries with assistance of the Department of Environment and Conservation. An attribute 'ORTHOPHOTO' has been added for orthophotography records within the ILZ. DEC has removed any plantation areas from the original remnant vegetation dataset supplied by DAFWA. The plantation areas removed consist of PFC plantations (2011), Private plantations and any plantation areas in the 2006 National Forests Inventory plantation data set (NFI) that were not present in the aforementioned dataset. Limited visual checks of plantation areas were done with orthophotos acquired from 2004 to 2008. The private plantation data was sourced from various private growers in 2006, 2007, 2008 and 2012. The plantation data also included clear felled and harvested areas if made available. The result is a remnant vegetation dataset that more accurately displays the remaining native vegetation extent.
Tenure	FMP data	1	2	Good	fmp2004_2013_tenure_mga50.shp	Yes	Species located within national parks and state forest can determine likelihood of disturbance. This shows DEC and freehold land (crown land is missing) so Cadastre data is not required. This dataset also contains information found in the Managed Land and Waters data. It is essential that Proposed land categories data is used (compared to Existing) as this contains land that will be incorporated into Managed Lands and should be treated as such.	E:\GIS1-Corporate\Data\Tenure\CALMState	CATEGORY	Name of data is: Forest Management Plan (FMP) 2004-2013 Proposed Tenure	This is the proposed dataset and CD confirmed that it should be used in the analysis.	Existing Tenure with CALM category changes as stated in the Forest Management Plan 2004-2013 May-3. The plan covers three forest regions. Tenure categories include Conservation Park, National Park, Nature Reserve, State Forest, Section 62, and Other Reserve. 5.1.1 up to 5.1.11.0	early 1990s	1/12/2004			as per CALM FMP's	
Sensitive Sites/Aboriginal sites		1	3	Good	aboriginal_sites_mga50.shp	Yes	Shows all aboriginal heritage sites. Use data from DIA site (Although data differs a little from DEC's - it is mainly consistent.)	E:\GIS1-Corporate\Data\Sensitive_Sites	SITE_TYPE	Downloaded from DIA website. http://www.dia.wa.gov.au/			1/01/1972	11/07/2011			See metadata for Spatial Cadastre Database	The boundaries of the properties are defined by industrial boundaries. These boundaries are derived from Landgate's Spatial Cadastre Database.
Sensitive Sites	Environmentally sensitive areas (ESA)	1	4	Good	esa_mga50.shp	Yes	Environmentally Sensitive Areas. Includes a lot of the sensitive areas - maybe a good substitute for various sensitive areas (such as Ramsar sites) Has detailed metadata.	E:\GIS1-Corporate\Data\Sensitive_Sites	Add all fields up (Boolean)	Will need to complete stats based on varying attributes (based on various sensitive areas)		Environmentally Sensitive Areas as declared in Environmental Protection (Environmentally Sensitive Areas) Notice 2005, Government Gazette No. 55. The dataset is provided to assist landowners and managers in determining the location of environmentally sensitive areas under the Environmental Protection Act 1986. It is not a substitute for any requirement of the legislation. Those seeking further information should contact the data custodian. History: The ESA data was originally produced by Department of Water (DOW) completed at 30/05/2005. Department of Environment and Conservation (DEC) produced a new ESA data set to amend errors in the ESA data set. A number of datasets were manipulated as per Regulation 6 then merged together and dissolved to remove internal boundaries and overlaps resulting in polygons showing environmentally sensitive land while not releasing source of sensitivity. A full list of input datasets with metadata can be obtained from the DOW on request. 11/05/05 Approval of the use of CALM datasets - Declared Flora - 100m Buffer, and Threatened Ecological Communities Buffer from 'Ecological Area of Interest' attribute - allowed for the inclusion of these areas within the internal attributed dataset. Internal linework was dissolved to produce this external unbuffered version. No restraints on access, however, no responsibility taken as to the accuracy or currency of information. Only to be used as an indicative presence of Environmentally Sensitive Areas. Not to be used as the sole determinant, seek further advice where appropriate, particularly regarding DGLM datasets.	20/05/2005	27/08/2006	1/04/2011	Accuracy dependent on source datasets. Ranges from +/- 1m to 100m.		
Sensitive Sites	Heritage commission sites	1	5	Low	heritage_commission_sites_mga50.shp	Yes	Point data. Social Economic dataset for heritage areas (official legal sites)	E:\GIS1-Corporate\Data\Sensitive_Sites	NAME	Only one point per LMU. Do we still keep it in?		The Register of Heritage Places focuses on places, buildings and sites and is a list of places considered worth conserving.	1997	1/11/2003		+/- 100m		
Hydrography	Public drinking water Protection zones	1	6	Good	public_drinking_water_protection_zones_mga50.shp	Yes	Currently being used as a water supply area.	E:\GIS1-Corporate\Data\Hydrography\State	DISPLAY + ACT	Originally DOW dataset so may not be up to date.		As part of Public Drinking Water Source Areas and in addition to priority classification areas, Wellhead Protection Zones (WHPZ) and Reservoir Protection Zones (RPZ) are defined to protect the drinking water source from contamination in the immediate vicinity of production wells and reservoirs. Situated under the Country Areas Water Supply Act 1947 (CAWSA), the New South Drinking Water Supply, Sewerage and Drainage Act 1992 (NSWSSD Act) and the Town Planning Development Act 1928, provides for defined land uses and activities within these zones that are prohibited, restricted or subject to agency conditions so that contamination of the water source is prevented. Special conditions, such as restrictions on storage and use of chemicals, may be applied within these zones. WHPZ are usually circular with a radius of 500 metres in P1 areas and 300 metres in P2 and P3 areas. WHPZ do not extend outside PDWSA boundaries. RPZ consist of a 2.5 kilometre buffer area around the top water level of storage reservoirs and include the reservoir itself. A reduced buffer area may be applied where the reservoir is designed only for short-term storage of collected water (e.g. pumped or pumped-back dams) before transfer to a main storage reservoir. Reservoir protection zones are normally only recognised over Crown land and generally prohibit public access to prevent contamination (physical, chemical and biological) of the source. Reservoir protection zones do not extend outside PDWSA boundaries (e.g. down stream of dam walls). New bylaws are currently being developed to allow RPZ and WHPZ to be established using uniform conditions in both country and metropolitan catchment areas.	1/01/1994	1/10/2005		Good but variable as the source is based on lines of wellhead locations at the time of publication. The circular areas were projected to a geographical coordinate system for this statewide dataset resulting in circular areas projecting to slightly oblong but acceptable shapes. This dataset is in the process of being reviewed and there are areas that have yet to be checked once positions used are being reviewed and will be updated as a ongoing project. New Reservoir protection zones will be determined through publicly consulted Drinking Water Source protection plans. Please consult the Water Source Protection branch if you have queries about particular areas. As January 2004 the dataset coverage was mostly complete for the Wellhead protection zones and requires population of most of the reservoir protection zones.		

Public drinking water: Source areas	1	7	Good	public_drinking_water_supply_areas_mga50.shp	Yes	Maybe important to extract separately the "Underground Pollution Control Area". These are areas that are protected by not being used currently (but need to be aware for pesticides etc)	E\GIS1-Corporate\Data\Hydrography\State	Type = Display = ACT	Originally DOW dataset so may not be up to date. NOTE: Data states that its "Supply" while online metadata refers to it as "Source"	NOTE: No Underground Pollution Control in project LMU areas...	The Public Drinking Water Source Area (PDWSA) dataset is currently owned by the Department of Environment and Conservation and the Department of Water. It is a geospatial dataset used for planning advice for land use and water supply. The dataset is a vector dataset that shows the public drinking water supply areas. The dataset is a vector dataset that shows the public drinking water supply areas. The dataset is a vector dataset that shows the public drinking water supply areas.	1/01/1989	17/02/2011	1/01/2009	Good but variable in the accuracy based on different methods of capture and definition. Where possible, the original mapping and/or legal description was used for definition. If in dispute the original legal description plan should be attached, and if necessary the photo-plan should be consulted for further information or clarity.	Areas originally legally defined by Western Australian Government Statute with boundary shown as per a variable. Each of these boundaries were reviewed in 1997 and 2009. These boundaries were either reviewed and corrected into the 2009 dataset or retained as is. The 2009 dataset was created in October 2009. Where possible, the original mapping and/or legal description was used for definition. If in dispute the original legal description plan should be attached, and if necessary the photo-plan should be consulted for further information or clarity.	
Fire frequency	1	8	Low	DEC_Fire_Frequency_mga50.shp	Yes	Shows when control burns occurred. Could be used for the next stage of project. May have data issues - currently quite a few silvers.	E\GIS1-Corporate\Data\Fire\South_West	Frequency	South West, Swan and Warren data falls within the LMU boundaries	Seems to be a union of many datasets resulting in small silvers and overlaps (and some gaps) of data (each polygon has a different value). Might be hard to map. Could not include Min and Max year - output was over 9000 categories.	The DEC Fire Frequency dataset is a dynamic dataset which contains a collection of records of fire events (controlled burns and lightning) which have occurred in DEC managed land and where available non-DEC managed land in Western Australia. The dataset records available are from 1937. Some historic maps have been made available and this dataset is used to provide a complete state coverage in the Western Australian region. Complete state coverage is available from 2006 to present day. The DEC Fire Frequency dataset is a derivative dataset from DEC Fire History. The DEC Fire Frequency dataset shows areas that have been prescribed burnt and lightning based on the number of times burnt between 1937 and June 2011. The calculation of times burnt is based on financial years. For further information please contact the data custodian.	1937	30/06/2011	None	Value is included in the field CAPT_METRI; contact custodian for more information.	Historical maps, metadata, GPS data capture on ground control points, aerial-photos, aerial observation and remote sensing data.	
Fauna habitat zones	1	9	Good	fauna_habitat_zones_mga50.shp	Yes	Protected fauna habitats (they are not harvested). They are to ensure biodiversity recovers from one rotation to the next (eco-linkages between undisturbed areas).	E\GIS1-Corporate\Data\Forest_management_plan	DESCRIP		The principal purpose of fauna habitat zones is to provide a strategy to meet the Forest Management Plan's (Conservation Commission of Western Australia (2004), Forest Management Plan 2004-2015) Conservation Commission of Western Australia, Perth objective of ensuring that biodiversity recovers between one rotation and the next through the network of zones. The zones include the network of zones that are excluded from timber harvesting in the medium-term within State forest and buffer zones. The design of the network of zones therefore applies at the landscape scale, with implementation then occurring at the forest block and coupe scales. The zones are intended to maintain both fauna populations within themselves, and to provide a source for the recolonisation of nearby areas after timber harvesting.	1/01/2004	31/12/2010		The locations of the majority of fauna habitat zones remain under three cover. Final locations will be identified for all mature fauna habitat zones in advance of any operation that will cause disturbance.	Indicative fauna habitat zones of a minimum of 200-hectare size are located across all forest types. Where the shape becomes elongated the minimum width of the narrowest part should be 150m. Generally, the boundaries of these indicative fauna habitat zones will be between two and four kilometers apart. They may where considered appropriate be located wholly or partly in internal reserves. In addition, the boundaries of an indicative fauna habitat zone should generally be between two and four kilometers from the nearest formal reserve. The exception to this general principle is in the forest blocks adjacent to the pre-2001 Greater Kimberley National Park where a greater concentration of fauna habitat zones has been planned. The locations of final fauna habitat zones are to be determined with regard to the requirements of the Forest Management Plan 2004-2013, and through State consultation with relevant stakeholders using processes prescribed under, and consistent with, rights under the relevant Agreement Act.		
Declared rare and priority flora	1	10	Good	defl.shp	Yes	Declared and endangered flora. Carol confirmed that this is a full list after her discussions with Ken Atkins. However, confidential, and data should not be released to the public.	E\GIS1-Corporate\Data\Floral_State	CONSVCODE & WA_RANK		No difference in data from GIS corporate and DEC. Use this set.	This database describes threatened and priority flora populations for all land tenures within the State of Western Australia. The database is provided for management purposes. Information topics include taxon identification, location, status, habitat, population size, biology, reproductive state, pollution, and selected management requirements. Declared rare flora are listed in the State government gazette as being rare, threatened or otherwise in need of special protection. Priority flora are either poorly known, or are rare but not currently threatened, and are being monitored. The Department of Environment and Conservation maintain these lists.	14/11/1990	19/03/2007	1:50,000	The locational accuracy of data varies with each record, but are reasonably accurate to a published scale of 1:50,000 however many records are now being recorded using GPS. The spatial data structure of the system is based on point coordinates.	This database describes threatened and priority flora populations for the State of Western Australia including all land tenures. The data source is field reports, herbarium specimen information and species survey reports. Records are entered by DEC officers in the form of the Rare Flora Report Form. This is a one page sheet containing fill-in information boxes pertaining to location, physical and biological attributes.	
Threatened fauna	1	11	Good	threatened_fauna_mga50.shp	Yes	DECLIST attribute shows Threatened etc	E\GIS1-Corporate\Data\Fauna\state	CLASSNAME & RANKING		No difference in data from GIS corporate and DEC. Use this set.	The records shown in this data set have been derived from the following two datasets: 1. The WA Threatened and Priority Fauna Database which contains records of observations of any fauna listed as threatened under the Wildlife Conservation Act 1950 or listed on the DEC Priority Fauna List. The data is maintained by DEC. 2. The DEC Fauna Survey Database which contains records of Western Australian fauna from sources including historical reports, DEC staff survey data from major projects, consultants, as part of the Scientific Liaison procedure, and the general public that are known holders. This data is managed by DEC. The information contained within is used to assist the Department with the management of fauna populations especially in relation to proposed land developments or activities likely to impact on fauna and fauna habitat. Data and information from the database can be accessed by written request to the Principle Zoologist, Species and Communities Branch. Detailed location information for individual species is generally kept confidential unless direct conservation benefits to the species can be demonstrated. An indication of the level of knowledge or threat associated with the listed species. Declared Threatened Fauna are ranked using IUCN criteria and allocated rankings of Extinct (EX), Vulnerable (VU), Endangered (EN) or Critically Endangered (CR). There are five Priority Fauna rankings. Priority 1 contains taxa with few, poorly known populations on threatened lands. Priority 2 contains taxa with few, poorly known populations on conservation lands. Priority 3 contains taxa with several poorly known populations, some on conservation lands. Priority 4 contains taxa in need of monitoring. Priority 5 contains taxa in need of monitoring and are subject to a specific conservation program.	1994	16/11/2011	14/02/2005	Indication of accuracy of coordinates on a scale of 1 to 6 where 1 = 50m, 2 = 500m, 3 = 1km, 4 = 10km, 5 = 50km, 6 = 100km and null = not defined.	Variable depending on data source, generally within 1km. Database includes scaled attribute for positional accuracy.	Records are sourced from published literature, Departmental reports, and files. Departmental staff and direct reports to District Offices, environmental consultants and other licensed scientific fauna licence return, and members of the public. The themes capture in this dataset include taxon details, locality details, some habitat details, and observation details. The DEC Fauna Survey Database is an online system of data entry, maintenance and distribution. The database was developed during 2004-2006 as a project coordinated by the Royal Society of Western Australia with funds provided by Lottery West, and was launched in 2008.
Isohyets	1	12	Low	isohyets_mga50.shp	Yes (unless zone dataset can be sourced)	Shows rainfall data in mm. Important as Salinity Risk usually occurs between 900 to 1100mm	E\GIS1-Corporate\Data\Clima\State	RainfallMM		Turn into polygons.	Digital isohyets for the state of Western Australia. Rainfall in mm.	1987	1994	1:250,000 up to 1:1,000,000 in north of the state.		The isohyets in the north of the state from 400mm and above have been improved using data defined at a scale of 1:1,000,000 (see file ISCHY_HW_251) Water Authority (1988). The isohyets in the south of the state from 400mm through to the coast have been improved using data defined at a scale of 1:250,000 (see file ISCHY_SW_251) Water Authority (Public Works Department) (1981, 1984). Elsewhere based on Bureau of Meteorology (1979) digitised from Australia's Rainfall and Runoff, vol 1 (1971) DGN data converted to ARC format and attributed according to DGN graphic labels.	
Forest disease risk areas	1	13	Low	dra_mga50.shp	Yes	Important boundaries showing protectable areas.	E\GIS1-Corporate>Data\CALM_Operations	TEXT			Administrative boundaries which delineate areas of forest vegetation subject to the risk of infection from 'dieback' - a highly contagious fungal disease. Strict quarantine and access restrictions apply to these areas.	1/01/1987	Not known	23/09/2004	1:50,000	85% - 1:12.5m scale worse than 30m	
RATIS sites	1	14	Low	RATIS_sites_mga50.shp	Yes	Data includes recreational spots in point form.	E\GIS1-Corporate>Data\CALM_Operations	Primary Function + Activity	Recreation and Tourism Information System (RATIS)		This dataset is an extract from the RATIS Oracle database. RATIS RTI Sites displayed have spatial coordinates. Some sites have been attributed with spatial coordinates that are incorrect. Sites that fall within DEC Regions have been attributed with that Region.	1/01/1987	Not known	23/09/2004	1:50,000		

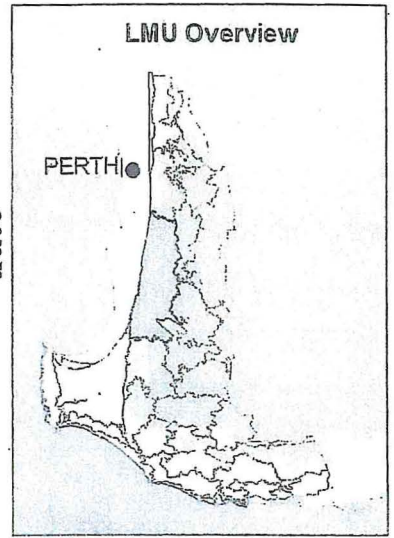
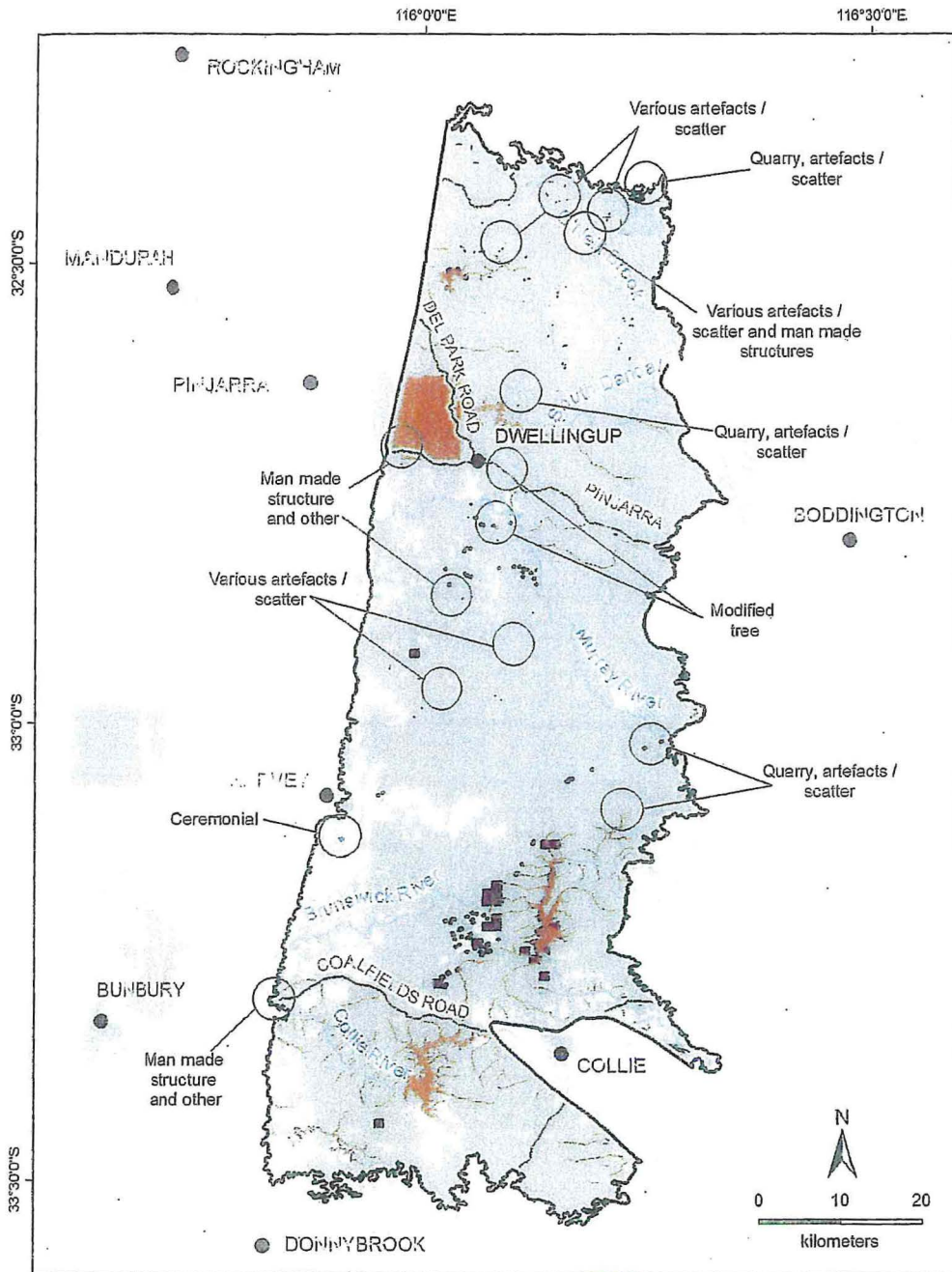
South Coast NRM dieback	15	Good	Southcoast_2_Sha_GDA94_20090513.shp	Yes	Best source of dieback data currently available.		INTERP	Use raw data not interpreted DEC data. From SCNRM 9 categories. Category 1 - 3: Infested, Category 4: Unmappable, Category 5: Unmappable, Category 6 - 8: Uninfested, Category 9: Not interpreted.	This dataset has been derived from several sources. The background data was mapped early 1970s from broad scale (1:40,000) black and white aerial photographs with ground truthing. Extensive. The background data has been progressively superseded since 1976 by mapping derived from large scale aerial photography (1:4,500) and intensive ground survey. Intensive. The current strategic mapping was mapped in 2005 from colour aerial photography (1965 to 1998) images as well as black and white (1980-2007) aerial photos (1:4,500, 1:25,000 and 1:100,000) and with limited ground truthing. Strategic.	Not known	30/12/2005	1:4,500, 1:25,000 and 1:100,000	Background data - originally mapped on imperial scale maps and later translated to 1:50,000 scale with an accuracy of +/- 50 meters. Post 1976 data 15-20 meters. 2007 strategic mapping +/- 20 meters.	Mapping from broad scale (1:40,000) aerial photography was used to locate areas showing advanced symptoms of vegetation death as a result of the Phytophthora cinnamomi dieback disease. The photo scale was too broad for the detection of initial infestation in the understory. The results of this mapping were used to assist in the determination of the Disease Risk Areas which were subsequently managed to minimize disease spread. In the post 1976 mapping the presence of dieback is identified by the death or senescence of susceptible indicator species in both the understory and overstorey. Results are confirmed by laboratory testing of soil and root tissue samples recent vegetation deaths. When the presence of dieback is confirmed in the area, a localized disease risk map is prepared to identify possible impacts from human activity. The strategic mapping of 2007 at 1:4,500, 1:25,000 and 1:100,000 scale was also unable to detect initial infestation in the understory but was used to locate areas showing advanced symptoms of the dieback disease.
South West NRM dieback	15	Good	SW_2_Sha_GDA94_20090513.shp	Yes	Best source of dieback data currently available.		INTERP	Use raw data not interpreted DEC data. From SCNRM 9 categories. Category 1 - 3: Infested, Category 4: Unmappable, Category 5: Unmappable, Category 6 - 8: Uninfested, Category 9: Not interpreted.	This dataset has been derived from several sources. The background data was mapped early 1970s from broad scale (1:40,000) black and white aerial photographs with ground truthing. Extensive. The background data has been progressively superseded since 1976 by mapping derived from large scale aerial photography (1:4,500) and intensive ground survey. Intensive. The current strategic mapping was mapped in 2007 from colour aerial photography (1965 to 1998) images at a scale of 1:20,000 and with limited ground truthing. Strategic.	Not known	30/12/2006	1:20,000 to 1:40,000	Background data - originally mapped on imperial scale maps and later translated to 1:50,000 scale with an accuracy of +/- 50 meters. Post 1976 data 15-20 meters. 2007 strategic mapping +/- 20 meters.	Mapping from broad scale (1:40,000) aerial photography was used to locate areas showing advanced symptoms of vegetation death as a result of the Phytophthora cinnamomi dieback disease. The photo scale was too broad for the detection of initial infestation in the understory. The results of this mapping were used to assist in the determination of the Disease Risk Areas which were subsequently managed to minimize disease spread. In the post 1976 mapping the presence of dieback is identified by the death or senescence of susceptible indicator species in both the understory and overstorey. Results are confirmed by laboratory testing of soil and root tissue samples recent vegetation deaths. When the presence of dieback is confirmed in the area, a localized disease risk map is prepared to identify possible impacts from human activity. The strategic mapping of 2007 at 1:20,000 and 1:40,000 scale was also unable to detect initial infestation in the understory but was used to locate areas showing advanced symptoms of the dieback disease.

Swan Avon NRM dieback	15	Good	SwanAvon_2_Sha_GDA84_20090513.shp	Yes	Best source of dieback data currently available		INTERP	License obtained by Helen Tasker and John Bloor, signed and sent 8/2/2012. One year only - expires on 8th Feb 2013. Two datasets given. One dieback boundaries, and the other Kingdom reporting regions (regions are summary boundaries for data)	Use raw data not interpreted DEC data. From SCNRM 9 categories. Category 1 - 3: Infested, Category 4: Unmappable, Category 5: Uninterpretable, Category 6 - 8: Uninfested, Category 9: Not interpreted	This dataset has been derived from several sources. The background data was mapped early 1970s from broad scale aerial photography with ground truthing. The background data has been progressively superseded since 1976 by large scale aerial photography (1:4,500) and intensive ground survey. The current strategic mapping was mapped in 2007 from colour aerial photography (1:20,000) at a scale of 1:20,000 and with limited ground truthing. Strategic	Not known	30/06/2005	1:50,000	Background data - originally mapped on imperial scale maps and later translated to 1:50,000 scale with accuracy of +/- 50 meters. Post 1976 data 15-20 meters. 2007 strategic mapping +/- 20 meters	Mapping from broad scale (1:40,000) aerial photography was used to locate areas showing advanced symptoms of vegetation death as a result of the Phytophthora cinnamomi dieback disease. The photo scale was too broad for the detection of initial infestation in the understorey. The results of the mapping were used to assist in the determination of the Disease Risk Areas which were subsequently managed to minimize disease spread. In the post 1976 mapping the presence of dieback is identified by the death or senescence of susceptible indicator species in both the understorey and overstorey. Results are confirmed by laboratory testing of soil and root tissue samples recent vegetation deaths. When the presence of dieback is confirmed in the area, a localized disease risk map is prepared to identify possible impacts from human activity. The strategic mapping of 2007 at 1:20,000 and 1:25,000 scale was unable to detect initial infestation in the understorey but was used to locate areas showing advanced symptoms of the dieback disease.
North Agricultural Region NRM dieback	15	Good	NAR_2_Sha_GDA84_20090513.shp	Yes	Best source of dieback data currently available.		INTERP	License obtained by Helen Tasker and John Bloor, signed and sent 8/2/2012. One year only - expires on 8th Feb 2013. Two datasets given. One dieback boundaries, and the other Kingdom reporting regions (regions are summary boundaries for data)	Use raw data not interpreted DEC data. From SCNRM 9 categories. Category 1 - 3: Infested, Category 4: Unmappable, Category 5: Uninterpretable, Category 6 - 8: Uninfested, Category 9: Not interpreted.	This dataset has been derived from several sources. The background data was mapped early 1970s from broad scale aerial photography with ground truthing. The background data has been progressively superseded since 1976 by large scale aerial photography (1:4,500) and intensive ground survey. The current strategic mapping was mapped in 2007 from colour aerial photography (1:20,000) at a scale of 1:20,000 and with limited ground truthing. Strategic. Results of samples obtained by laboratory testing of soil and root samples have been included for all Phytophthora species found in the region - beagones	Not known	30/06/2005	1:20,000	Intensive ground survey interpretation data. 15-20 meters. 2007 strategic mapping +/- 20 meters	In the intensive ground survey interpretation, the presence of dieback is identified by the death or senescence of susceptible indicator species in both the understorey and overstorey. Results are confirmed by laboratory testing of soil and root tissue samples recent vegetation deaths. When the presence of dieback is confirmed in the area, a localized disease risk map is prepared to identify possible impacts from human activity. The strategic mapping of 2007 at 1:20,000 and 1:25,000 scale was unable to detect initial infestation in the understorey but was used to locate areas showing advanced symptoms of the dieback disease.

CCWA data dictionary listing

Type	Details	Common Name	Data Name ('e.g.' if data split over region)	Custodian	Licensed?	Comments
Vegetation	Analysis data	Land Management Units	landscape_conservation_units.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Vegetation	Analysis data	LMU Central Jarrah	LMU_CJarrah_MGA50_20120203.shp	Department of Environment and Conservation	Yes	Dissolved by Gaia.
Vegetation	Analysis data	LMU Northern Karri	LMU_NKarri_MGA50_20120203.shp	Department of Environment and Conservation	Yes	Dissolved by Gaia.
Vegetation	Analysis data	LMU All Boundaries	LMU_ALL_MGA50_Boundary.shp	Department of Environment and Conservation	Yes	Dissolved by Gaia.
Vegetation	Analysis data	Remnant Vegetation	e.g. remnant_vegetation_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Tenure	Analysis data	FMP data	fmp2004_2013_tenure_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Sensitive Sites	Analysis data	Aboriginal sites	sites.shp	Department of Indigenous Affairs	Yes	GIS1 - Corporate
Sensitive Sites	Analysis data	Environmentally sensitive areas (ESA)	esa_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Sensitive Sites	Analysis data	Heritage commission sites	heritage_commission_sites_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Hydrography	Analysis data	Public drinking water: Protection zones	public_drinking_water_protection_zones_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Hydrography	Analysis data	Public drinking water: Source areas	public_drinking_water_supply_areas_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Fire	Analysis data	Fire frequency	DEC_Fire_Frequency_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Forest Management Plan	Analysis data	Fauna habitat zones	fauna_habitat_zones_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Flora	Analysis data	Declared rare and priority flora	defl.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Fauna	Analysis data	Threatened fauna	threatened_fauna_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Climate	Analysis data	Isohyets	isohyets_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Calm Operations	Analysis data	Forest disease risk areas	dra_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Calm Operations	Analysis data	RATIS sites	RATIS_sites_mga50.shp	Department of Environment and Conservation	Yes	GIS1 - Corporate
Threat	Analysis data	South Coast NRM dieback	Southcoast_2_5ha_GDA94_20090513.shp	South Coast NRM	Yes	GIS1 - Corporate
Threat	Analysis data	South West NRM dieback	SW_2_5ha_GDA94_20090513.shp	South Coast NRM	Yes	GIS1 - Corporate
Threat	Analysis data	Swan Avon NRM dieback	SwanAvon_2_5ha_GDA94_20090513.shp	South Coast NRM	Yes	GIS1 - Corporate
Threat	Analysis data	North Agricultural Region NRM dieback	NAR_2_5ha_GDA94_20090513.shp	South Coast NRM	Yes	GIS1 - Corporate
Topography	Map background data	Towns	populatedplacesWA.shp	Geoscience Australia	No	Data clipped to WA coast by Gaia.
Topography	Map background data	Built Up Areas	builtupareasWA.shp	Geoscience Australia	No	Data clipped to WA coast by Gaia.
Topography	Map background data	Australian Coastline	Aust_Boundary_20120106	Geoscience Australia	No	Data cleaned by Gaia.
Topography	Map background data	Main Roads	Roads_Diss_Name_20120203.shp	Geoscience Australia	No	Data dissolved via name by Gaia.
Topography	Map background data	Bathymetry Southwest	Bathy_Southwest_20120106.shp	Geoscience Australia	No	Data cleaned and converted to polygons by Gaia.
Topography	Map background data	Lakes	lakesWA.shp	Geoscience Australia	No	Data clipped to WA coast by Gaia.
Topography	Map background data	Major Rivers	watercourselinesWA_majorRivers_Dissolved.shp	Geoscience Australia	No	Data clipped to WA coast and dissolved via major rivers by Gaia.
Topography	Map background data	LMU NKarri Mask	LMU_NKarri_MASK_20120206.shp	Department of Environment and Conservation	Yes	Dataset produced by Gaia using LMU data.
Topography	Map background data	LMU CJarrah Mask	LMU_CJarrah_MASK_20120206.shp	Department of Environment and Conservation	Yes	Dataset produced by Gaia using LMU data.

Central Jarrah Land Management Unit Aboriginal Heritage Sites

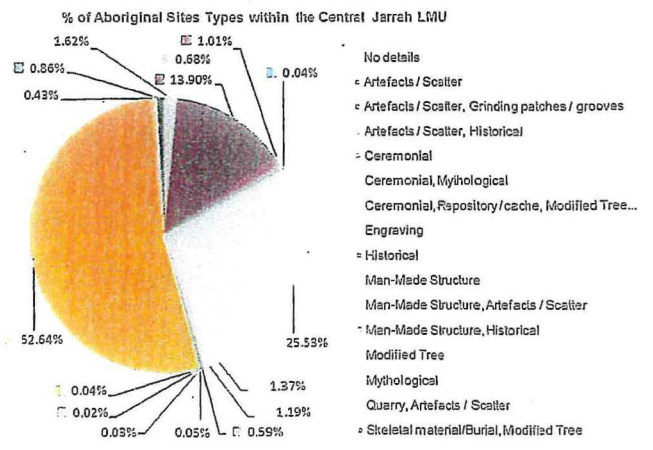


- Central Jarrah LMU**
- Aboriginal Heritage Site categories**
- No data
 - Artefacts / Scatter
 - Artefacts / Scatter, Grinding patches...
 - Artefacts / Scatter, Historical
 - Ceremonial
 - Ceremonial, Mythological
 - Ceremonial, Repository / cache ...
 - Engraving
 - Historical
 - Man-Made Structure
 - Man-Made Structure, Artefacts / Scatter
 - Man-Made Structure, Historical
 - Modified Tree
 - Mythological
 - Quarry, Artefacts / Scatter
 - Skeletal material / Burial, Modified Tree
 - Other heritage site categories

Project: Conservation Value LMUs
 Scale: 1: 850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_002_0

Category	Area (ha)	Percentage (%)
Total area of all LMUs	4232580.43	
Total area of Central Jarrah LMU only	393608.07	
Total area of data covering all LMUs	338732.24	8.00%
Total area of data covering Central Jarrah LMU	27978.50	7.11%

Aboriginal Site Type Details	Central Jarrah LMU Area (ha)	Total Central Jarrah LMU Area (%)	All LMUs Area (ha)	% total LMUs Area
No details	478.71	0.1216%	123800.99	0.39%
Artefacts / Scatter	4112.14	1.0447%	38575.74	10.65%
Artefacts / Scatter, Grinding patches / grooves	300.17	0.0763%	87.21	344.18%
Artefacts / Scatter, Historical	200.41	0.0509%	437.18	45.84%
Ceremonial	12.73	0.0032%	2458.09	0.52%
Ceremonial, Mythological	7563.89	1.9191%	18462.69	40.91%
Ceremonial, Repository / cache, Modified Trees, Artefacts / Scatter, Grinding patches / grooves	404.36	0.1027%	404.36	100.00%
Engraving	350.81	0.0891%	491.53	71.37%
Historical	174.54	0.0443%	1052.96	16.58%
Man-Made Structure	13.65	0.0035%	11090.52	0.12%
Man-Made Structure, Artefacts / Scatter	7.84	0.0020%	153.59	5.11%
Man-Made Structure, Historical	7.16	0.0018%	10.57	67.75%
Modified Tree	12.89	0.0033%	2965.80	0.43%
Mythological	15576.08	3.9573%	79833.54	19.51%
Quarry, Artefacts / Scatter	127.75	0.0325%	988.96	12.92%
Skeletal material/Burial, Modified Tree	254.74	0.0647%	813.64	31.31%
Total	29587.96	7.52%	281627.37	



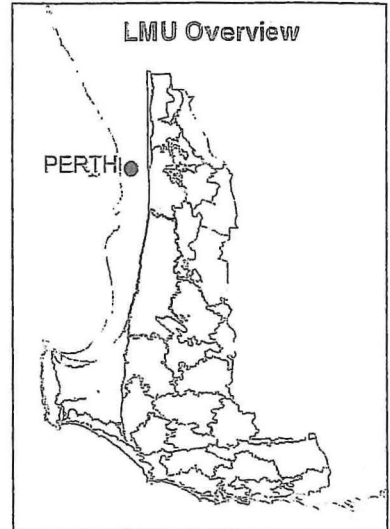
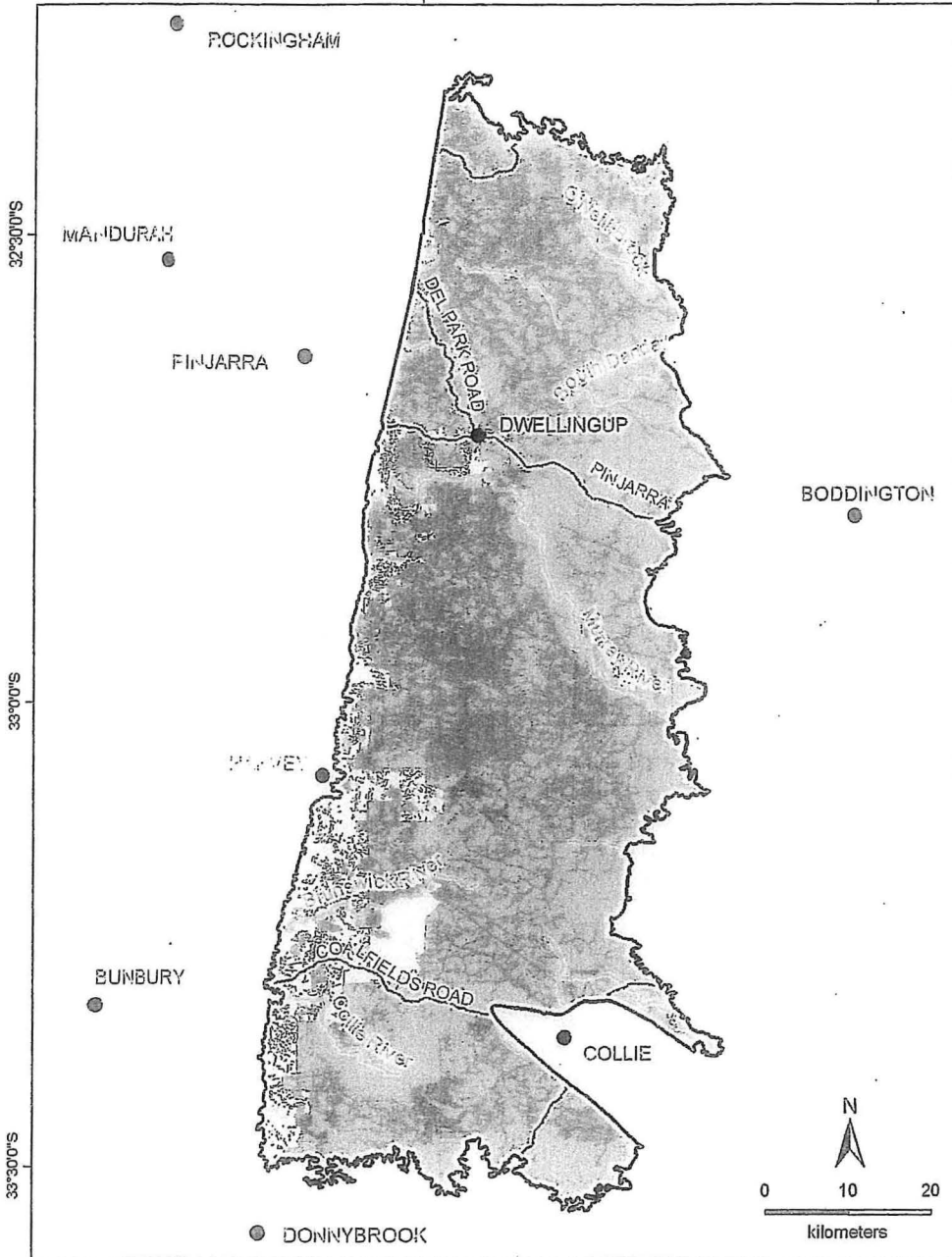
Inconsistent totals come from data on areas or topology issues

Central Jarrah Land Management Unit

Project Dieback *Phytophthora cinnamomi* Strategic Atlas

116°0'0"E

116°30'0"E



- Central Jarrah LMU
 - NRM Dieback categories**
 - Category 1 to 3: Infested
 - Category 4: Unmappable
 - Category 5: Uninterpretable
 - Category 6 to 8: Uninfested
 - Category 9: Not interpreted
- Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gala Resources
 Projection: GDA94
 Reference: GR243_003_1

116°0'0"E

116°30'0"E

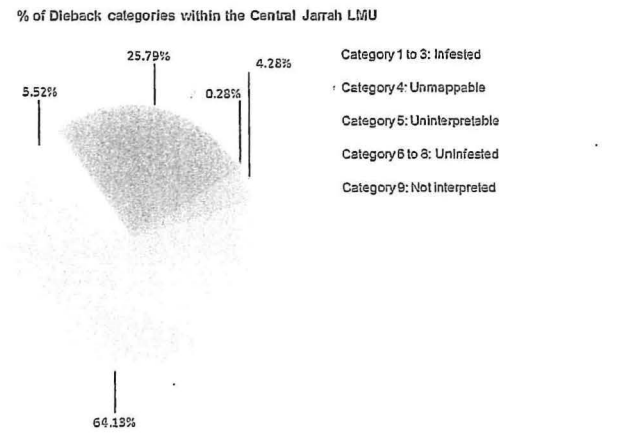
N.M.U. or photo	Area (Ha)
Total area of all LMUs	4232580.43
Total area of Central Jarrah LMU only	393608.07

N.M.U. or photo	Photo flight (%)
Central Jarrah LMU within all LMUs	9.30%

Metadata Item	Source
Custodian:	South Coast NRM
Dataset details:	Specific data license from SCNRM.
Last update:	30/06/2008
Lineage:	Aerial photo / ground truthing / lab testing
Accuracy:	+/- 20 meters

Dieback Category	Count	% of Count to Central Jarrah LMU	Area (Ha)	% Total LMU Area
Category 1 to 3: Infested	93291.64	23.70%	575435.91	16.21%
Category 4: Unmappable	1021.85	0.26%	43444.85	2.35%
Category 5: Uninterpretable	15485.47	3.93%	337928.10	4.58%
Category 6 to 8: Uninfested	231999.17	58.94%	1803045.30	12.87%
Category 9: Not interpreted	19971.52	5.07%	310776.52	6.43%
Total	361769.65	91.91%	3070630.68	

Dieback Category	Count	% of Count to Central Jarrah LMU	Area (Ha)	% Total LMU Area
Category 1 to 3: Infested	93291.64	25.79%	575435.91	16.21%
Category 4: Unmappable	1021.85	0.28%	43444.85	2.35%
Category 5: Uninterpretable	15485.47	5.52%	337928.10	4.58%
Category 6 to 8: Uninfested	231999.17	64.13%	1803045.30	12.87%
Category 9: Not interpreted	19971.52	4.28%	310776.52	6.43%



Inconsistent totals come from data overlaps or topology issues

Category 1 to 3: Infested: High to low confidence of dieback present.

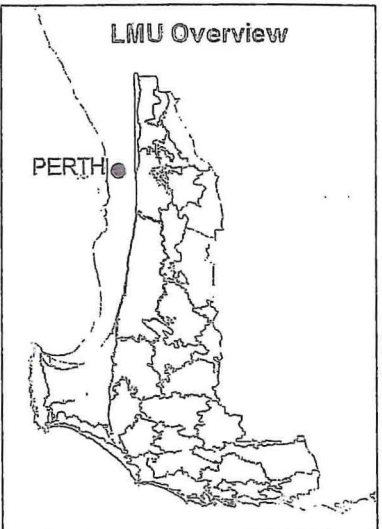
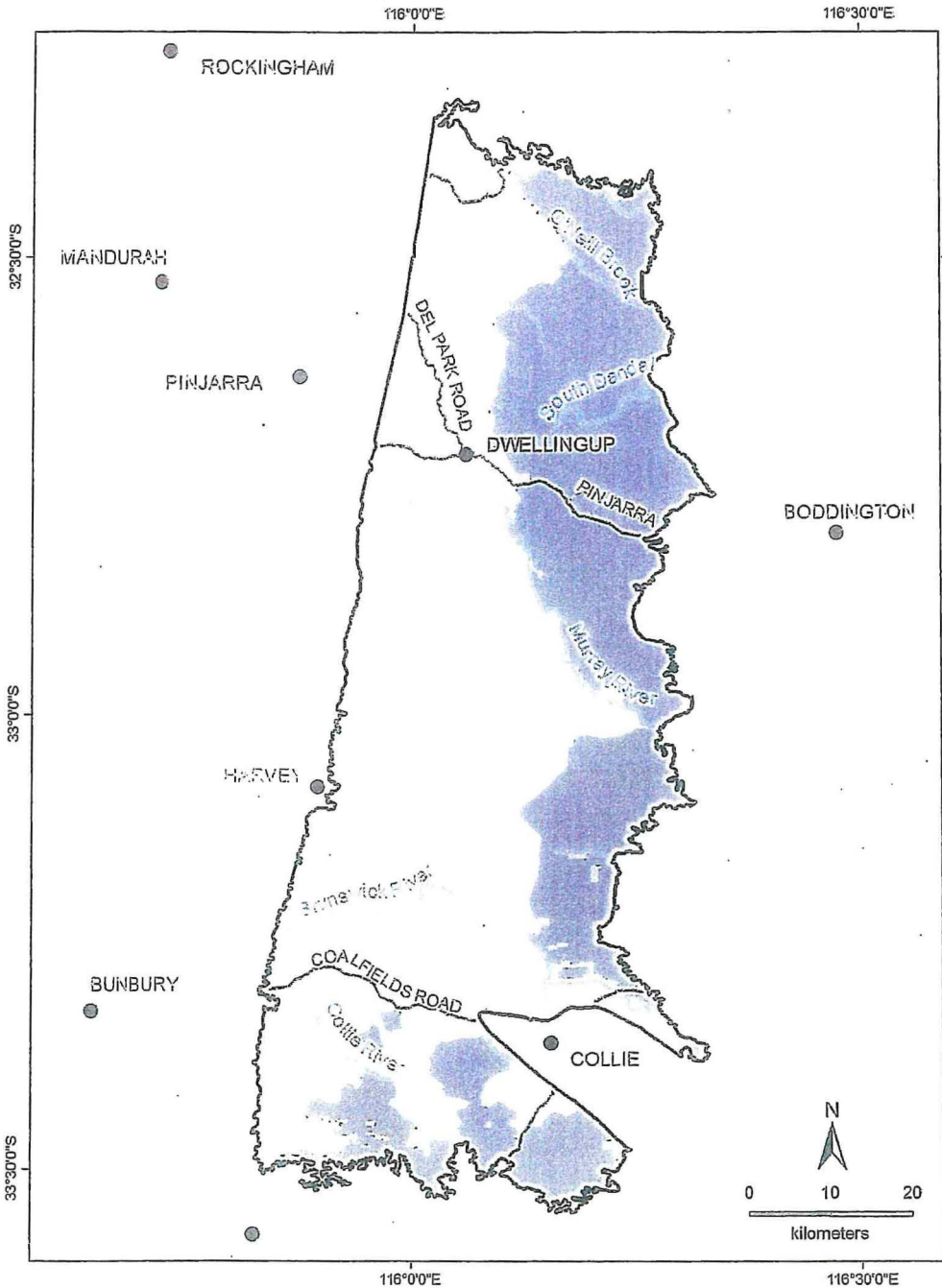
Category 4: Unmappable: Areas of permanent or temporary disturbance the remove, destroy or mask indicator species needed for interpretation. (i.e. Permanent: Mining, Temporary: Fire)

Category 5: Uninterpretable: No visible indicator species, or too few indicator species to interpret.

Category 6 to 8: Uninfested: High to low confidence of dieback not present.

Category 9: Not interpreted: <50 Ha areas (due to size) or >50 Ha areas recently cleared, or unable to review or lack of available photos.

Central Jarrah Land Management Unit Forest Disease Risk Areas (DRA)



Central Jarrah LMU
DRA categories
 Disease Risk Area

Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_004_1

LMU statistics	Area (Ha)
Total area of all LMUs	4232580.43
Total area of Central Jarrah LMU only	393608.07

LMU statistics	Percentage (%)
Central Jarrah LMU within all LMUs	9.30%

Forest Disease Risk Areas (DRA)	Percentage (%)
Total area of DRA data covering all LMUs	16.84%
Total area of DRA data covering Central Jarrah LMU	36.06%

Project Data Sources
 Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate
 Last update: Not known
 Lineage: No data. Captured at 1:50 000 scale
 Accuracy: 85% +/- 12.5m or no worse than 50m

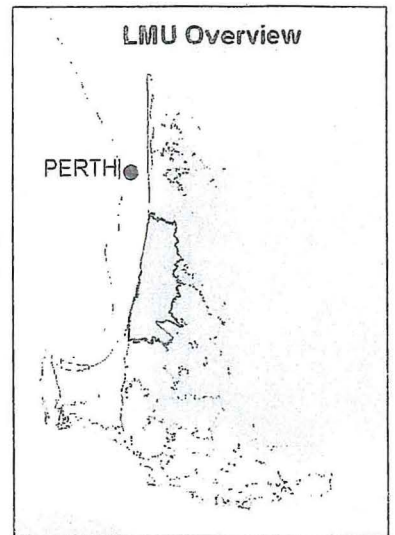
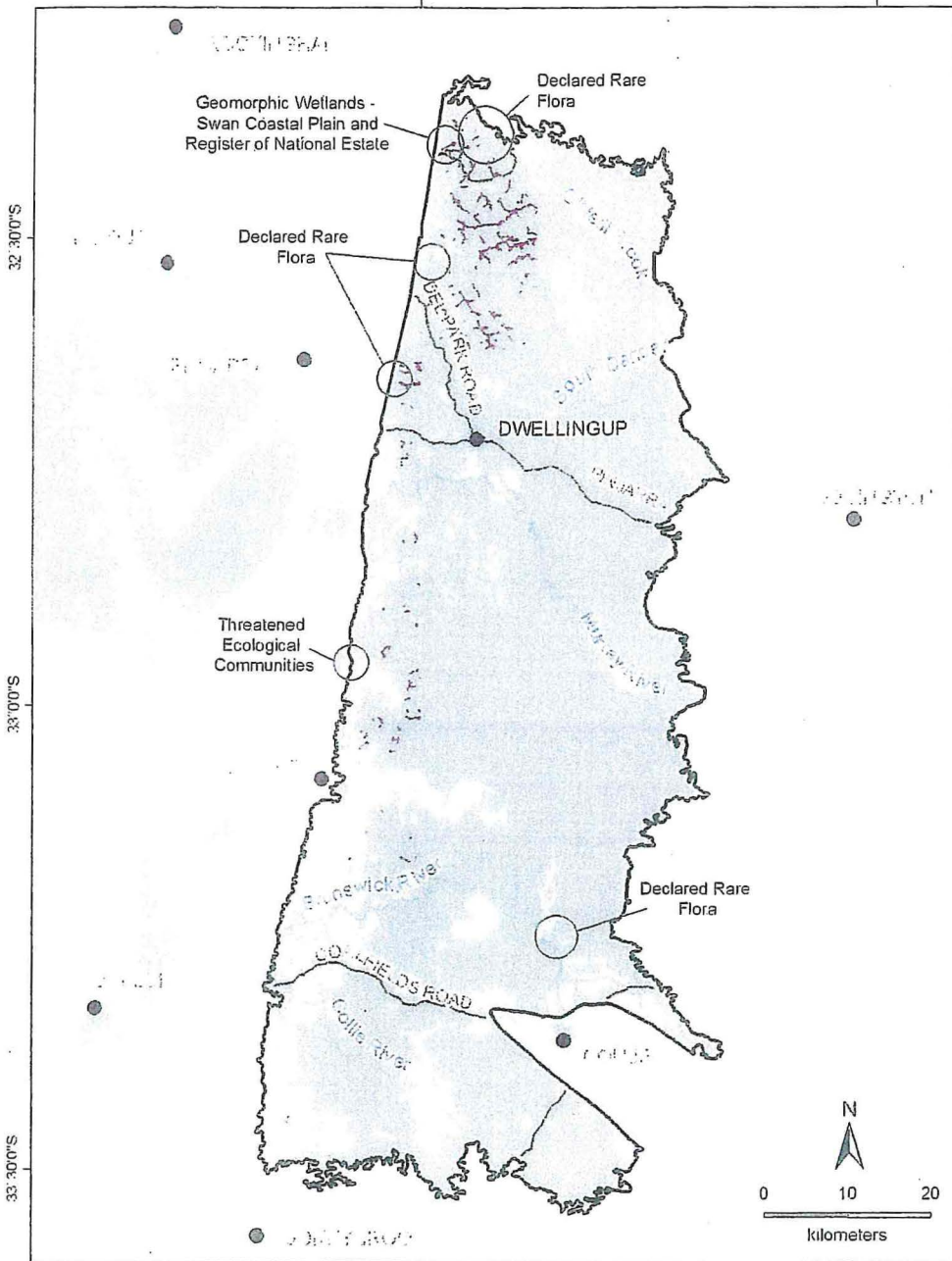
Forest Disease Risk Areas (DRA) statistics	Total Area (Ha)	% of Central Jarrah LMU	All LMUs Area (Ha)	% of all LMUs
Disease Risk Area	141945.11	36.06%	712746.08	19.92%
Total	141945.11	36.06%	712746.08	

No special conservation zones are located within this LMU
 Disease Risk Area: Administrative boundaries which delineate areas of forest / vegetation subject to the risk of infection from 'dieback' - a highly contagious fungal disease. Strict quarantine and access restrictions apply to these areas.

Central Jarrah Land Management Unit Environmentally Sensitive Areas (ESA)

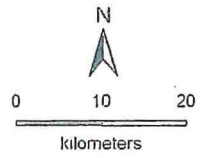
116°0'0"E

116°30'0"E



- Central Jarrah LMU
- ESA categories**
- Declared Rare Flora
- Geomorphic Wetlands - Swan Coastal Plain
- Threatened Ecological Communities
- Register of National Estate
- Geomorphic Wetlands - Swan Coastal Plain and Register of National Estate
- Other ESA categories

Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_005_1



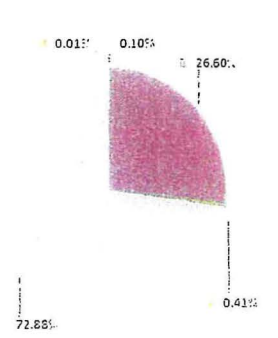
116°0'0"E

116°30'0"E

Category	Area (ha)	Percentage (%)
Total area of all LMUs	4232580.43	9.30%
Total area of Central Jarrah LMU only	393608.07	
Total area of ESA data covering all LMUs	480306.34	11.35%
Total area of ESA data covering Central Jarrah LMU	10684.65	2.71%

ESA Category	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
Declared Rare Flora	10.93	0.0028%	347.07	3.15%
Geomorphic Wetlands - Swan Coastal Plain	2841.97	0.72%	5270.70	53.92%
Threatened Ecological Communities	43.77	0.0111%	22414.02	0.20%
Register of National Estate	7787.30	1.98%	261474.97	2.98%
Register of National Estate and Geomorphic Wetlands - Swan Coastal Plain	0.67	0.0002%	57.81	1.16%
Total	10684.65	2.71%	289564.57	

% of ESA within the Central Jarrah LMU



- Declared Rare Flora
- Geomorphic Wetlands - Swan Coastal Plain
- Threatened Ecological Communities
- Register of National Estate
- Register of National Estate and Geomorphic Wetlands - Swan Coastal Plain

Environmentally Sensitive Areas as declared in Environmental Protection (Environmentally Sensitive Areas) Notice 2005, Government Gazette No. 55.

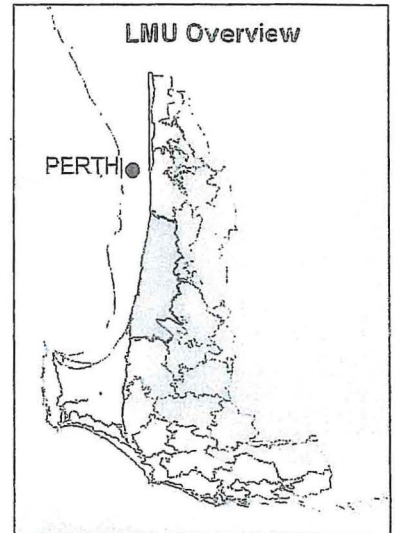
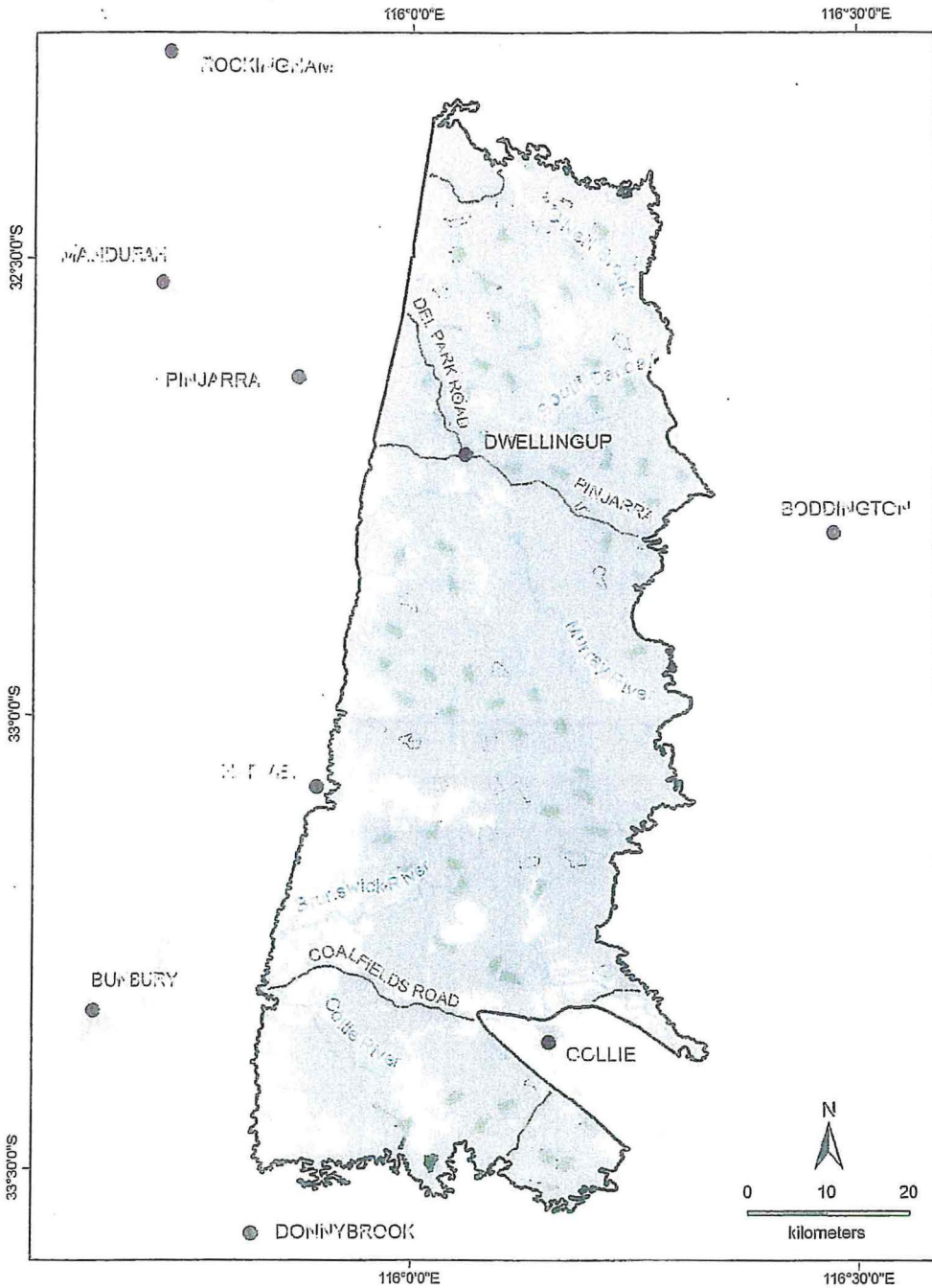
Declared Rare Flora (DRF): File manipulation: 100m buffer (50m radius) created, buffer boundaries dissolved. Custodian: DEC

Geomorphic Wetlands - Swan Coastal Plain: File manipulation: only sites with the evaluation field 'Conservation' attribute were selected for ESA. 100m (50m radius) buffer created, buffer boundaries dissolved. Custodian: DEC

Threatened Ecological Communities (TEC): File manipulation: buffer boundaries dissolved. Custodian: DEC

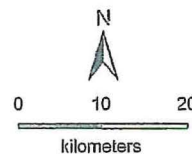
Register of National Estate: File manipulation: only sites with class field 'Natural' attribute and status field 'Registered' attribute were selected for ESA. Custodian: Environment Australia, Australian and World Heritage Division

Central Jarrah Land Management Unit Fauna Habitat Zones



- Central Jarrah LMU
- Fauna habitat boundaries**
- Final
- Indicative
- Interim

Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_006_1



LMU statistics	Area (ha)
Total area of all LMUs	4232580.43
Total area of Central Jarrah LMU only	393608.07

LMU statistics	Area (percentage %)
Central Jarrah LMU within all LMUs	9.30%

Ownership Statistics
 Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate

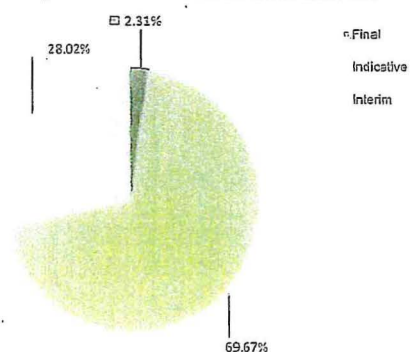
Fauna Habitat Zones	Area (ha)
Total area of habitat data covering all LMUs	63265.39
Total area of habitat data covering Central Jarrah LMU	16918.77

Fauna Habitat Zones	Area (percentage %)
Total area of habitat data covering all LMUs	1.49%
Total area of habitat data covering Central Jarrah LMU	5.06%

Last update: 31/12/2010
 Lineage: Locations determined by FMP 2004-2013
 Accuracy: Indicative only

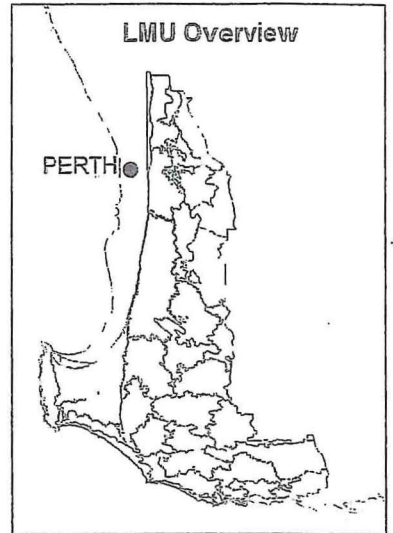
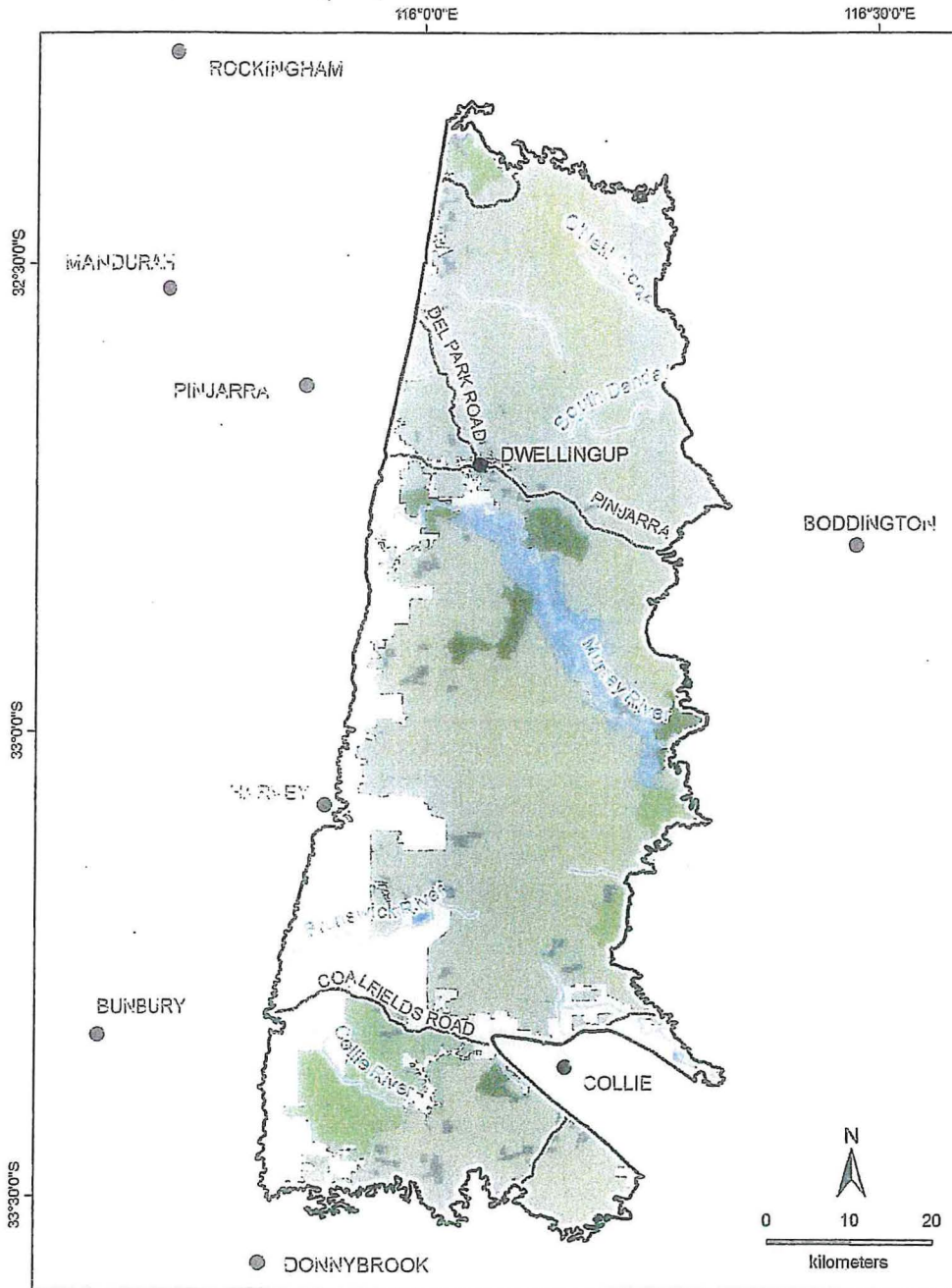
Fauna Habitat Zone Categories	Central Jarrah LMU Area (ha)	Central Jarrah LMU Area (percentage %)	All LMUs Area (ha)	All LMUs Area (percentage %)
Final	459.66	0.12%	13334.32	3.45%
Indicative	13877.46	3.53%	39632.27	35.02%
Interim	5581.65	1.42%	10298.80	54.20%
Total	16918.77	5.06%	63265.39	

% of Fauna Habitats within the Central Jarrah LMU



The principal purpose of fauna habitat zones is to provide a strategy to meet the Forest Management Plan's (Conservation Commission of Western Australia (2004), Forest Management Plan 2004-2013, Conservation Commission of Western Australia, Perth) objective of ensuring that biodiversity recovers between one rotation and the next. The zones fulfil this purpose by providing a sufficiently extensive network of areas excluded from timber harvesting in the mid-term within State forest and timber reserves. The design of the network of zones therefore applies at the landscape scale, with implementation then occurring at the forest block and coupe scales. The zones are intended to maintain both fauna populations within themselves, and to provide a source for the recolonisation of nearby areas after timber harvesting.

Central Jarrah Land Management Unit Forest Management Plan (FMP) Areas



- Central Jarrah LMU
- FMP categories**
- Conservation park
- National park
- Nature reserve
- Section 62
- State Forest/Timber Res
- Misc Res/Exec Dir
- Other reserves
- Hole

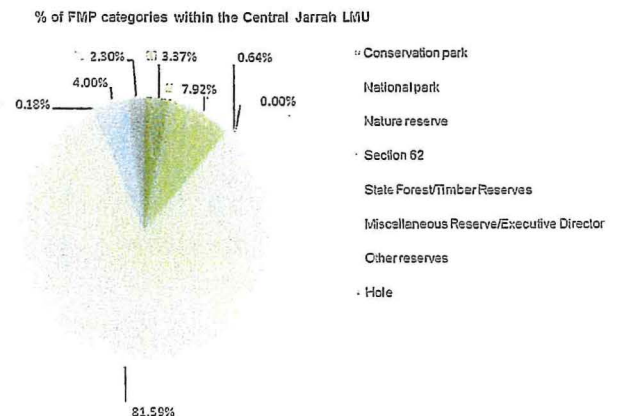
Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MIM: Gaia Resources
 Projection: GDA94
 Reference: GR243_007_1

Area description	Area (ha)
Total area of all LMUs	4232580.43
Total area of Central Jarrah LMU only	393608.07

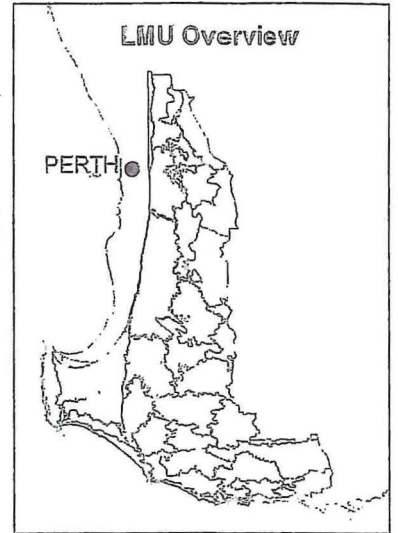
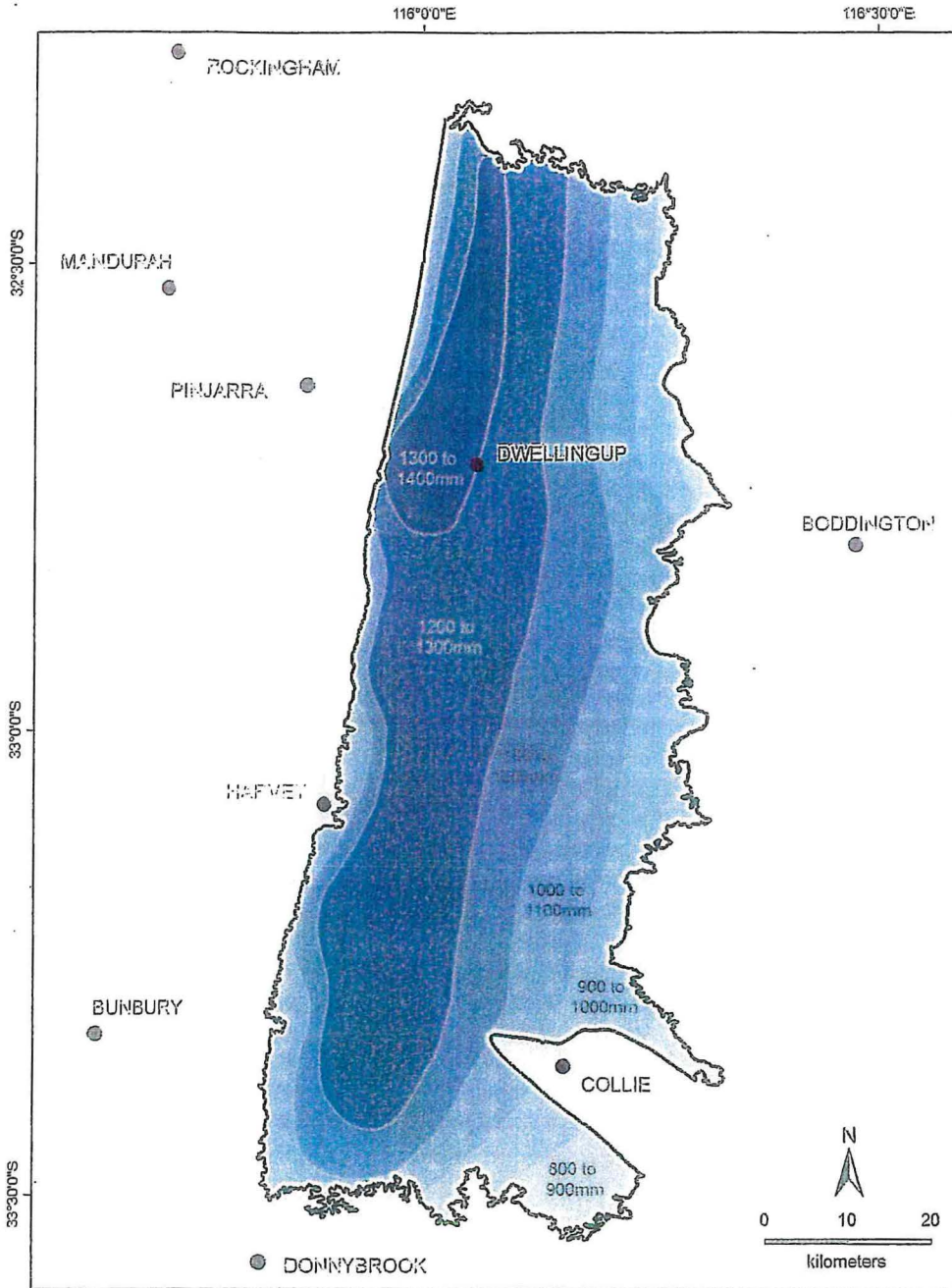
Area description	Percentage (%)
Central Jarrah LMU within all LMUs	9.30%
Total area of FMP data covering all LMUs	57.55%
Total area of FMP data covering Central Jarrah LMU	82.19%

Metadata:
 Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate
 Last update: 1/12/2004
 Lineage: No details given
 Accuracy: As per CALM FMIS

FMP category	Central Jarrah LMU Area (ha)	Area as % of LMU	All LMUs Area (ha)	% of all LMUs Area
Conservation park	10903.40	2.77%	108911.45	10.01%
National park	25614.98	6.51%	949006.83	2.70%
Nature reserve	2071.88	0.53%	43063.08	4.81%
Section 62	8.45	0.0021%	39070.01	0.02%
State Forest/Timber Reserves	263936.57	67.08%	1151522.09	22.92%
Miscellaneous Reserve/Executive Director	567.37	0.14%	5771.05	9.83%
Other reserves	12949.21	3.29%	13603.45	93.79%
Hole	7455.16	1.89%	124527.60	5.99%
Total	323507.02	82.19%	2435678.56	57.55%



Central Jarrah Land Management Unit Rainfall Isohyets (mm)



- Central Jarrah LMU
- Salinity Risk Area**
- 900 to 1100mm
- Rainfall (mm)**
- 600 to 700mm
- 700 to 800mm
- 800 to 900mm
- 900 to 1000mm
- 1000 to 1100mm
- 1100 to 1200mm
- 1200 to 1300mm
- 1300 to 1400mm

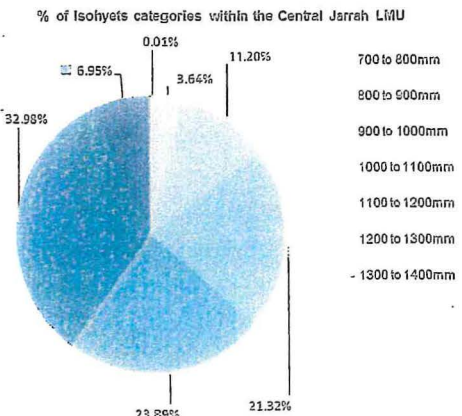
Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_008_1

Ischyets (mm)	Area (Ha)
Total area of all LMUs	4232580.43
Total area of Central Jarrah LMU only	393608.07
Total area of ischyets data covering all LMUs	4231573.88
Total area of ischyets data covering Central Jarrah	393608.71

Ischyets (mm)	Percentage (%)
Central Jarrah LMU within all LMUs	9.30%
Total area of ischyets data covering all LMUs	99.98%
Total area of ischyets data covering Central Jarrah LMU	100.00%

Project Data Sources:
 Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate
 Last update: 1994
 Lineage: Captured at 1:250K to 1:1M scale
 Accuracy: No details given

Rainfall Isohyets (mm)	Area (Ha)	% of Central Jarrah LMU Area	All LMUs Area (Ha)	% of All LMUs Area
700 to 800mm	49.92	0.01%	618065.45	0.01%
800 to 900mm	14336.12	3.64%	464360.62	3.09%
900 to 1000mm	44095.64	11.20%	557658.52	7.91%
1000 to 1100mm	83912.33	21.32%	505195.54	16.61%
1100 to 1200mm	94040.88	23.89%	412332.61	22.81%
1200 to 1300mm	129820.15	32.98%	295597.82	43.92%
1300 to 1400mm	27353.68	6.95%	192067.54	14.24%
Total	393608.71	100%	3045278.11	

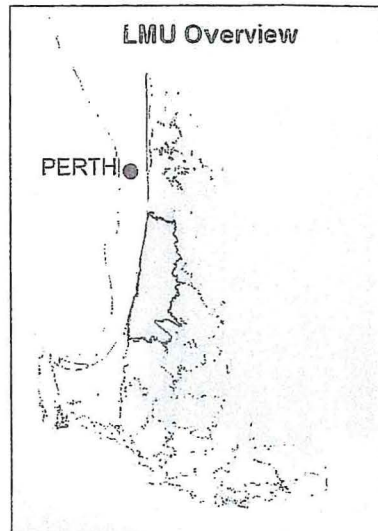
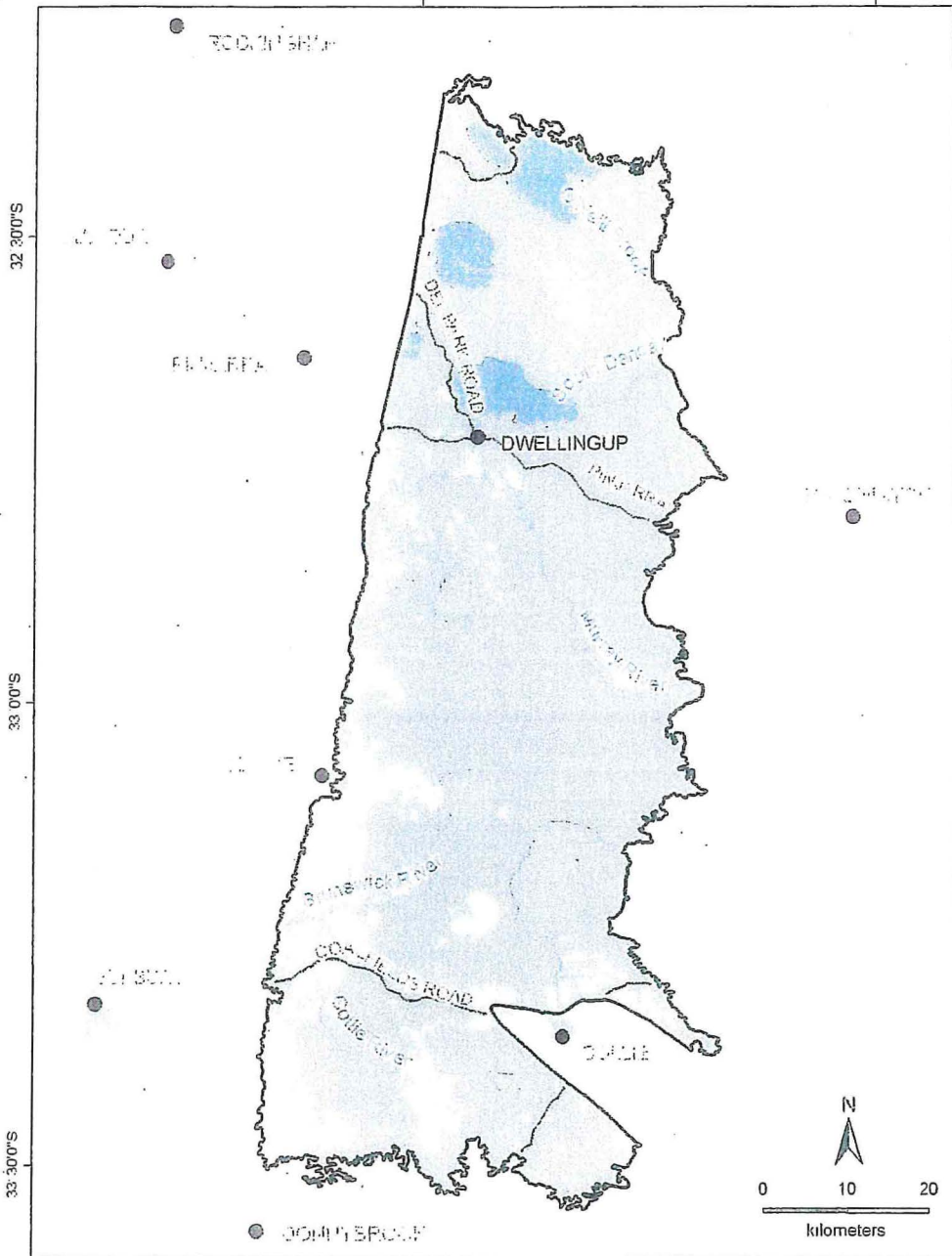


The ischyets in the north of the state from 400mm and above have been improved using data defined at a scale of 1:1 000 000 (see file ISOHY_NW.Z51) Water Authority (1986). The ischyets in the south of the state from 400mm through to the coast have been improved using data defined at a scale of 1:250 000 (see file ISOHY_SW.Z51) Water Authority (Public Works Department)(1981, 1984). Elsewhere based on Bureau of Meteorology (1979), digitised from Australia Rainfall and runoff, vol2 (1987).

Central Jarrah Land Management Unit Public Drinking Water Projection Zones (PDWPZ)

116°0'0"E

116°30'0"E



- Legend**
- Central Jarrah LMU
 - PDWPZ categories**
 - Reservoir Protection Zone under the CAWS Act
 - Reservoir Protection Zone under the MWSSD Act
 - Other PDWPZ categories

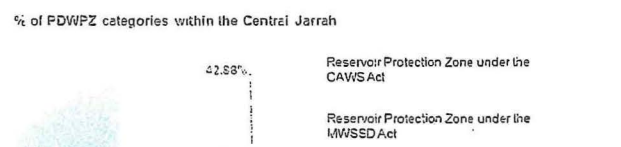
Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM, Gaia Resources
 Projection: GDA94
 Reference: GR243_009_1

116°0'0"E

116°30'0"E

Category	Area (Ha)	Percentage (%)
Total area of all LMUs	4232580.43	
Total area of Central Jarrah LMU only	393608.07	9.30%
Total area of PDWPZ within all LMUs	59383.41	1.40%
Total area of PDWPZ within Central Jarrah LMU	36274.94	9.22%

Public Drinking Water Projection Zone	Area (Ha)	% of LMU	Area (Ha)	% of LMU
Reservoir Protection Zone under the CAWS Act	15552.98	3.95%	22657.73	68.64%
Reservoir Protection Zone under the MWSSD Act	20721.95	5.26%	36624.22	56.58%
Total	36274.94	9.22%	59281.95	

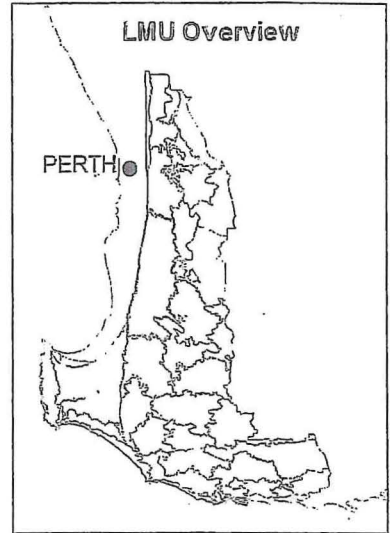
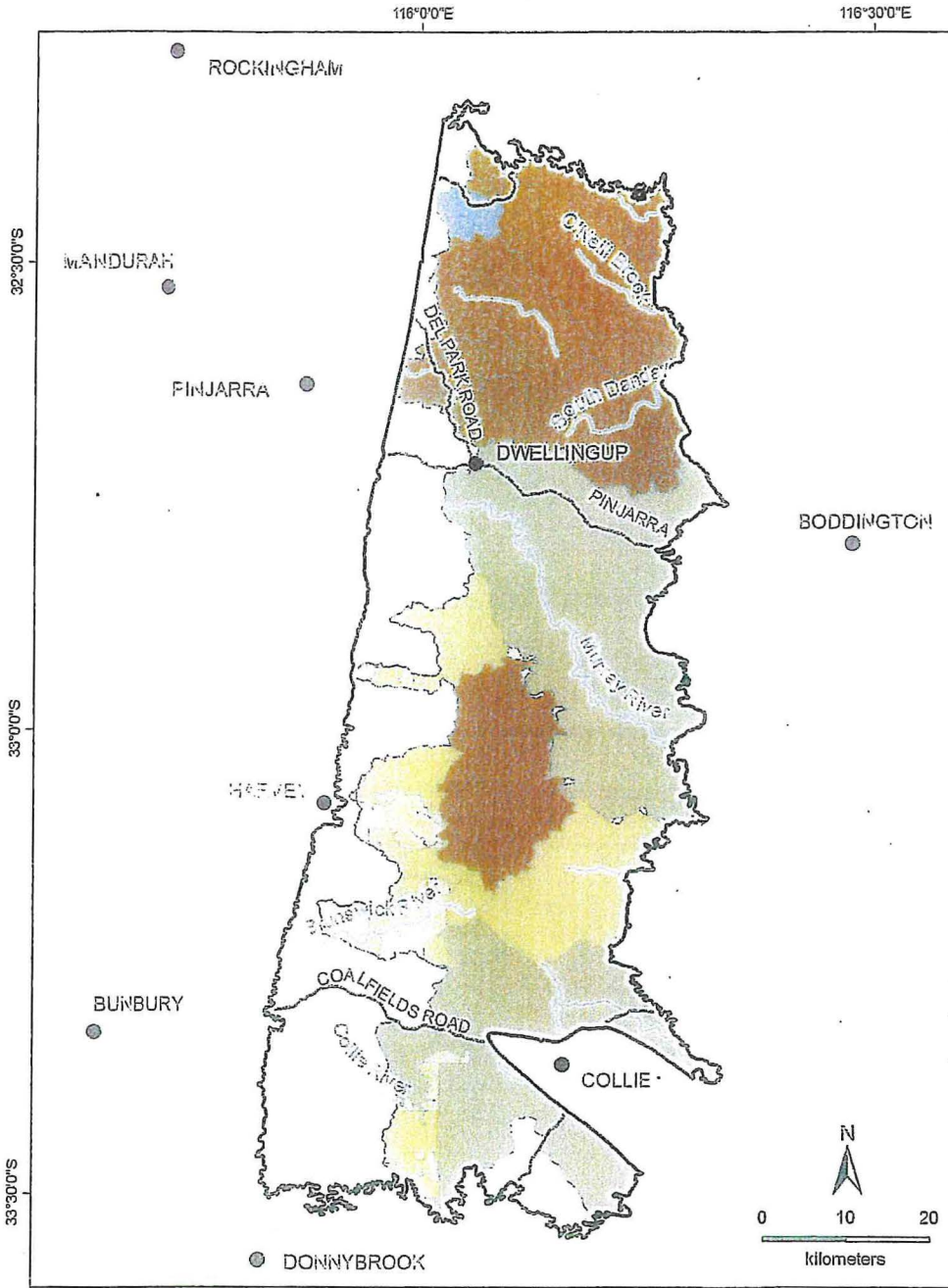


Public Drinking Water Projection Zones (PDWPZ)

As part of Public Drinking Water Source Areas and in addition to priority classification areas, Wellhead Protection Zones (WHPZ) and Reservoir Protection Zones (RPZ) are defined to protect the drinking water source from contamination in the immediate vicinity of production wells and reservoirs. Statutes under the Country Areas Water Supply Act, 1947 (CAWS Act), the Metropolitan Drinking Water Supply, Sewerage and Drainage Act, 1909 (MWSSD Act) and the Town Planning Development Act (1928) provide for defined land uses and activities within these zones that are prohibited, restricted or subject to agency conditions so that contamination of the water source is prevented. Special conditions, such as restrictions on storage and use of chemicals, may be applied within these zones. WHPZ are usually circular, with a radius of 500 metres in P1 areas and 300 metres in P2 and P3 areas. WHPZ do not extend outside PDWSA boundaries.

57.12%

Central Jarrah Land Management Unit Public Drinking Water Source Areas (PDWSA)



- Central Jarrah LMU**
- PDWSA categories**
- Catchment Area Priority Not Assigned under the CAWS Act
 - Catchment Area Priority One under the CAWS Act
 - Catchment Area Priority One under the MWSSD Act
 - Catchment Area Priority Two under the CAWS Act
 - Water Reserve Priority Not Assigned under the MWSSD Act
 - Other PDWSA categories

Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gale Resources
 Projection: GDA94
 Reference: GR243_010_1

Public Drinking Water Source Areas (PDWSA)	Area (Ha)
Total area of all LMUs	4232580.43
Total area of Central Jarrah LMU only	393608.07
Total area of PDWSA within all LMUs	1654153.66
Total area of PDWSA within Central Jarrah LMU	289924.65

Public Drinking Water Source Areas (PDWSA)	Area (Ha)	Percentage (%)
Central Jarrah LMU within all LMUs	393608.07	9.30%
Total area of PDWSA covering all LMUs	1654153.66	17.53%
Total area of PDWSA covering Central Jarrah LMU	289924.65	73.66%

Primary Data Sources:

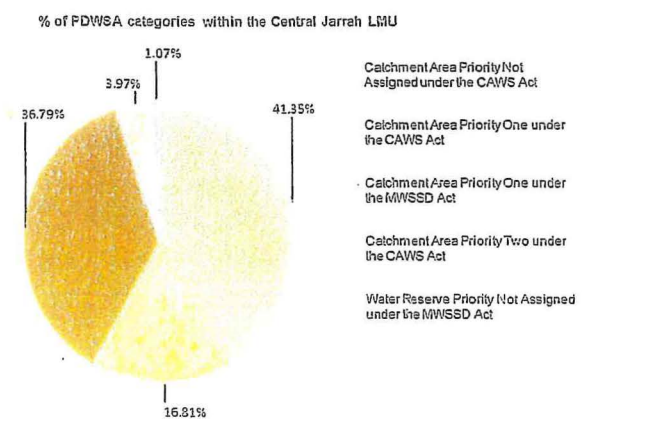
Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate

Last update: 17/08/2011
Lineage: Defined in WA Government Gazette
Accuracy: Good but variable

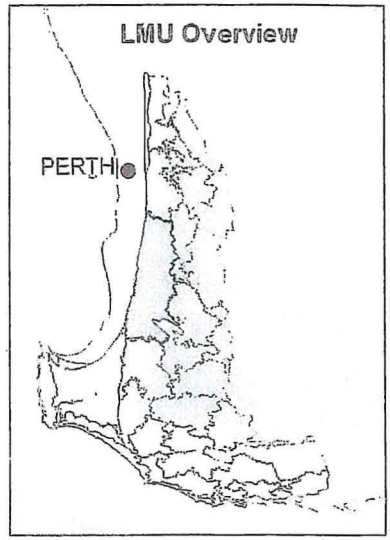
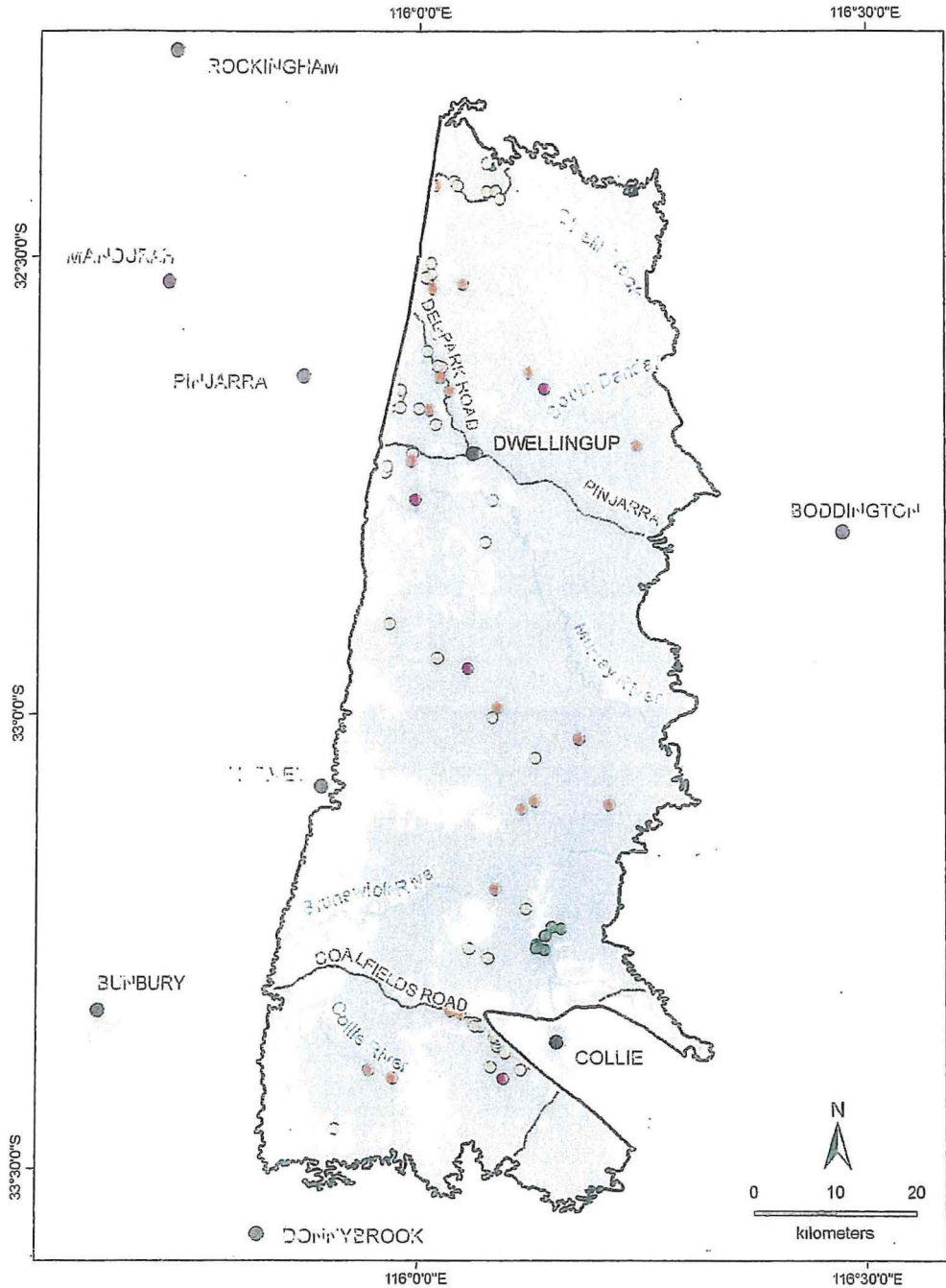
Public Drinking Water Source Area Categories	Central Jarrah LMU Area (Ha)	% of Central Jarrah LMU Area	All LMUs Area (Ha)	% of All LMUs Area
Catchment Area Priority Not Assigned under the CAWS Act	120307.31	30.57%	450125.00	26.73%
Catchment Area Priority One under the CAWS Act	48907.39	12.43%	238922.13	20.47%
Catchment Area Priority One under the MWSSD Act	107035.42	27.19%	295020.23	36.16%
Catchment Area Priority Two under the CAWS Act	11563.50	2.94%	21075.84	54.87%
Water Reserve Priority Not Assigned under the MWSSD Act	3118.59	0.79%	7235.42	43.10%
Total	290932.21	73.91%	1013378.63	

Inconsistent totals come from data overlaps or topology issues

The Public Drinking Water Source Area (PDWSA) dataset is currently used by the Department of Environment and Conservation and the Department of Water in policy decision making and for providing advice for land uses and activities within drinking water catchments. These areas require protection to maintain the quality of raw water used to supply public drinking water schemes. The quality of declared water sources in Western Australia is protected by declaring PDWSA under the Country Areas Water Supply Act, 1947 (CAWS Act) and the Metropolitan Water Supply Sewerage and Drainage Act, 1909, (MWSSD Act). By-laws under both the CAWS Act and the MWSSD Act enable the Department of Environment to control potentially polluting activities, to regulate land use, inspect premises and take necessary steps to prevent or ameliorate pollution



Central Jarrah Land Management Unit Declared Rare Flora (DEFL) populations



- Central Jarrah LMU
- DEFL categories**
- Priority One
- Priority Two
- Priority Three
- Priority Four
- Critically Endangered
- Endangered
- Vulnerable
- Other DEFL categories

Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_011_2

Category	Area (Ha)	Area (km ²)	Percentage (%)
Total area of all LMUs	4232580.43		9.30%
Total area of Central Jarrah LMU only	393608.07		
DEFL Sites			
Total area of points within all LMUs	3326		2.98%
Total area of points within Central Jarrah LMU	99		

Project Details
 Custodian: Department of Environment and Conservation
 Database details: CCWA GIS Corporate
 Last update: No details given
 Lineage: Field reports, Herbarium data and surveys
 Accuracy: Reasonably accurate. Scale 1: 50 000

DEFL Category	Count	% within LMU	Total Count	% of all LMUs
Priority One	1	1.01%	134	0.75%
Priority Two	5	5.05%	317	1.58%
Priority Three	22	22.22%	1055	2.09%
Priority Four	56	56.57%	929	6.03%
Declared Rare Flora: Critically Endangered	1	1.01%	91	1.10%
Declared Rare Flora: Endangered	7	7.07%	295	2.37%
Declared Rare Flora: Vulnerable	7	7.07%	504	1.38%
Total	99	100%	3325	

Some categories are not found in the Central Jarrah LMU (i.e. Extinct)

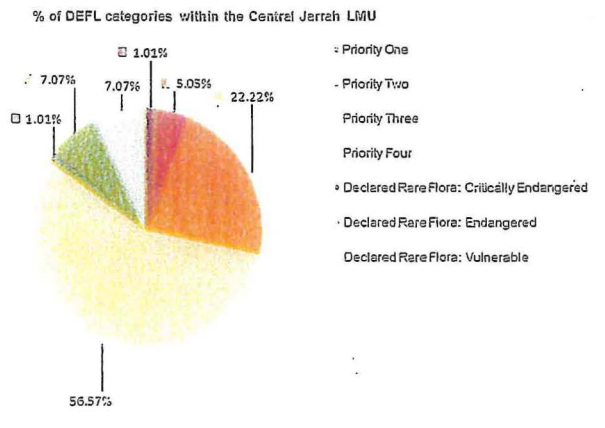
Priority One: Taxa which are known from one or a few (generally <5) populations which are under threat.

Priority Two: Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered).

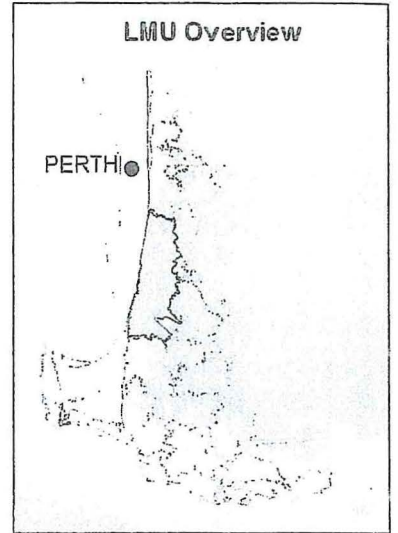
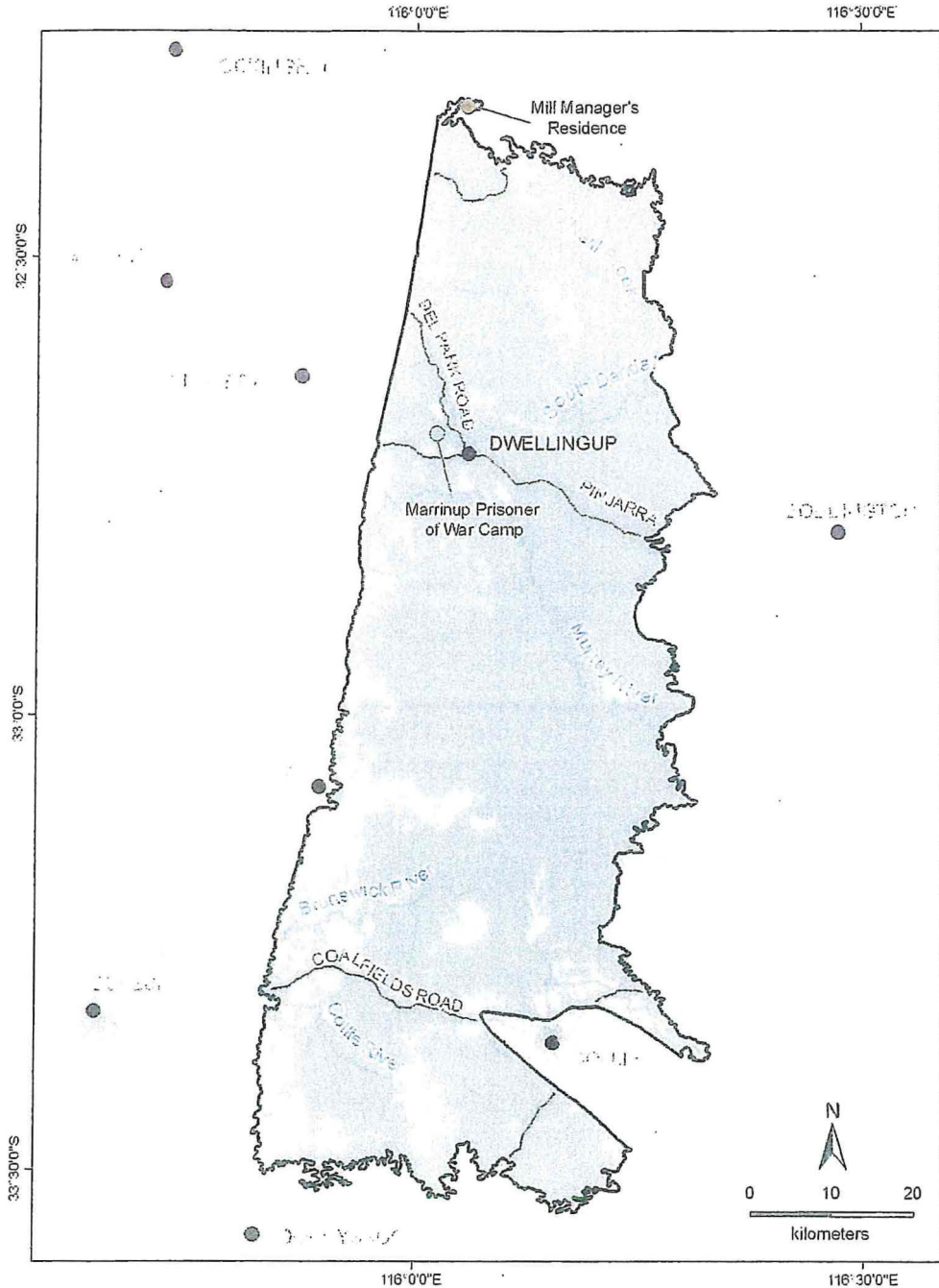
Priority Three: Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered).

Priority Four: Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors.

Declared Rare Flora: Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.



Central Jarrah Land Management Unit Heritage Commission Sites (HCS)



- Central Jarrah LMU
- Heritage Commission site name**
- Marrinup Prisoner of War Camp
- Mill Manager's Residence
- Other HCS sites

Project: Conservation Value LMUs
 Scale: 1:850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_012_1

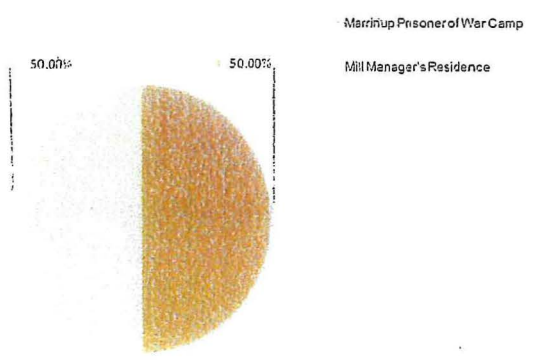
Category	Area (ha)
Total area of all LMUs	4232580.43
Total area of Central Jarrah LMU only	393608.07
Total area of points within all LMUs	40
Total area of points within Central Jarrah LMU	2

Category	Percentage
Central Jarrah LMU within all LMUs	9.30%
Total number of points in Central Jarrah compared to all LML	5.00%

Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate
 Last update: 1/10/2003
 Lineage: No details given
 Accuracy: +/- 100m

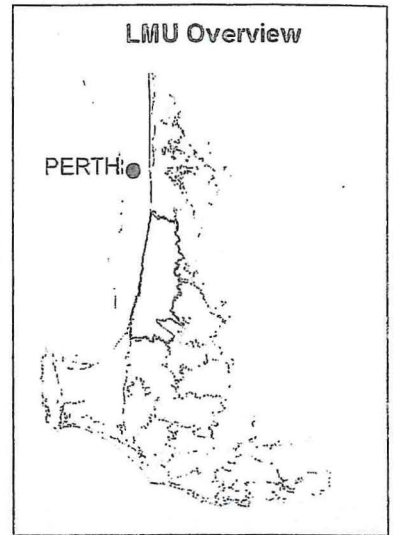
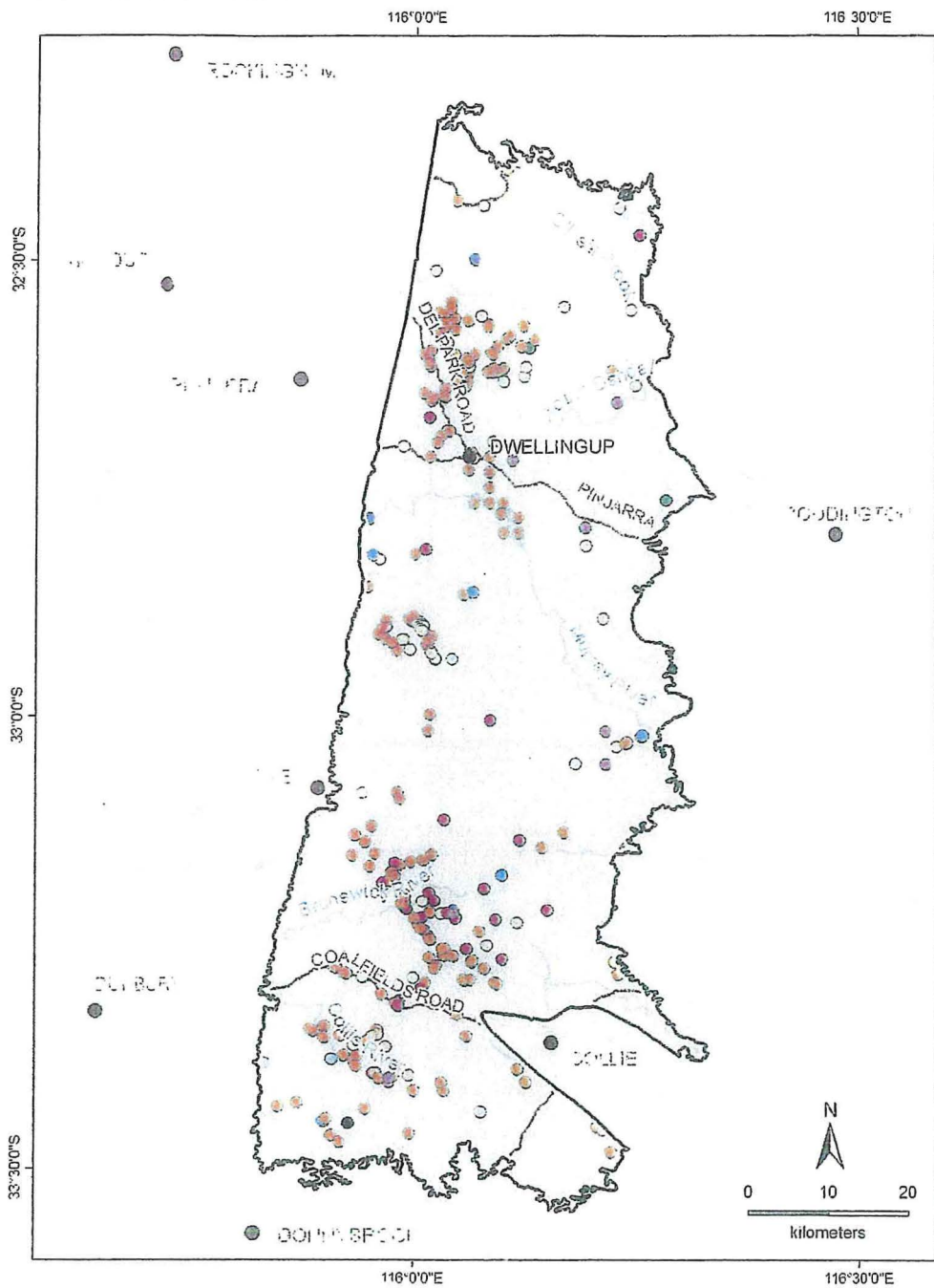
Heritage Commission Site	Number of Sites	% of Sites	Number of LMUs	% of LMUs
Marrinup Prisoner of War Camp	1	50.00%	1	100.00%
Mill Manager's Residence	1	50.00%	1	100.00%
Total	2	100%	2	

% of Heritage Commission Sites within the Central Jarrah LMU



Heritage Commission Sites: The Register of Heritage Places focuses on places, buildings and sites and is a list of places considered worth conserving.

Central Jarrah Land Management Unit Threatened Fauna sites



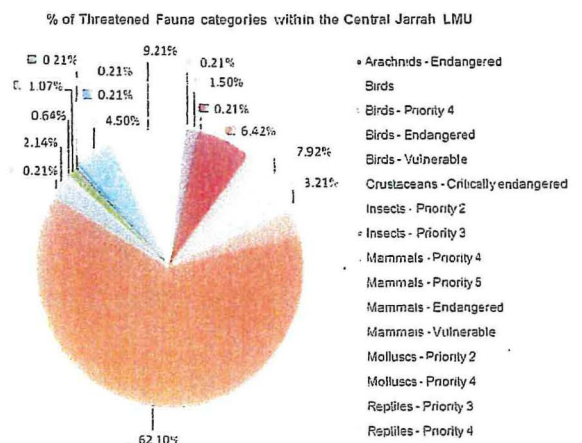
- Central Jarrah LMU**
- Threatened fauna categories**
- Arachnids - Endangered
 - Birds
 - Birds - Priority 4
 - Birds - Endangered
 - Birds - Vulnerable
 - Crustaceans - Critically endangered
 - Insects - Priority 2
 - Insects - Priority 3
 - Mammals - Priority 4
 - Mammals - Priority 5
 - Mammals - Endangered
 - Mammals - Vulnerable
 - Molluscs - Priority 2
 - Molluscs - Priority 4
 - Reptiles - Priority 3
 - Reptiles - Priority 4
 - Other threatened fauna categories

Project: Conservation Value LMUs
 Scale: 1:850 000
 Date: 20 Feb 2012
 Author: MM Gaia Resources
 Projection: GDA94
 Reference: GR243_013_1

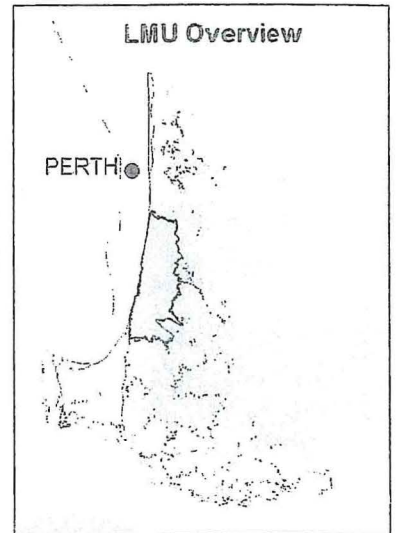
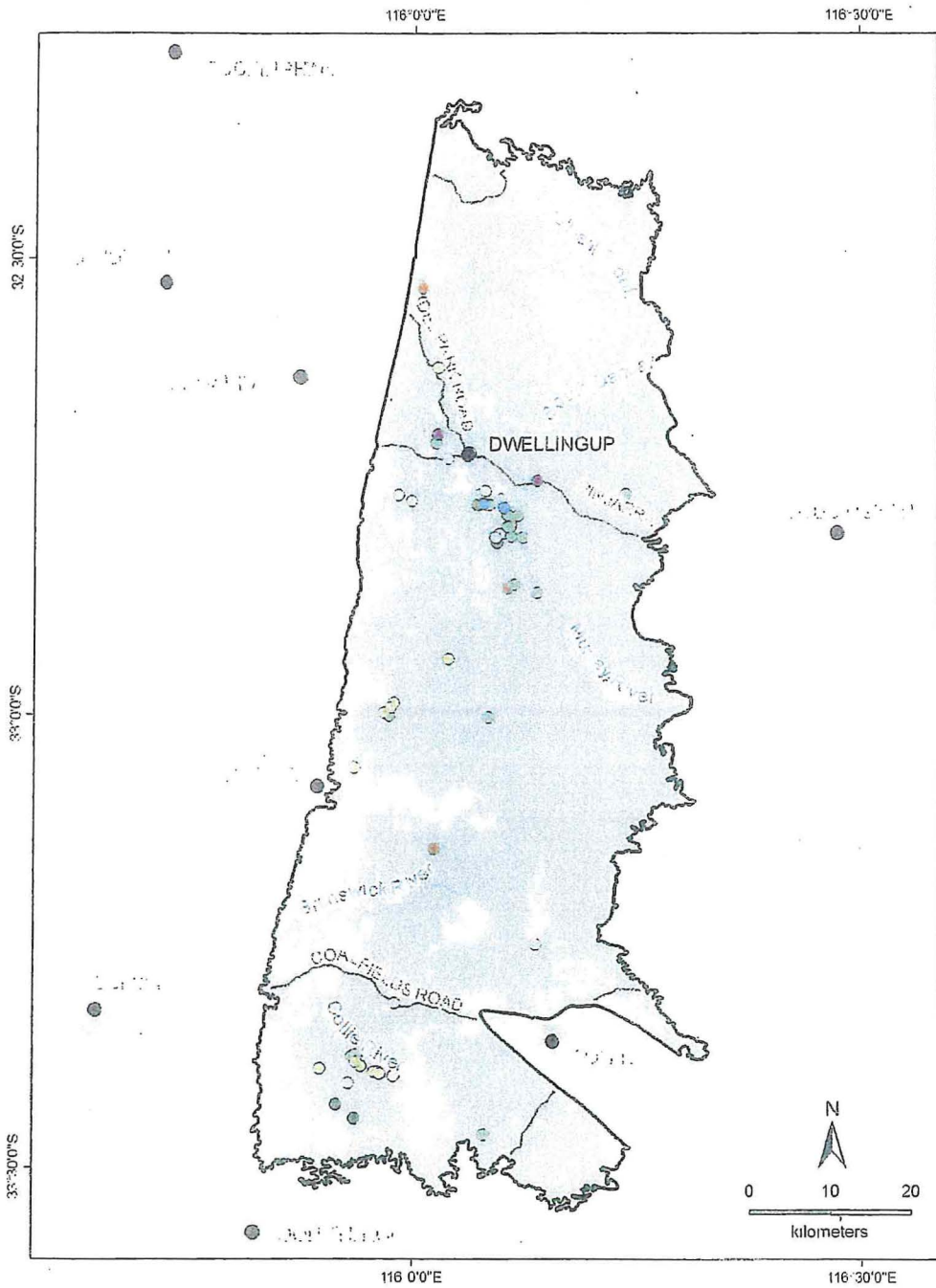
Category	Area (ha)	Category	Percentage (%)
Total area of all LMUs	4232580.43	Central Jarrah LMU within all LMUs	9.30%
Total area of Central Jarrah LMU only	393608.07		
Category	Number of points	Category	Percentage (%)
Total area of points within all LMUs	5646	Total number of points in Central Jarrah compared to all LML	8.27%
Total area of points within Central Jarrah LMU	467		

Custodian: Department of Environment and Conservation
Dataset details: CCWA GIS Corporate
Last update: 16/11/2011
Lineage: Data captured from various sources
Accuracy: Variable but generally within 1km

Threatened Fauna Category	Central Jarrah LMU Points	% within Central Jarrah LMU	All LMU Points	% within All LMU
Arachnids - Endangered	1	0.21%	19	5.26%
Birds	1	0.21%	32	3.13%
Birds - Priority 4	1	0.21%	103	0.97%
Birds - Endangered	21	4.50%	1015	2.07%
Birds - Vulnerable	43	9.21%	562	7.65%
Crustaceans - Critically endangered	1	0.21%	5	20.00%
Insects - Priority 2	7	1.50%	34	20.59%
Insects - Priority 3	1	0.21%	5	20.00%
Mammals - Priority 4	30	6.42%	477	6.28%
Mammals - Priority 5	37	7.92%	514	7.20%
Mammals - Endangered	15	3.21%	167	8.98%
Mammals - Vulnerable	290	62.10%	1788	16.22%
Molluscs - Priority 2	1	0.21%	3	33.33%
Molluscs - Priority 4	10	2.14%	23	43.48%
Reptiles - Priority 3	3	0.64%	34	8.82%
Reptiles - Priority 4	5	1.07%	105	4.76%
Total	467	100%	4986	

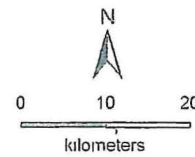


Central Jarrah Land Management Unit Recreation and Tourism Information System (RATIS) Sites



- Legend**
- Central Jarrah LMU
 - RATIS site categories**
 - No data
 - Accommodation
 - Camping
 - Day
 - Historic
 - Information
 - Lookout
 - Nature
 - River
 - Road
 - Trail
 - Other RATIS categories

Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_014_1



Category	Value	Category	Value
Total area of all LMUs	4232580.43	Central Jarrah LMU within all LMUs	9.30%
Total area of Central Jarrah LMU only	393698.07		
Total area of points within all LMUs	370	Total number of points in Central Jarrah compared to all LML	18.11%
Total area of points within Central Jarrah LMU	67		

Metadata

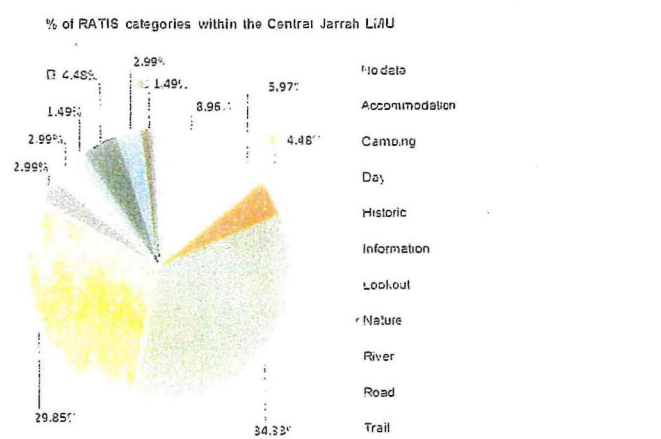
Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate

Last update: Extracted 16/11/2011

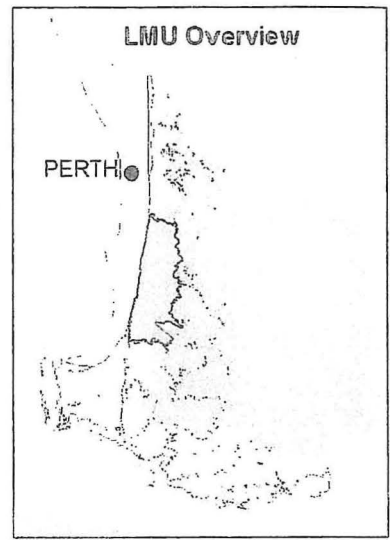
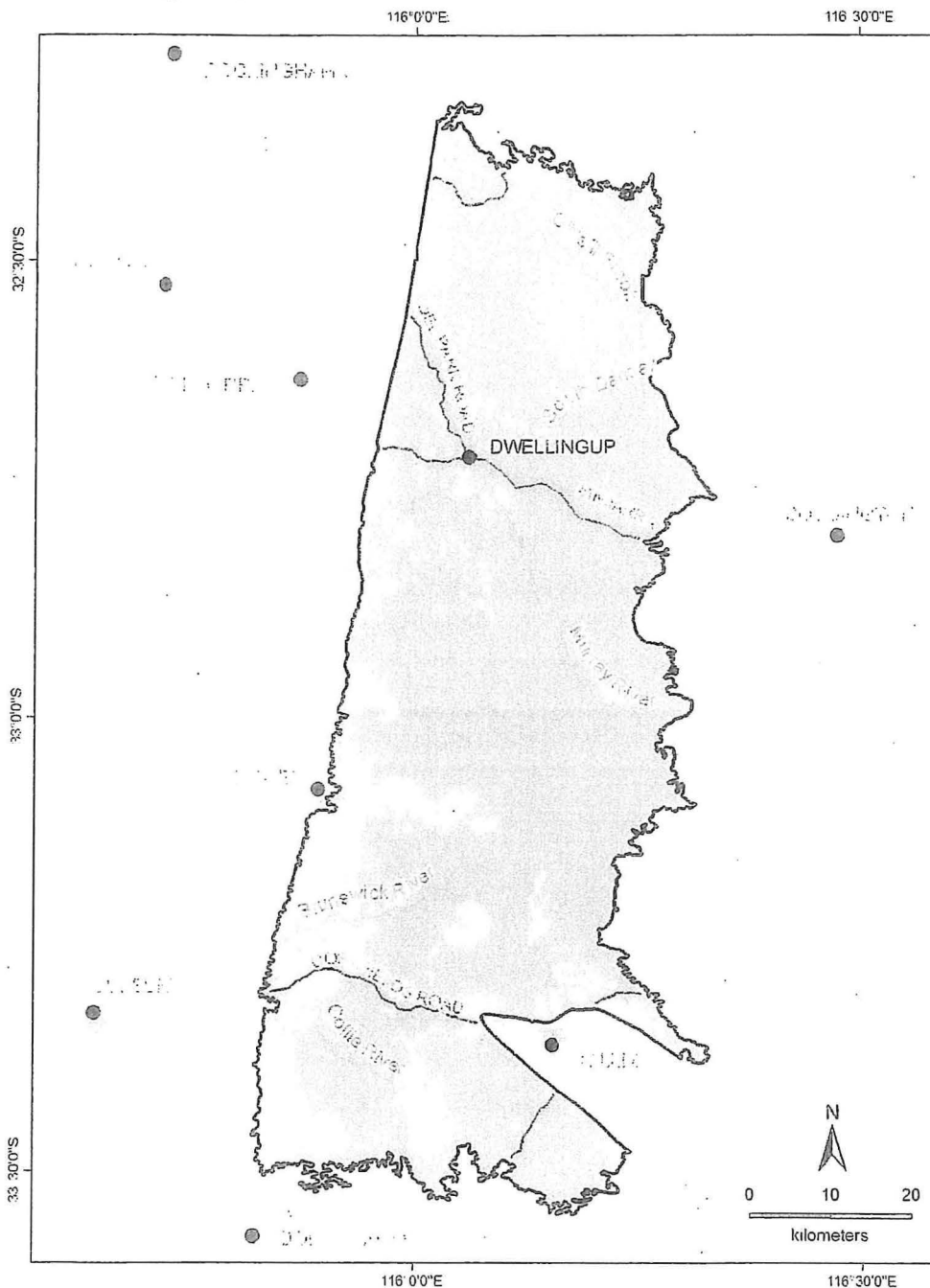
Lineage: Extracted from the RATIS Oracle database

Accuracy: Some sites are spatially incorrect

RATIS Site category	Count	% of total points in all LMUs	% of total points in Central Jarrah LMU
No data: Bicycle, Bush 4WD, Rallying, Camping, Picnicking, Wildlife	4	5.97%	6.06%
Accommodation: Bicycle, Camping	3	4.48%	33.33%
Camping: BBQ, Bush, Bicycle, Bird, Camping, Caravan, Picnicking, Canoeing, Wildlife Scenic, Swimming	23	34.33%	29.49%
Day: 4WD, BBQ, Bicycle, Picnicking, Swimming, Boat, Bush Canoeing, Rock, Snorkel, Fishing	20	29.85%	12.74%
Historic: Bush, Other	2	2.99%	33.33%
Information: Scenic, Other	2	2.99%	50.00%
Lookout: Scenic	1	1.49%	9.09%
Nature: BBQ, Bush, Camping, Guided, Picnicking, Other	3	4.48%	75.00%
River: 4WD, Bicycle, Bush, Canoeing	2	2.99%	66.67%
Road	1	1.49%	12.50%
Trail: 4WD, Bird, Bush, Swimming, Horse	6	8.96%	54.55%
Total	67	100%	357

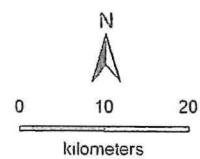


Central Jarrah Land Management Unit Remnant Vegetation



Central Jarrah LMU
 Remnant vegetation

Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_015_1



Area (km ²)	Area (ha)
Total area of all LMUs	4232580.43
Total area of Central Jarrah LMU only	393608.07
Total area of data covering all LMUs	2797461.68
Total area of data covering Central Jarrah LMU	324973.68

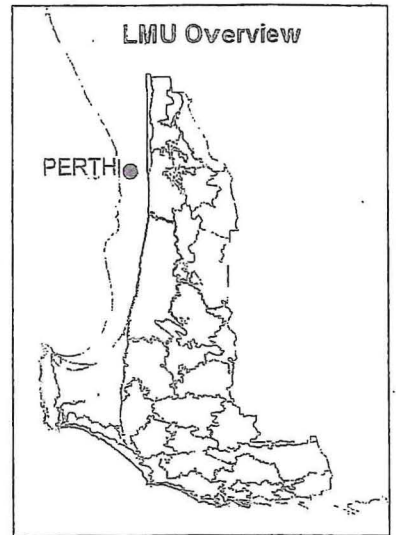
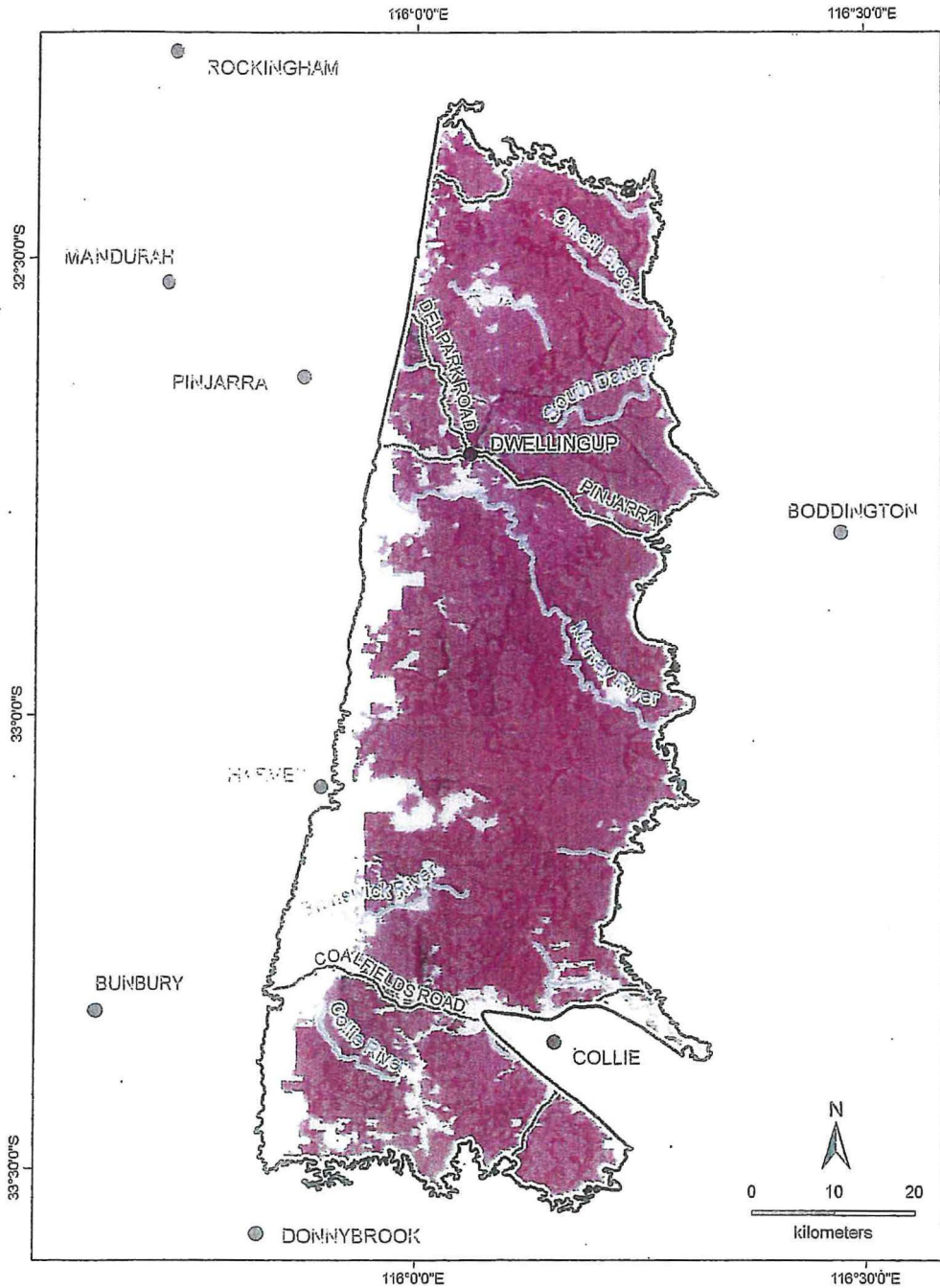
Percentage (%)	Percentage (%)
Central Jarrah LMU within all LMUs	9.30%
Total area of data covering all LMUs	66.09%
Total area of data covering Central Jarrah LMU	82.56%

Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate
 Last update: 1/05/2011
 Lineage: Various. Scale at 1:20 000 to 1 100 000.
 Accuracy: + or - 20m and + or - 100m

Category	Central Jarrah LMU Area (ha)	% of Central Jarrah LMU Area	Total LMU Area (ha)	% of Total LMU Area
Remnant Vegetation	324973.68	82.56%	2797461.68	11.62%
Total	324973.68	82.56%	2797461.68	

Remnant Vegetation: A data set containing vegetation extent polygons from the mapping of remnant vegetation in Western Australia. This was originally compiled as part of the vegetation theme of the National Land and Water Resource Audit (NLWRA). The dataset has been progressively updated by the Department of Agriculture and Food post-NLWRA with assistance of the Department of Environment and Conservation. This has been carried out using digital aerial photography (orthoimages) acquired 1966 to 2011.

Central Jarrah Land Management Unit Fire Frequency



- Central Jarrah LMU
- Fire frequency categories
- Burnt 1 to 5 times
- Burnt 6 to 10 times
- Burnt 11 to 15 times
- Burnt 16 to 20 times
- Burnt 21 to 25 times
- Burnt 26 to 30 times

Project: Conservation Value LMUs
 Scale: 1 : 850 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_016_1

Area (Hektars)	Area (Hektars)
Total area of all LMUs	4232580.43
Total area of Central Jarrah LMU only	393608.07

Area (Hektars)	Percentage (%)
Central Jarrah LMU within all LMUs	9.30%

Information	Details
Custodian:	Department of Environment and Conservation
Dataset detail:	CCWA GIS Corporate

Area (Hektars)	Area (Hektars)
Total area of data covering all LMUs	2839887.25
Total area of data covering Central Jarrah LMU	377952.98

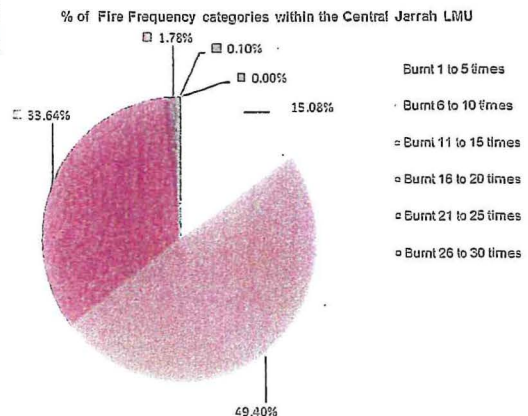
Area (Hektars)	Percentage (%)
Total area of data covering all LMUs	67.10%
Total area of data covering Central Jarrah LMU	96.02%

Information	Details
Last update:	30/06/2011
Lineage:	Varicus (GPS, maps, anecdotal, imagery)
Accuracy:	Varied

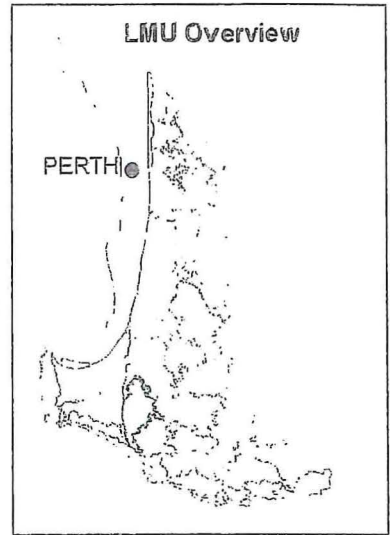
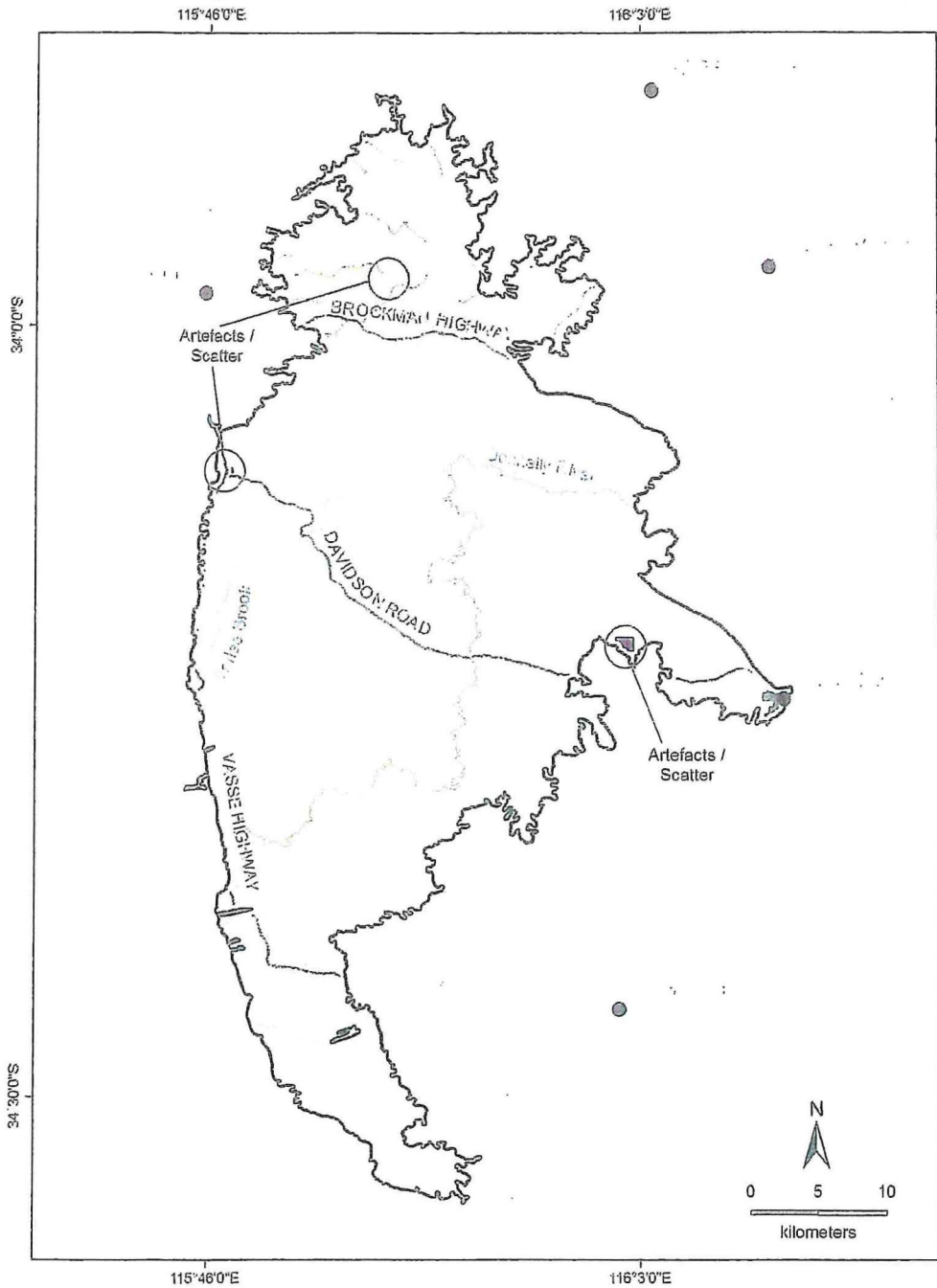
Fire Frequency Category	Area (Hektars)	% of Central Jarrah LMU	All LMU Area (Hektars)	% of All LMU Area
Burnt 1 to 5 times	56993.79	14.48%	1218498.17	4.68%
Burnt 6 to 10 times	186715.92	47.44%	1256847.79	14.86%
Burnt 11 to 15 times	127128.07	32.30%	348537.85	36.47%
Burnt 16 to 20 times	6714.22	1.7058%	15336.02	43.78%
Burnt 21 to 25 times	389.17	0.10%	653.72	59.53%
Burnt 26 to 30 times	11.80	0.00%	18.42	64.04%
Total	377952.98	96.02%	2839891.97	

Inconsistent totals come from data overlaps or topology issues

The DEC Fire Frequency dataset is a dynamic dataset which contains a collection of records of fire events (prescribed burns and bushfires), which were captured in DEC managed land and, where available, non-DEC managed land in Western Australia. The earliest records available are from 1937. Some historic map sheets have been unattainable and thus the dataset is missing some data. Complete state coverage is available from 2005 to present day. The DEC Fire Frequency dataset is a derivative dataset from DEC Fire History. The DEC Fire Frequency dataset shows areas burnt by prescribed burns and bushfires based on the number of times burnt between 1937 and June 2011. The calculation of times burnt is based on financial years



Northern Karri Land Management Unit
Aboriginal Heritage Sites



- Northern Karri LMU
- Aboriginal Heritage Site categories
- Artefacts / Scatter
- Mythological

Project: Conservation Value LMUs
 Scale: 1 : 500 000
 Date: 23 Feb 2012
 Author: MM/ Gaia Resources
 Projection: GDA94
 Reference: GR243_022_1

Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

Northern Karri LMU within all LMUs	2.98%
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Custodian:	Department of Indigenous Affairs
Dataset details:	Downloaded from website.

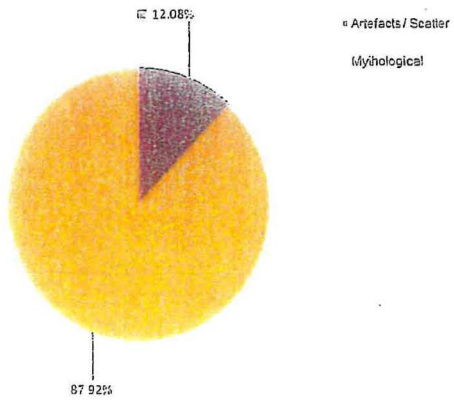
Total area of data covering all LMUs	338732.24
Total area of data covering Northern Karri LMU	978.40

Total area of data covering all LMUs	8.00%
Total area of data covering Northern Karri LMU	0.78%

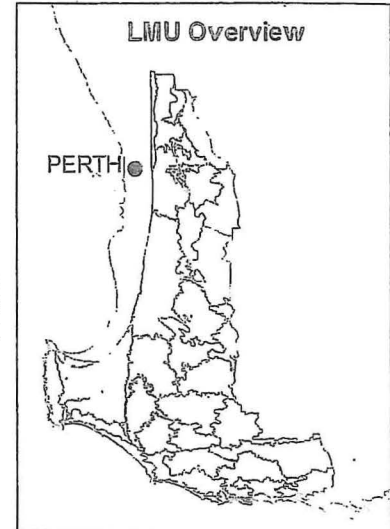
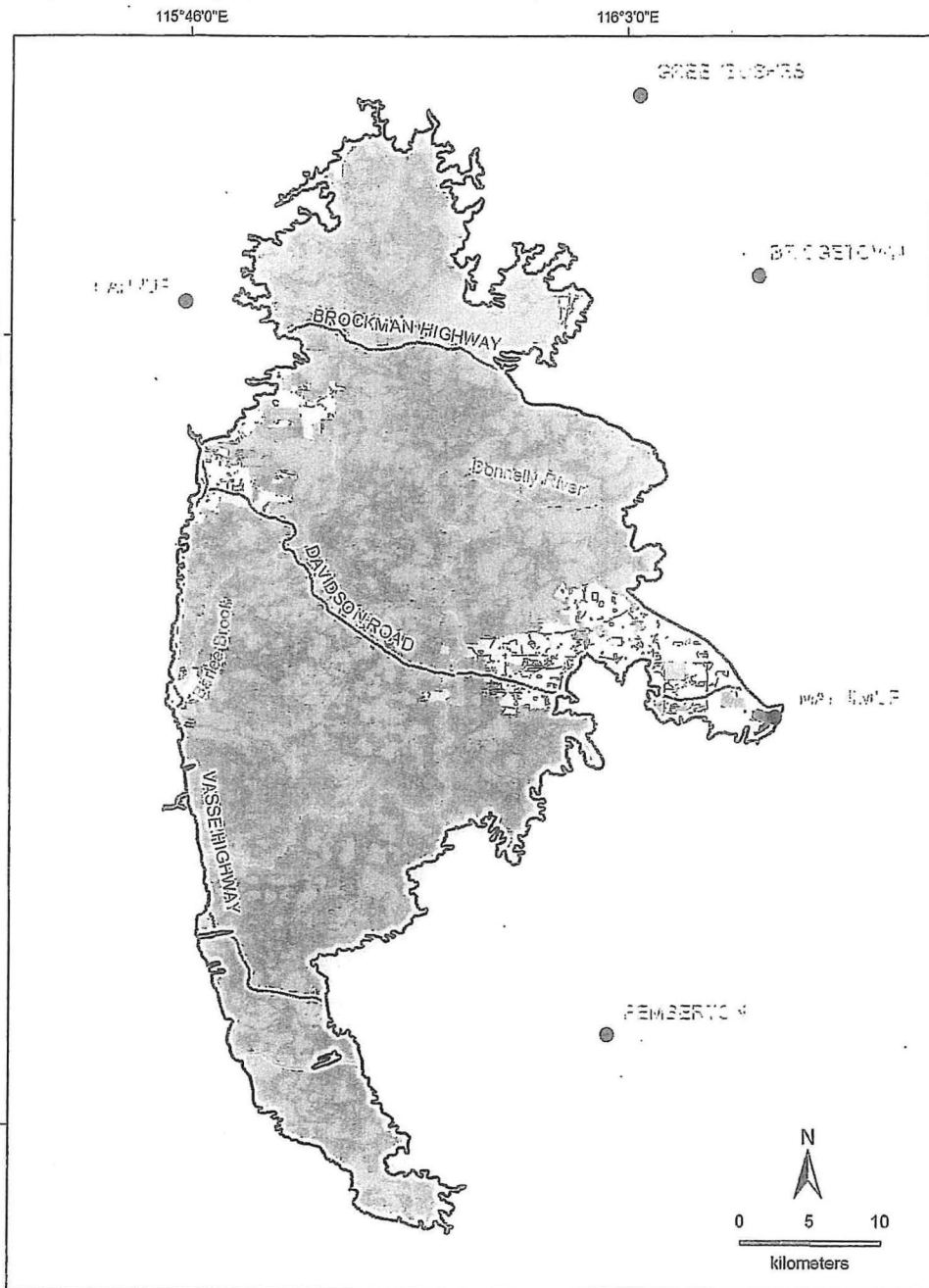
Last update:	11/07/2011
Lineage:	Based on Landgate's Cadastral Database
Accuracy:	As per the Cadastral Database (various)

Aboriginal Site Type	Area (ha)	% of Northern Karri LMU	Total Area (ha)	% of All Sites
Artefacts / Scatter	118.21	0.0937%	38575.74	0.31%
Mythological	860.19	0.6821%	79833.54	1.08%
Total	978.40	0.78%	118409.27	

% of Aboriginal Sites Types within the Northern Karri LMU



Northern Karri Land Management Unit
 Project Dieback *Phytophthora cinnamomi* Strategic Atlas



- Northern Karri LMU
- NRM Dieback categories**
- Category 1 to 3: Infested
- Category 4: Unmappable
- Category 5: Uninterpretable
- Category 6 to 8: Uninfested
- Category 9: Not interpreted

Project: Conservation Value LMUs
 Scale: 1 : 500 000
 Date: 23 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_023_1

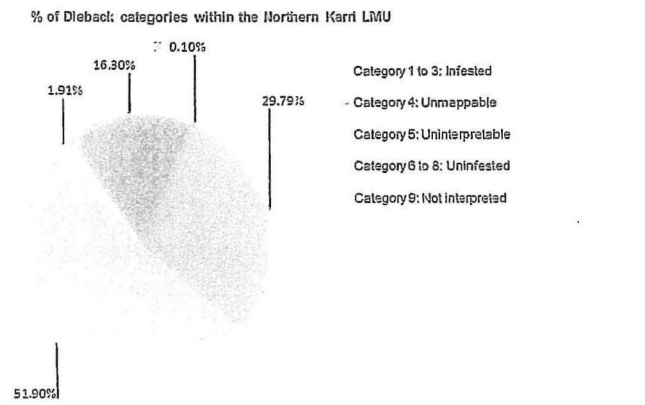
All Results	Area (Ha)
Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

All Results	Percentage (%)
Northern Karri LMU within all LMUs	2.98%

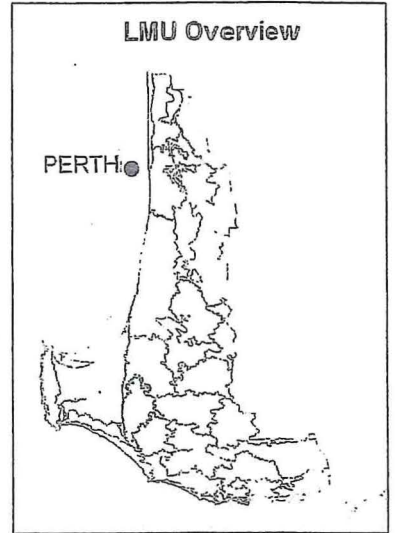
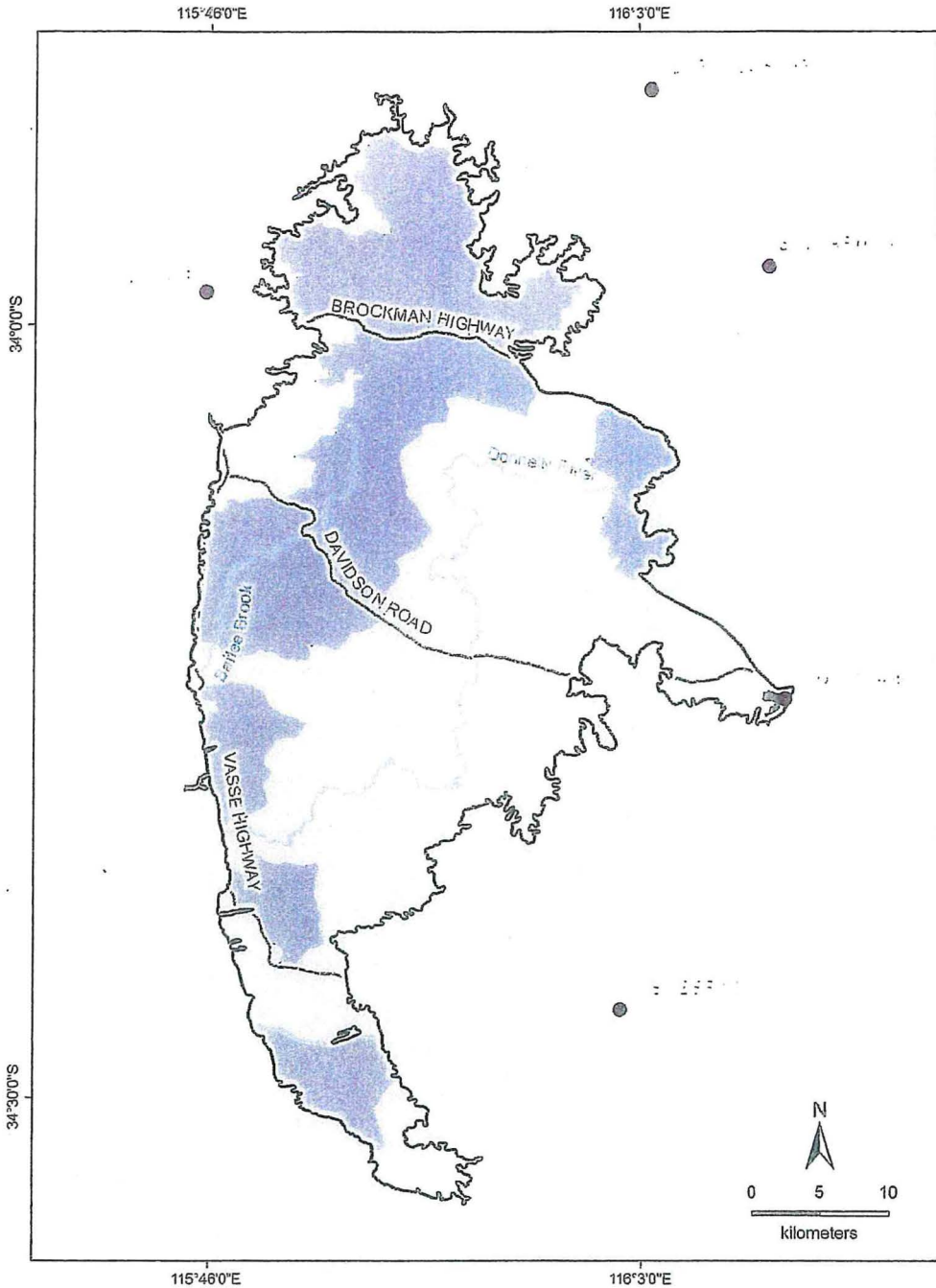
Metadata: Data Sources	Percentage (%)
Custodian: South Coast NRM	
Dataset details: Specific data license from SCNRM.	
Last update: 30/06/2008	
Lineage: Aerial photo / ground truthing / lab testing	
Accuracy: +/- 20 meters	

Dieback Strategic Atlas Categories	Area (Ha)	% of Northern Karri LMU Area (Ha)	All LMUs Area (Ha)	% of all LMUs Area
Category 1 to 3: Infested	18823.43	14.93%	575435.91	3.27%
Category 4: Unmappable	115.11	0.09%	43444.85	0.26%
Category 5: Uninterpretable	34386.69	27.27%	337928.10	10.18%
Category 6 to 8: Uninfested	59920.50	47.52%	1803045.30	3.32%
Category 9: Not interpreted	2202.45	1.75%	310776.52	0.71%
Total	115448.38	91.55%	3070630.68	

Inconsistent totals come from data overlaps or topology issues
 Category 1 to 3: Infested: High to low confidence of dieback present.
 Category 4: Unmappable: Areas of permanent or temporary disturbance the remove, destroy or mask indicator species needed for interpretation. (i.e. Permanent: Mining, Temporary: Fire)
 Category 5: Uninterpretable: No visible indicator species, or too few indicator species to interpret.
 Category 6 to 8: Uninfested: High to low confidence of dieback not present.
 Category 9: Not interpreted: <50 Ha areas (due to size) or >50 Ha areas recently cleared, or unable to review or lack of available photos.

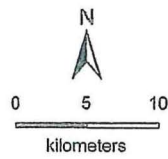


Northern Karri Land Management Unit
Forest Disease Risk Areas (DRA)



Northern Karri LMU
DRA categories
 Disease Risk Area

Project: Conservation Value LMUs
 Scale: 1:500,000
 Date: 23 Feb 2012
 Author: MM Gaia Resources
 Projection: GDA94
 Reference: GR243_024_1



LMU details	Area (Ha)
Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

LMU details	Percentage (%)
Northern Karri LMU within all LMUs	2.98%

Primary Data Source:
 Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate

Forest Disease Risk Areas (DRA)	Area (Ha)
Total area of DRA data covering all LMUs	712746.08
Total area of DRA data covering Northern Karri LMU	50539.62

Forest Disease Risk Areas (DRA)	Percentage (%)
Total area of DRA data covering all LMUs	16.84%
Total area of DRA data covering Northern Karri LMU	40.08%

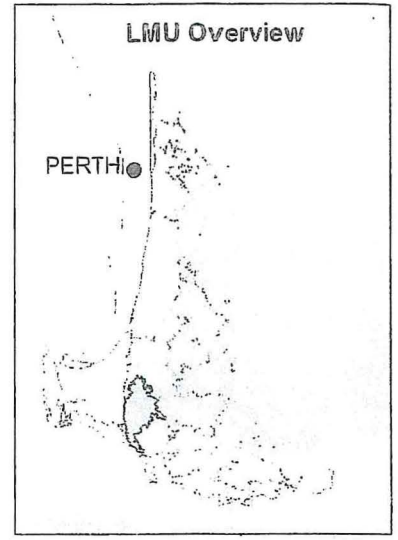
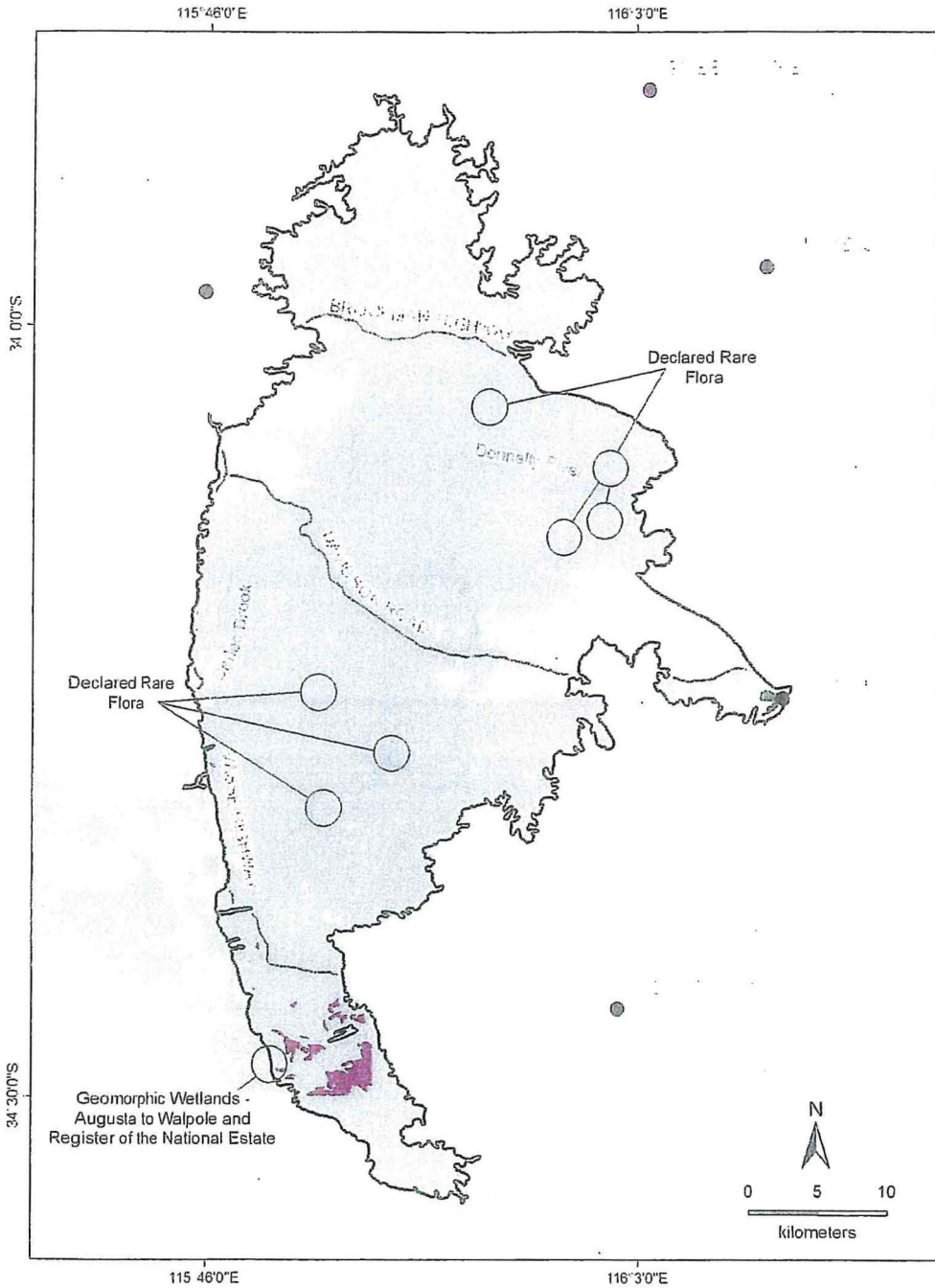
Last update: Not known
 Lineage: No data Captured at 1:50 000 scale
 Accuracy: 85% +/- 12.5m or no worse than 50m

Forest Disease Risk Areas Categories	Northern Karri LMU Area (Ha)	% of Northern Karri LMU Area (Ha)	All LMU Area (Ha)	% of all LMU Area
Disease Risk Area	50539.62	40.08%	712746.08	7.09%
Total	50539.62	40.08%	712746.08	

No special conservation zones are located within this LMU.

Disease Risk Area: Administrative boundaries which delineate areas of forest / vegetation subject to the risk of infection from 'dieback' - a highly contagious fungal disease. Strict quarantine and access restrictions apply to these areas.

Northern Karri Land Management Unit
Environmentally Sensitive Areas (ESA)



- Northern Karri LMU
- ESA categories**
- Declared Rare Flora
- Geomorphic Wetlands
Augusta to Walpole
- Register of the National Estate
- Geomorphic Wetlands -
Augusta to Walpole and
Register of the National Estate
- Other ESA categories

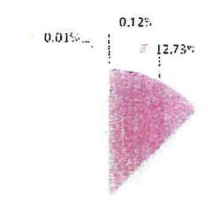
Project: Conservation Value LMUs
Scale: 1 : 500 000
Date: 23 Feb 2012
Author: MM: Gaia Resources
Projection: GDA94
Reference: GR243_025_1

Total area of all LMUs	4232580.43	Northern Karri LMU within all LMUs	2.98%
Total area of Northern Karri LMU only	126103.23		
Total area of ESA data covering all LMUs	480396.34	Total area of ESA data covering all LMUs	11.35%
Total area of ESA data covering Northern Karri LMU	8515.04	Total area of ESA data covering Northern Karri LMU	6.75%

Custodian: Department of Environment and Conservation
Dataset details: CCWA GIS Corporate
Last update: 7/08/2009
Lineage: Combination of various datasets
Accuracy: Ranges from - 1m to 100m (various)

ESA Category	Area (km ²)	% of Northern Karri LMU	Area (km ²)	% of Total ESA
Declared Rare Flora	10.55	0.0084%	347.07	3.04%
Geomorphic Wetland Mapping - Augusta to Walpole	1083.80	0.86%	84832.41	1.26%
Register of National Estate	7420.25	5.8843%	261474.97	2.84%
Register of National Estate and Geomorphic Wetland Mapping - Augusta to Walpole	0.44	0.00%	49315.41	0.00%
Total	8515.04	6.75%	395969.85	

% of ESA within the Northern Karri LMU



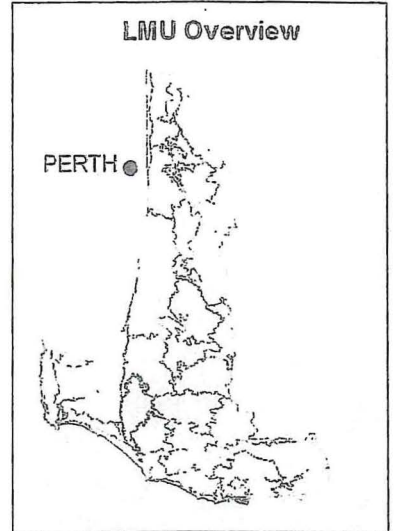
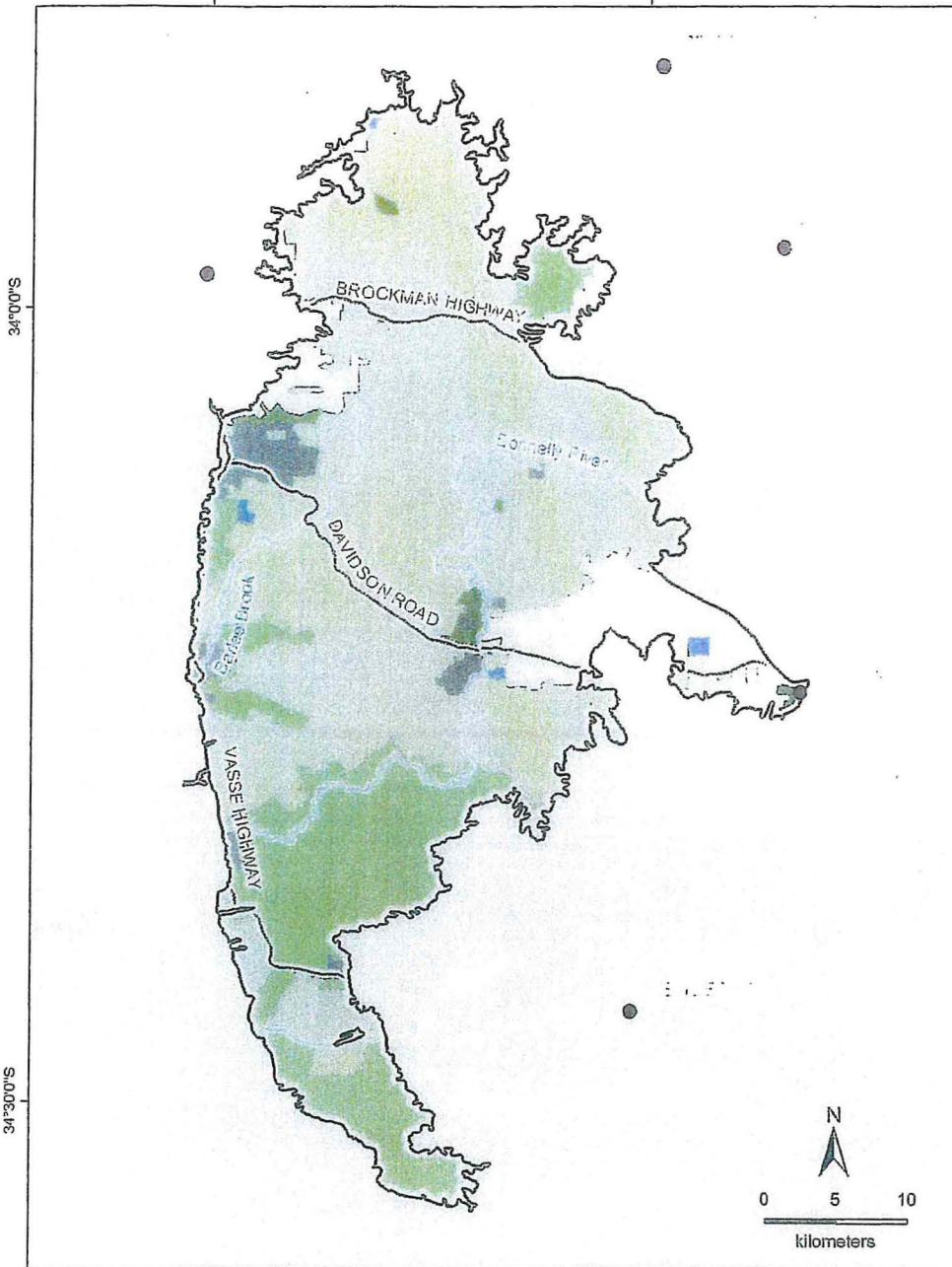
- Declared Rare Flora
- Geomorphic Wetland Mapping - Augusta to Walpole
- Register of National Estate
- Register of National Estate and Geomorphic Wetland Mapping - Augusta to Walpole

Environmentally Sensitive Areas as declared in Environmental Protection (Environmentally Sensitive Areas) Notice 2005, Government Gazette No. 55.
Declared Rare Flora (DRF): File manipulation: 100m buffer, 50m radius created, buffer boundaries dissolved. Custodian: DEC
Geomorphic Wetland Mapping - Augusta to Walpole: File manipulation: 100m (50m radius) buffer created, buffer boundaries dissolved. Custodian: DEC
Register of National Estate: File manipulation: only sites with class field "natural" attribute and status field "Registered" attribute were selected for ESA. Custodian: Environment Australia, Australian and World Heritage Division

Northern Karri Land Management Unit Forest Management Plan (FMP) Areas

115°46'0"E

116°3'0"E



- Northern Karri LMU
- FMP categories**
- Conservation park
- National park
- Nature reserve
- Section 62
- State Forest/Timber Res
- Misc Res/Exec Dir
- Hole
- Other FMP categories

Project: Conservation Value LMUs
 Scale: 1 : 500 000
 Date: 23 Feb 2012
 Author: MM, Gaia Resources
 Projection: GDA94
 Reference: GR243_027_1

115°46'0"E

116°3'0"E

All LMUs	Area (Ha)
Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

LMU Name	% of LMUs
Northern Karri LMU within all LMUs	2.98%

Department of Environment and Conservation

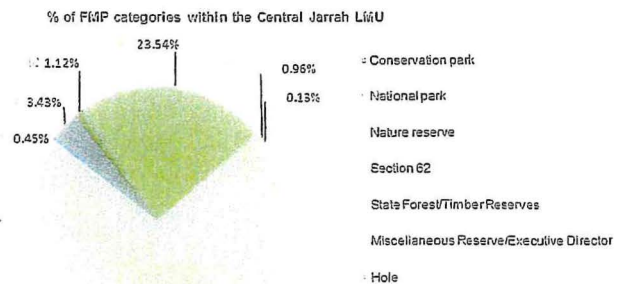
Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate

Forest Management Plan (FMP) Areas	Area (Ha)
Total area of FMP data covering all LMUs	2435678.56
Total area of FMP data covering Northern Karri LMU	112390.47

Forest Management Plan (FMP) Areas	% of LMUs
Total area of FMP data covering all LMUs	57.55%
Total area of FMP data covering Northern Karri LMU	89.13%

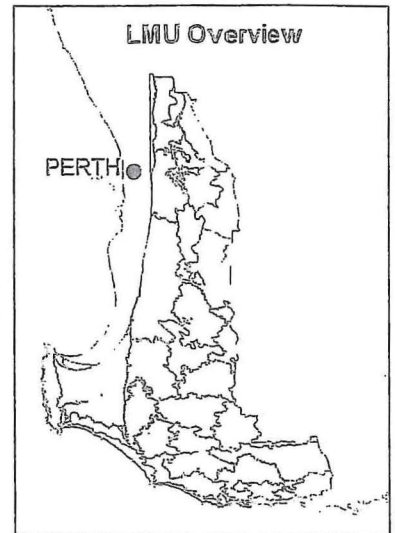
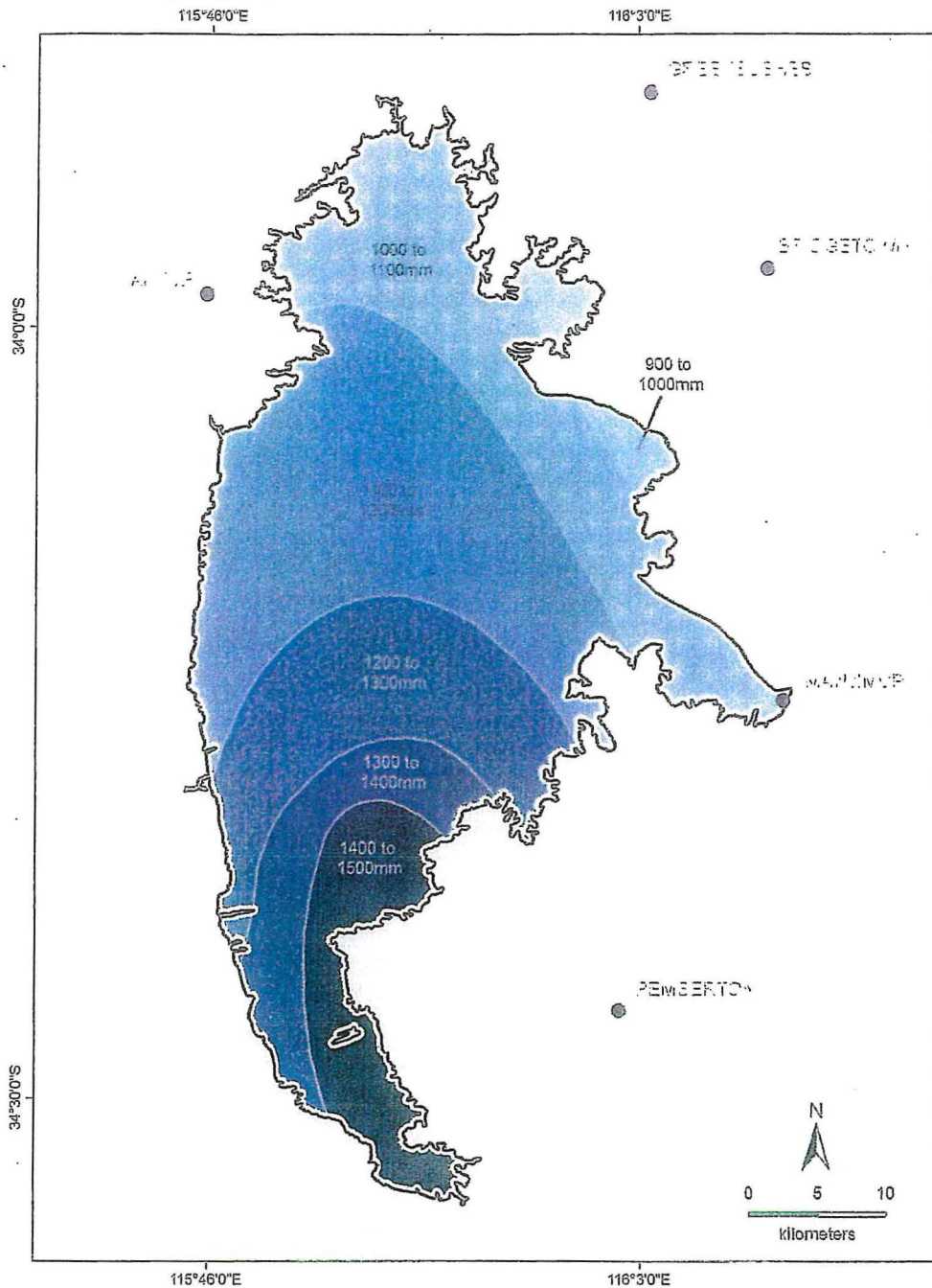
Last update: 1/12/2004
 Lineage: No details given
 Accuracy: As per CALM FMIS

Forest Management Plan Category	Northern Karri LMU Area (Ha)	% of Northern Karri Area LMU	All LMUs Area (Ha)	% of total LMU Area
Conservation park	1259.71	1.00%	108911.45	1.16%
National park	26458.33	20.98%	949006.83	2.79%
Nature reserve	1075.96	0.85%	43063.08	2.50%
Section 62	143.05	0.11%	39070.01	0.37%
State Forest/Timber Reserves	79094.40	62.72%	1151522.09	6.87%
Miscellaneous Reserve/Executive Director	503.53	0.40%	5771.05	8.73%
Hole	3855.47	3.06%	124527.60	3.10%
Total	112390.47	89.13%	2421872.11	



70.27%

Northern Karri Land Management Unit Rainfall Isohyets (mm)



- Northern Karri LMU
- Salinity Risk Area**
- 900 to 1100mm
- Rainfall (mm)**
- 700 to 800mm
- 800 to 900mm
- 900 to 1000mm
- 1000 to 1100mm
- 1100 to 1200mm
- 1200 to 1300mm
- 1300 to 1400mm
- 1400 to 1500mm

Project: Conservation Value LMUs
 Scale: 1 : 500 000
 Date: 23 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_028_1

Area (hectares)	Area (ha)
Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

Percentage (%)	
Northern Karri LMU within all LMUs	2.98%

Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate

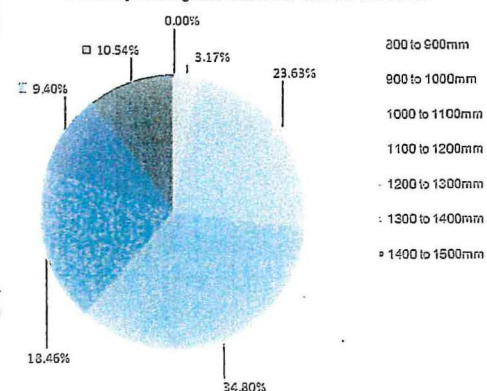
Area (hectares)	Area (ha)
Total area of isohyets data covering all LMUs	4231573.88
Total area of isohyets data covering Northern Karri	126103.23

Percentage (%)	
Total area of isohyets data covering all LMUs	99.98%
Total area of isohyets data covering Northern Karri LMU	100.00%

Last update: 1994
 Lineage: Captured at 1:250K to 1:1M scale
 Accuracy: No details given

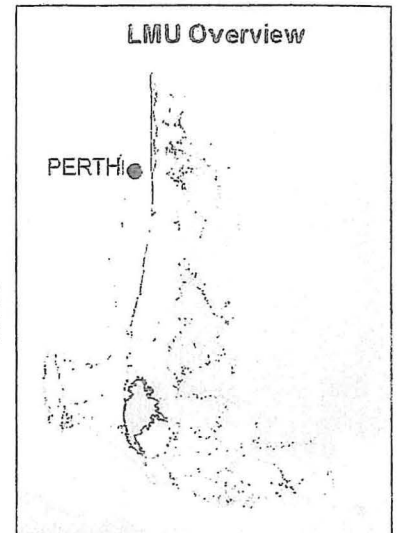
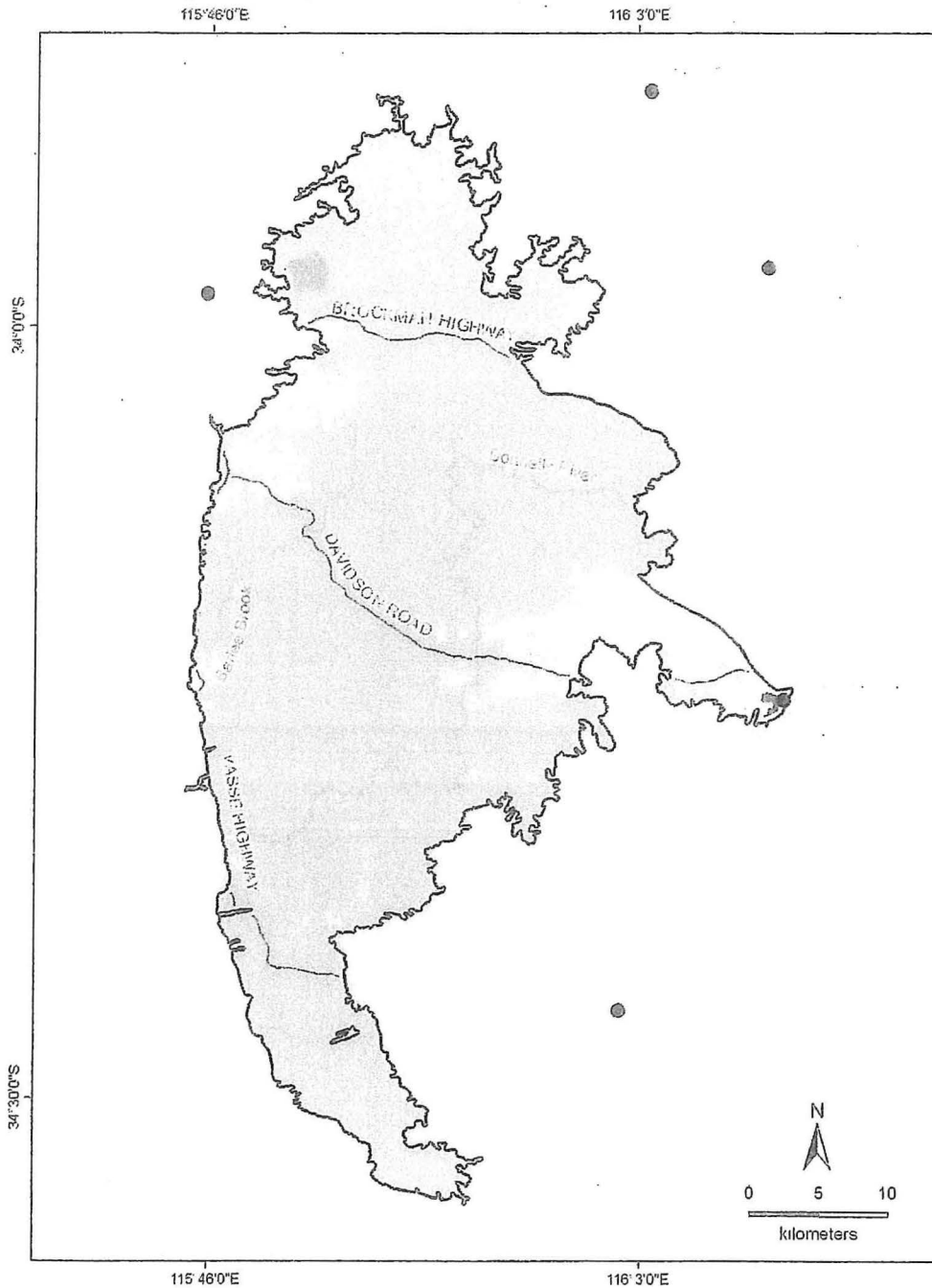
Rainfall Isohyets Categories	Number of Polygons	% Northern Karri LMU Area	Total Area (ha)	% Total LMU Area
800 to 900mm	2.11	0.0017%	464350.61	0.00%
900 to 1000mm	3992.30	3.17%	557655.52	0.72%
1000 to 1100mm	29799.30	23.63%	505195.54	5.90%
1100 to 1200mm	43884.40	34.80%	412532.17	10.64%
1200 to 1300mm	23262.42	18.46%	295597.57	7.88%
1300 to 1400mm	11848.69	9.40%	192067.54	6.17%
1400 to 1500mm	13294.02	10.54%	139124.11	9.56%
Total	126103.23	100%	2566336.06	

% of Isohyets categories within the Northern Karri LMU



The isohyets in the north of the state from 400mm and above have been improved using data defined at a scale of 1:1 000 000 (see file ISOHY_NW.Z51) Water Authority (1985). The isohyets in the south of the state from 400mm through to the coast have been improved using data defined at a scale of 1:250 000 (see file ISOHY_SW.Z51) Water Authority (Public Works Department) (1981, 1984) Elsewhere based on Bureau of Meteorology (1979), digitised from Australia Rainfall and Runoff, vol2 (1987).

Northern Karri Land Management Unit Public Drinking Water Projection Zones (PDWPFZ)



- Northern Karri LMU
- PDWPFZ categories**
- Reservoir Protection Zone under the MWSSD Act
- Other PDWPFZ categories

Project: Conservation Value LMUs
 Scale: 1 : 500 000
 Date: 23 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_029_1

Category	Area (ha)	Percentage (%)
All LMUs		
Total area of all LMUs	4232580.43	
Total area of Northern Karri LMU only	126103.23	2.98%
Public Drinking Water Projection Zones (PDWPFZ)		
Total area of PDWPFZ within all LMUs	59383.41	1.00%
Total area of PDWPFZ within Northern Karri LMU	591.52	0.47%

Project Data Summary

Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate

Last update: 1/10/2009
 Lineage: Defined in WA Government Gazette
 Accuracy: Good but variable

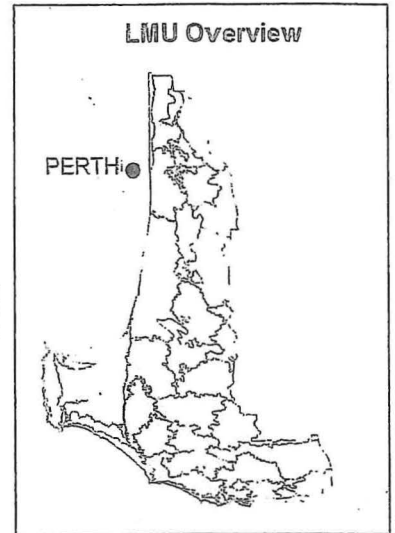
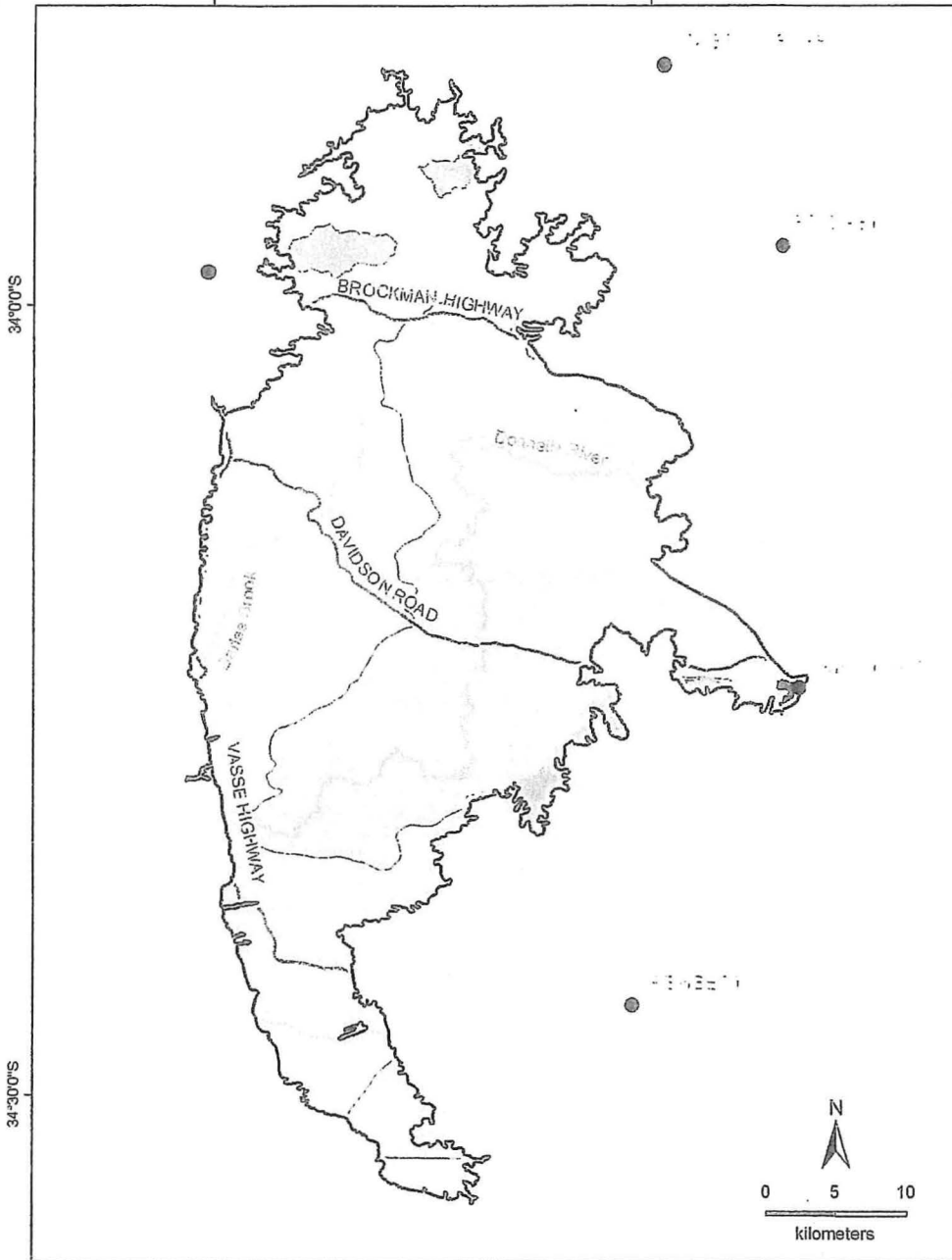
Reservoir Protection Zone under the MWSSD Act	Area (ha)	Percentage (%)	All LMUs Area (ha)	% total LMUs Area
Reservoir Protection Zone under the MWSSD Act	591.52	0.47%	36624.22	1.62%
Total	591.52	0.47%	36624.22	

As part of Public Drinking Water Source Areas and in addition to priority classification areas, Wellhead Protection Zones (WHPZ) and Reservoir Protection Zones (RPZ) are defined to protect the drinking water source from contamination in the immediate vicinity of production wells and reservoirs. Statutes under the Country Areas Water Supply Act, 1947 (CAWS Act), the Metropolitan Drinking Water Supply, Sewerage and Drainage Act, 1909 (MWSSD Act) and the Town Planning Development Act (1928) provide for defined land uses and activities within these zones that are prohibited, restricted or subject to agency conditions so that contamination of the water source is prevented. Special conditions, such as restrictions on storage and use of chemicals, may be applied within these zones. WHPZ are usually circular, with a radius of 500 metres in P1 areas and 300 metres in P2 and P3 areas. WHPZ do not extend outside PDWSA boundaries.

Northern Karri Land Management Unit Public Drinking Water Source Areas (PDWSA)

115°46'0"E

116°3'0"E



- Northern Karri LMU
- PDWSA categories**
- Catchment Area Priority Not Assigned under the CAWS Act
- Catchment Area Priority One under the CAWS Act
- Water Reserve Priority Not Assigned under the CAWS Act
- Other PDWSA categories

Project: Conservation Value LMUs
 Scale: 1 500 000
 Date: 23 Feb 2012
 Author: MM Gaia Resources
 Projection: GDA94
 Reference: GR243_030_1

115°46'0"E

116°3'0"E

Area (ha)	Area (ha)
Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

LMU name	Percentage (%)
Northern Karri LMU within all LMUs	2.98%

Public Drinking Water Source Areas (PDWSA)
 Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate

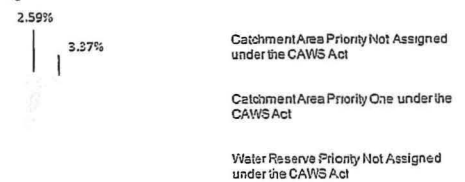
Area (ha)	Area (ha)
Total area of PDWSA within all LMUs	1654153.66
Total area of PDWSA within Northern Karri LMU	63151.25

Public Drinking Water Source Areas (PDWSA)	Percentage (%)
Total area of PDWSA covering all LMUs	3.82%
Total area of PDWSA covering Northern Karri LMU	50.08%

Last update: 17/09/2011
 Lineage: Defined in WA Government Gazette
 Accuracy: Good but variable

Public Drinking Water Source Areas Categories	Number of Northern Karri LMU Areas (ha)	Percentage of Northern Karri LMU Areas (%)	All LMUs Area (ha)	% total LMU Area
Catchment Area Priority Not Assigned under the CAWS Act	1679.58	1.33%	450125.00	0.37%
Catchment Area Priority One under the CAWS Act	2185.48	1.73%	238922.13	0.91%
Water Reserve Priority Not Assigned under the CAWS Act	60944.99	48.33%	695886.57	8.76%
Total	64810.05	51.39%	1384933.71	

% of PDWSA categories within the Northern Karri LMU

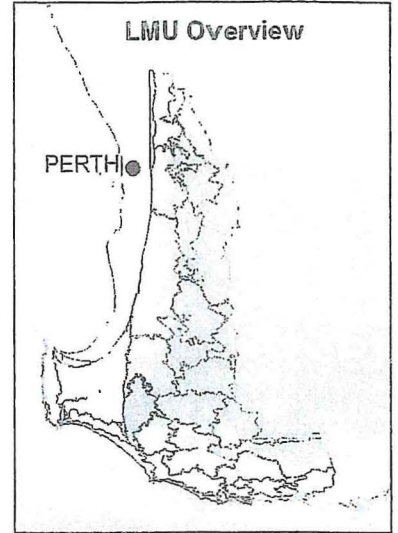
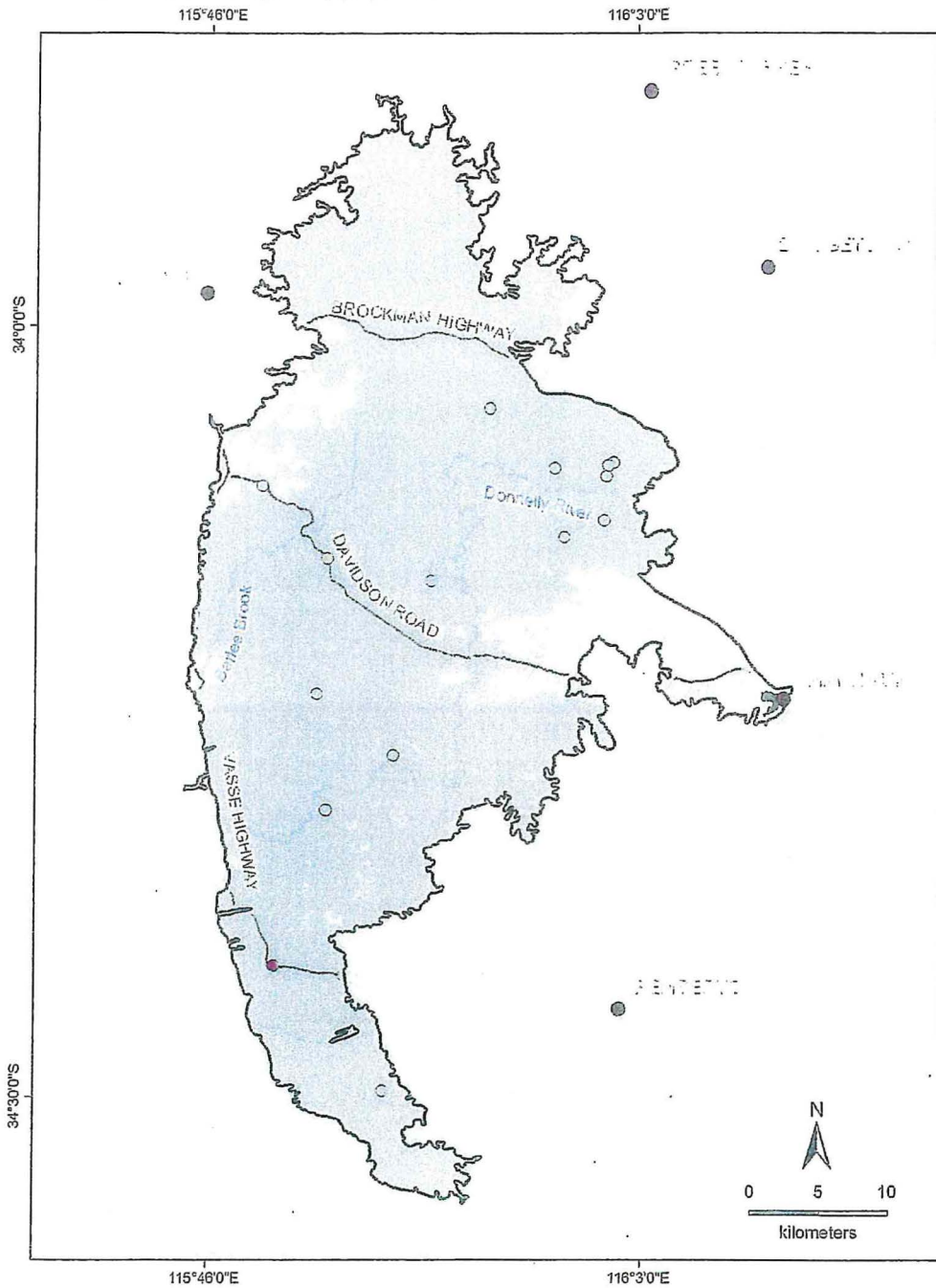


Inconsistent total values from data changes to topology issues

The Public Drinking Water Source Area (PDWSA) dataset is currently used by the Department of Environment and Conservation and the Department of Water in policy decision making and for providing advice for land uses and activities within drinking water catchments. These areas require protection to maintain the quality of raw water used to supply public drinking water schemes. The quality of declared water sources in Western Australia is protected by declaring PDWSA under the Country Areas Water Supply Act, 1947 (CAWS Act) and the Metropolitan Water Supply Sewerage and Drainage Act, 1909 (MWSSD Act). By-laws under both the CAWS Act and the MWSSD Act enable the Department of Environment to control potentially polluting activities, to regulate land use, inspect premises and take necessary steps to prevent or ameliorate pollution.

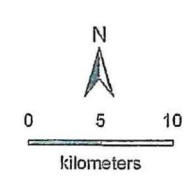
94.04%

Northern Karri Land Management Unit Declared Rare Flora (DEFL) populations



- Northern Karri LMU
- DEFL categories**
- Priority One
- Priority Two
- Priority Three
- Priority Four
- Vulnerable
- Other DEFL categories

Project: Conservation Value LMUs
 Scale: 1: 500 000
 Date: 23 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_031_1

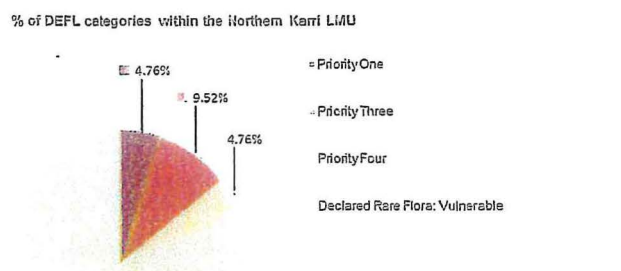


Category	Value	Category	Percentage	Category	Value
Total area of all LMUs	4232580.43	Northern Karri LMU within all LMUs	2.98%	Custodian:	Department of Environment and Conservation
Total area of Northern Karri LMU only	126103.23			Dataset details:	CCWA GIS Corporate
Total area of points within all LMUs	3326	Total number of points in Northern Karri compared to all LML	0.63%	Last update:	No details given
Total area of points within Northern Karri LMU	21			Lineage:	Field reports, Herbarium data and surveys
				Accuracy:	Reasonably accurate Scale 1: 50'000

DEFL Category	No. taxa	% of taxa	No. of points	% of points
Priority One	1	4.76%	134	0.75%
Priority Three	2	9.52%	1055	0.19%
Priority Four	1	4.76%	929	0.11%
Declared Rare Flora: Vulnerable	17	80.95%	504	3.37%
Total	21	100%	2622	

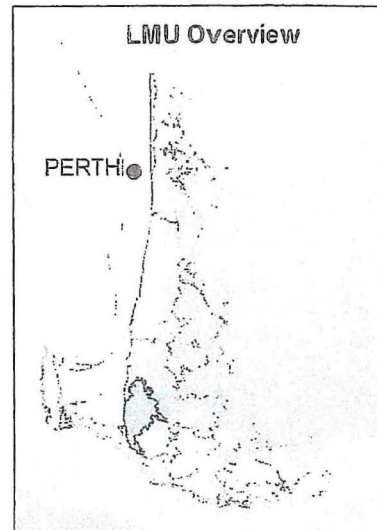
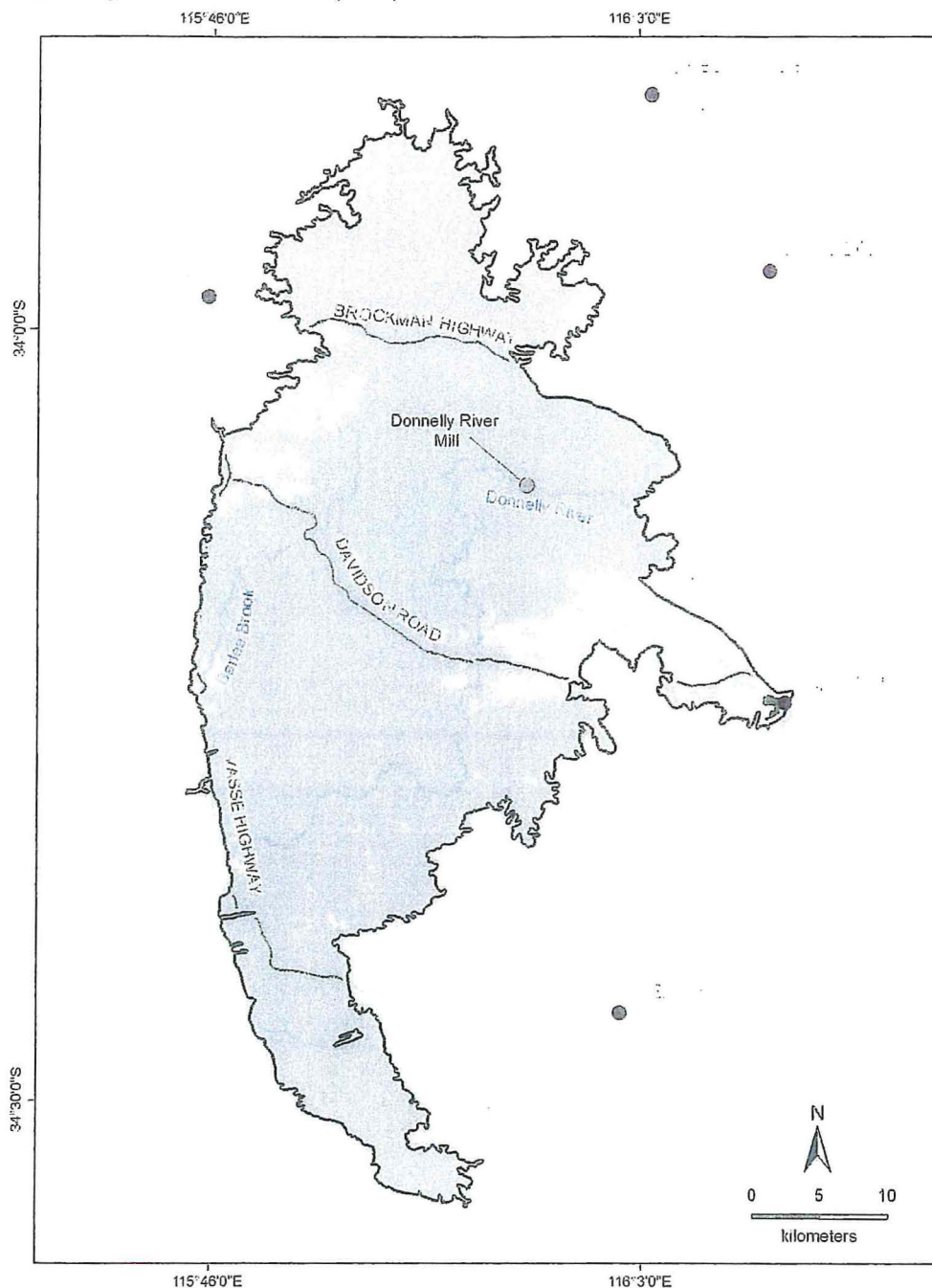
Some categories are not found in the Northern Karri LMU (i.e. Extinct)

Priority One: Taxa which are known from one or a few (generally <5) populations which are under threat.
Priority Three: Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered).
Priority Four: Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors
Declared Rare Flora: Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.



80.95%

Northern Karri Land Management Unit Heritage Commission Sites (HCS)



- Northern Karri LMU
- Heritage Commission site name
- Donnelly River Mill
- Other HCS sites

Project: Conservation Value LMUs
 Scale: 1 : 500 000
 Date: 23 Feb 2012
 Author: MM, Gaia Resources
 Projection: GDA94
 Reference: GR243_032_1

Statistics	Area (ha)
Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

Statistics	Percentage (%)
Northern Karri LMU within all LMUs	2.98%

Statistics	No. of points
Total area of points within all LMUs	40
Total area of points within Northern Karri LMU	1

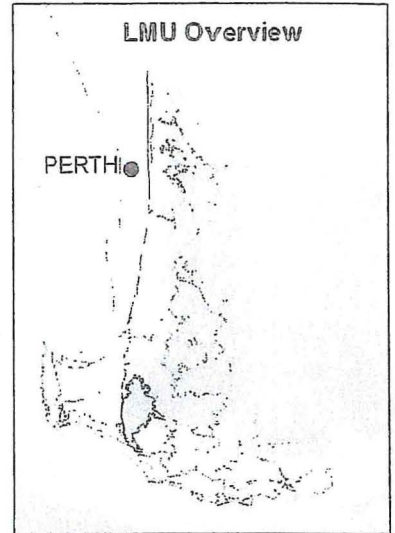
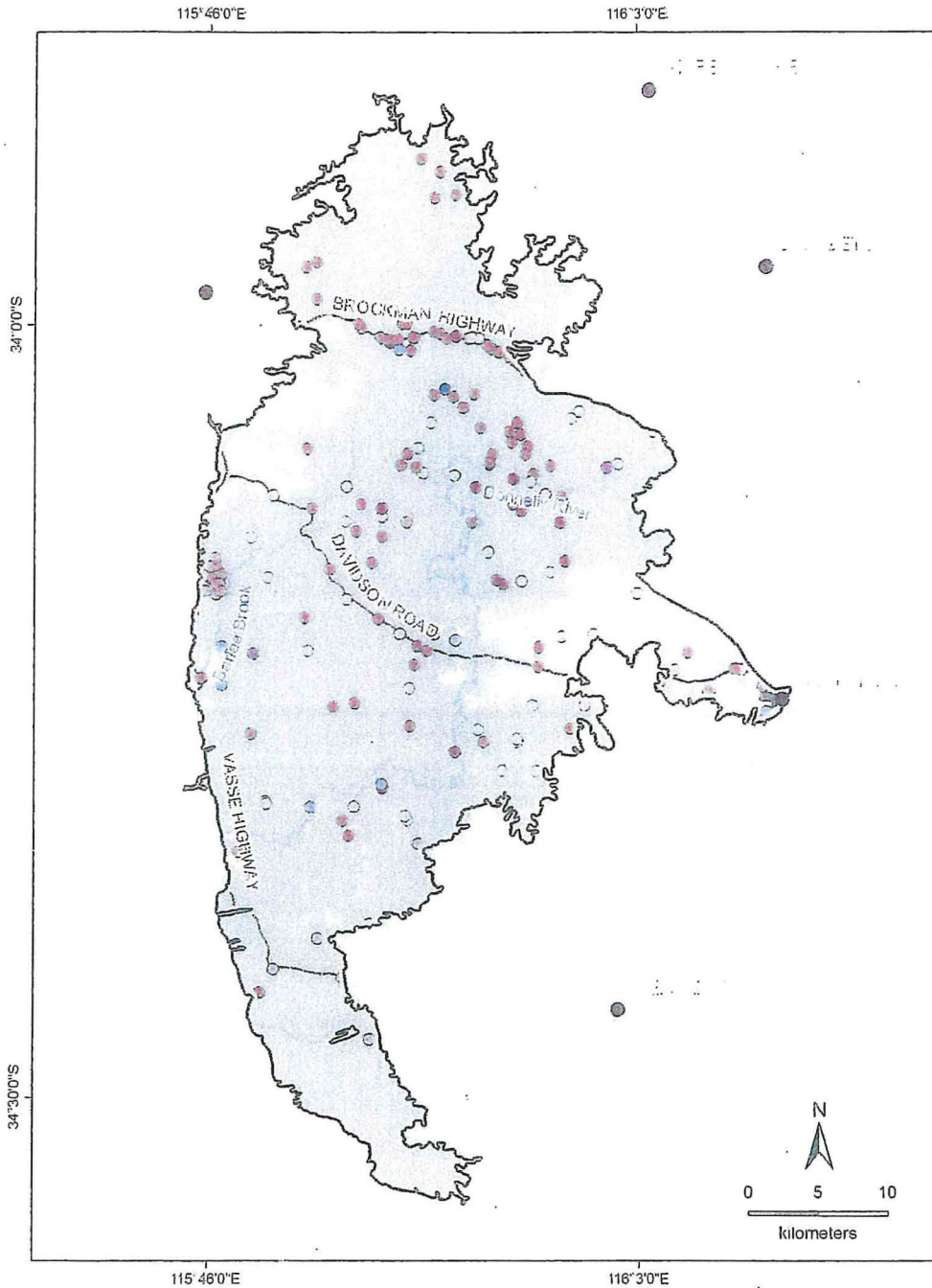
Statistics	Percentage (%)
Total number of points in Northern Karri compared to all LML	2.50%

Heritage Commission Site	Number of points	Percentage of total points	All LMUs	All LMUs
Donnelly River Mill	1	100.00%	1	100.00%
Total	1	100%	1	

Project details:
 Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate
 Last update: 1/10/2003
 Lineage: No details given
 Accuracy: +/- 100m

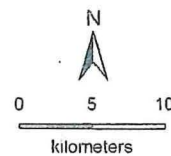
Heritage Commission Sites: The Register of Heritage Places focuses on places, buildings and sites and is a list of places considered worth conserving

Northern Karri Land Management Unit Threatened Fauna sites



- Northern Karri LMU
- Threatened fauna categories**
- Birds - Priority 4
- Birds - Endangered
- Birds - Vulnerable
- Fish - Priority 1
- Insects - Priority 2
- Mammals - Priority 4
- Mammals - Priority 5
- Mammals - Endangered
- Mammals - Vulnerable
- Other threatened fauna categories

Project: Conservation Value LMUs
 Scale: 1 : 500 000
 Date: 23 Feb 2012
 Author: MM, Gaia Resources
 Projection: GDA94
 Reference: GR243_033_1

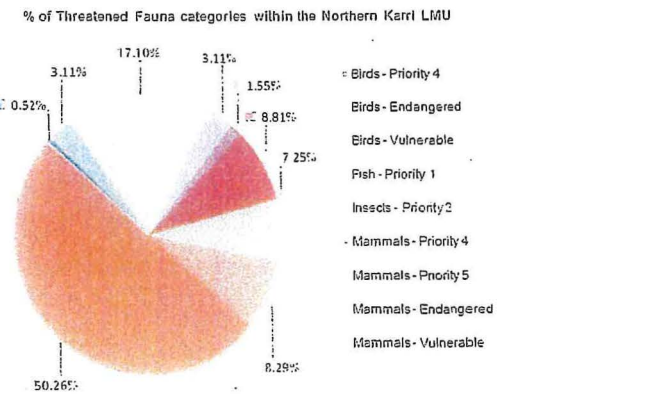


Area	Area (ha)
Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

Area	Percentage
Northern Karri LMU within all LMUs	2.98%
Total number of points in Northern Karri compared to all LML	3.42%

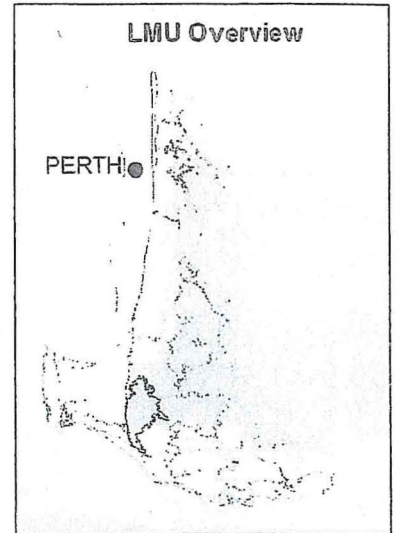
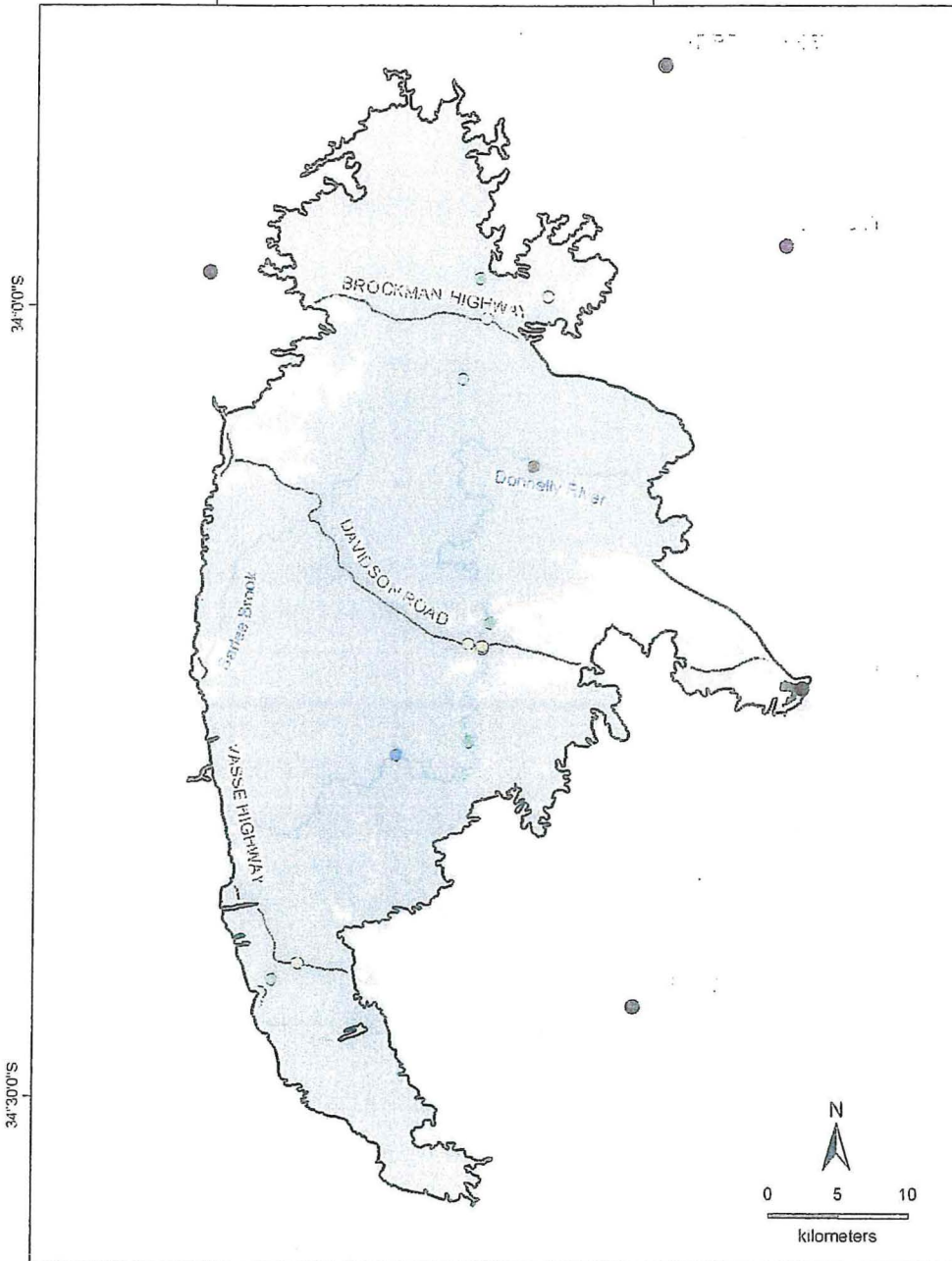
Custodian:	Department of Environment and Conservation
Dataset details:	CCWA GIS Corporate
Last update:	16/11/2011
Lineage:	Data captured from various sources
Accuracy:	Variable but generally within 1km

Threatened Fauna Category	Count	% of all Threatened Fauna	Total Points	% of all LML Points
Birds - Priority 4	1	0.52%	103	0.97%
Birds - Endangered	6	3.11%	1015	0.59%
Birds - Vulnerable	33	17.10%	562	5.67%
Fish - Priority 1	6	3.11%	38	15.79%
Insects - Priority 2	3	1.55%	34	8.82%
Mammals - Priority 4	17	8.81%	477	3.55%
Mammals - Priority 5	14	7.25%	514	2.72%
Mammals - Endangered	16	8.29%	167	9.56%
Mammals - Vulnerable	97	50.26%	1788	5.43%
Total	193	100%	4698	



Northern Karri Land Management Unit Recreation and Tourism Information System (RATIS) Sites

115°46'0"E 116°3'0"E



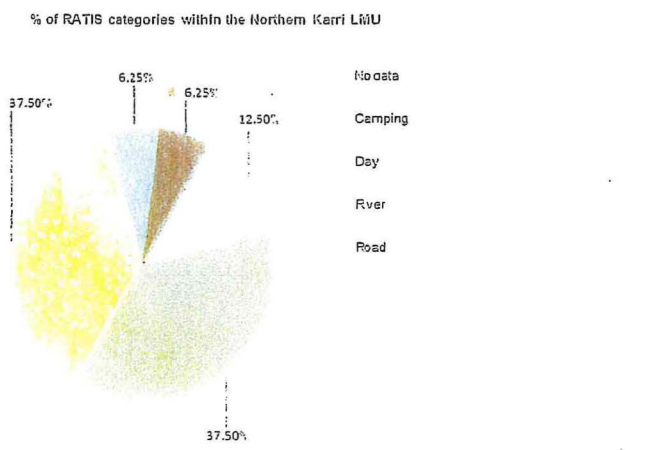
- Legend**
- Northern Karri LMU
 - RATIS site categories**
 - No data
 - Camping
 - Day
 - River
 - Road
 - Other RATIS categories

Project: Conservation Value LMUs
 Scale: 1 500 000
 Date: 23 Feb 2012
 Author: MM, Gaia Resources
 Projection: GDA94
 Reference: GR243_034_1

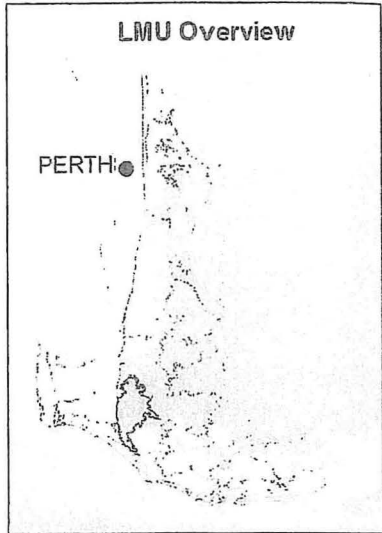
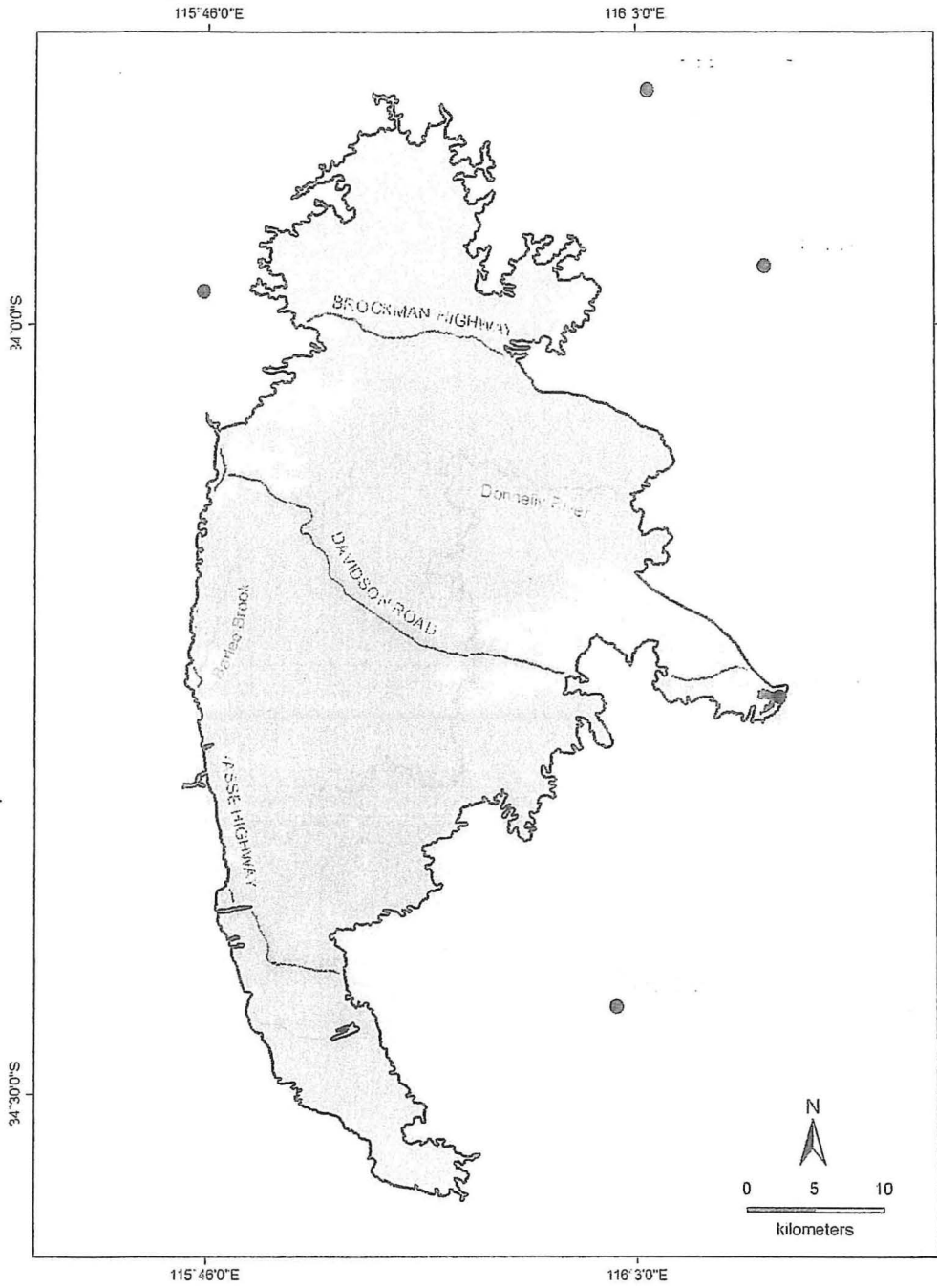
115°46'0"E 116°3'0"E

Summary Statistics	Value	Percentage (%)
Total area of all LMUs	4232580.43	
Total area of Northern Karri LMU only	126103.23	
Northern Karri LMU within all LMUs		2.98%
Total area of points within all LMUs	370	
Total area of points within Northern Karri LMU	16	
Total number of points in Northern Karri compared to all LML		4.32%

RATIS Categories	Count	% within Northern Karri LMU	% within all LMUs
No data: Camping, Picnicking	2	12.50%	66
Camping: BBQ, Bird, Bush, Canoeing, Fishing, 4WD, Marroning, Scenic, Wildlife	6	37.50%	78
Day: BBQ, Bicycle, Bird, Bush Canoeing Caravan, Fishing, 4WD, Marroning, Picnicking, Scenic, Swimming, Rallying, Wildlife	6	37.50%	157
River: BBQ, Bicycle, Bird, Bush, Camping, Canoeing, Fishing, 4WD Marroning, Picnicking, Scenic, Wildlife	1	6.25%	3
Road: Bird, Bush, 4WD, Picnicking, Scenic, Wildlife	1	6.25%	8
Total	16	100%	312

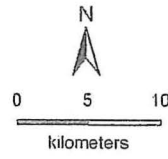


Northern Karri Land Management Unit Remnant Vegetation



Northern Karri LMU
 Remnant vegetation

Project: Conservation Value LMUs
 Scale: 1 500 000
 Date: 23 Feb 2012
 Author: MM, Gaia Resources
 Projection: GDA94
 Reference: GR243_035_1



Area (km ²)	Area (Ha)
Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

Area (km ²)	Percentage (%)
Northern Karri LMU within all LMUs	2.98%

Custodian: Department of Environment and Conservation
 Dataset details: CCWA GIS Corporate

Area (km ²)	Area (Ha)
Total area of data covering all LMUs	2797461.68
Total area of data covering Northern Karri LMU	110242.56

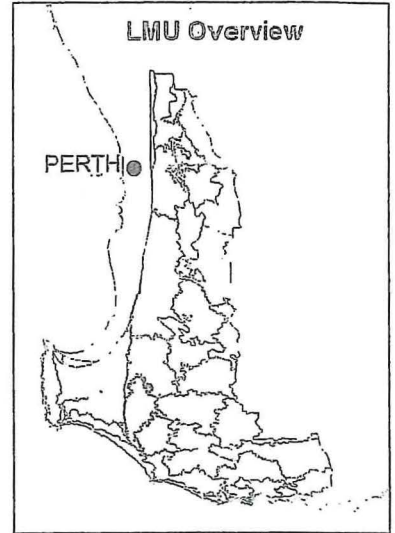
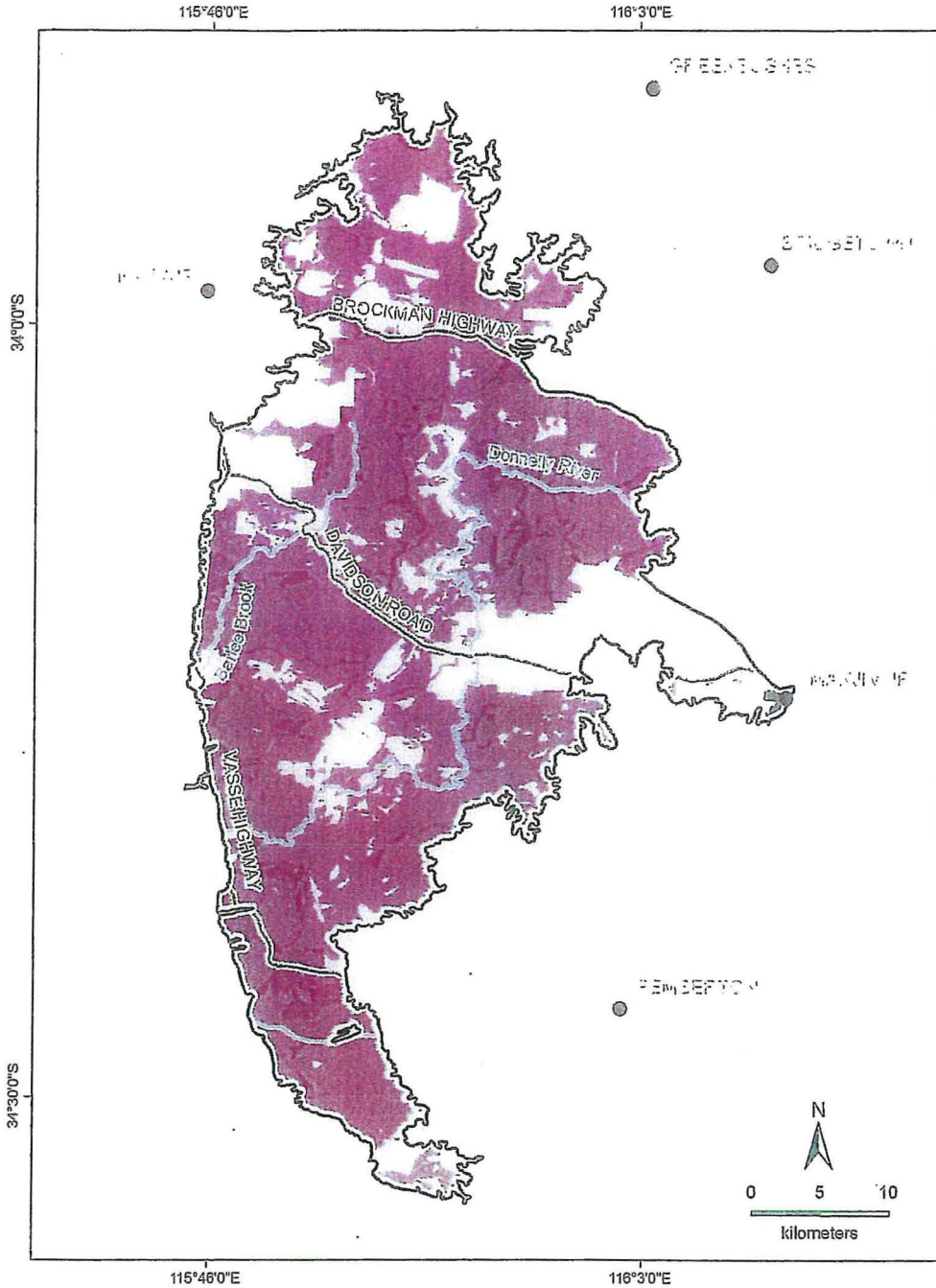
Area (km ²)	Percentage (%)
Total area of data covering all LMUs	66.09%
Total area of data covering Northern Karri LMU	87.42%

Last update: 1/05/2011
 Lineage: Various Scale at 1 20 000 to 1 100 000
 Accuracy: + or - 20m and + or - 100m

Remnant Vegetation	Northern Karri LMU		All LMUs	
	Area (km ²)	Percentage (%)	Area (km ²)	Percentage (%)
Remnant Vegetation	110242.56	87.42%	2797461.68	3.94%
Total		87.42%		

Remnant Vegetation: A data set containing vegetation extent polygons from the mapping of remnant vegetation in Western Australia. This was originally compiled as part of the vegetation theme of the National Land and Water Resource Audit (NLWRA). The dataset has been progressively updated by the Department of Agriculture and Food post-NLWRA with assistance of the Department of Environment and Conservation. This has been carried out using digital aerial photography (orthophotos) acquired 1996 to 2011.

Northern Karri Land Management Unit Fire Frequency



- Northern Karri LMU
- Fire frequency categories**
- Burnt 1 to 5 times
- Burnt 6 to 10 times
- Burnt 11 to 15 times
- Burnt 16 to 20 times
- Burnt 21 to 25 times
- Burnt 26 to 30 times

Project: Conservation Value LMUs
 Scale: 1 : 500 000
 Date: 23 Feb 2012
 Author: MM: Gaia Resources
 Projection: GDA94
 Reference: GR243_036_1

Area (ha)	Area (km ²)
Total area of all LMUs	4232580.43
Total area of Northern Karri LMU only	126103.23

Area (km ²)	Percentage (%)
Northern Karri LMU within all LMUs	2.98%

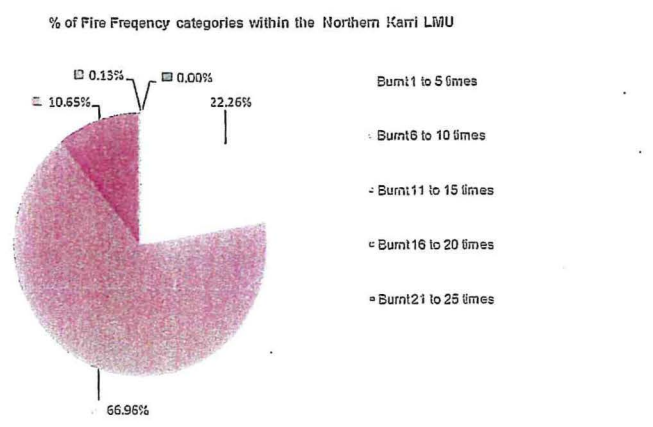
Information	Details
Custodian:	Department of Environment and Conservation
Dataset details:	CCWA GIS Corporate

Area (ha)	Area (km ²)
Total area of data covering all LMUs	2839887.25
Total area of data covering Northern Karri LMU	120530.07

Area (km ²)	Percentage (%)
Total area of data covering all LMUs	67.10%
Total area of data covering Northern Karri LMU	95.58%

Last update:	30/06/2011
Lineage:	Various (GPS, maps, anecdotal, imagery)
Accuracy:	Varied

Fire Frequency Categories	Number of Burnt LMUs	% of Burnt LMUs	Total Area (ha)	% of Total Area
Burnt 1 to 5 times	26832.68	21.20%	1218498.17	2.20%
Burnt 6 to 10 times	30709.41	64.00%	1256847.79	6.42%
Burnt 11 to 15 times	12833.05	10.18%	348537.85	3.68%
Burnt 16 to 20 times	154.65	0.12%	15335.02	1.01%
Burnt 21 to 25 times	0.28	0.0002%	603.08	0.05%
Total	120530.07	95.58%	2839927.91	



The DEC Fire Frequency dataset is a dynamic dataset which contains a collection of records of fire events (prescribed burns and bushfires), which were captured in DEC managed land and, where available, non-DEC managed land in Western Australia. The earliest records available are from 1937. Some historic map sheets have been unavailable and thus the dataset is missing some data. Complete state coverage is available from 2006 to present day. The DEC Fire Frequency dataset is a derivative dataset from DEC Fire History. The DEC Fire Frequency dataset shows areas burnt by prescribed burns and bushfires based on the number of times burnt between 1937 and June 2011. The calculation of times burnt is based on financial years.

Central Jarrah Land Management Unit
Biodiversity Value Heat Map

116°00'E

116°30'E

32°30'S

32°30'S

33°00'S

33°00'S

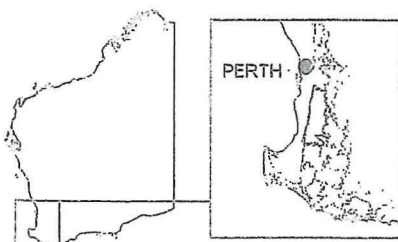
33°30'S

33°30'S



116°00'E

116°30'E

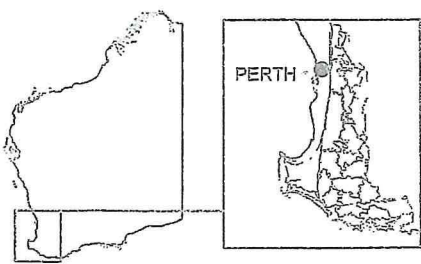
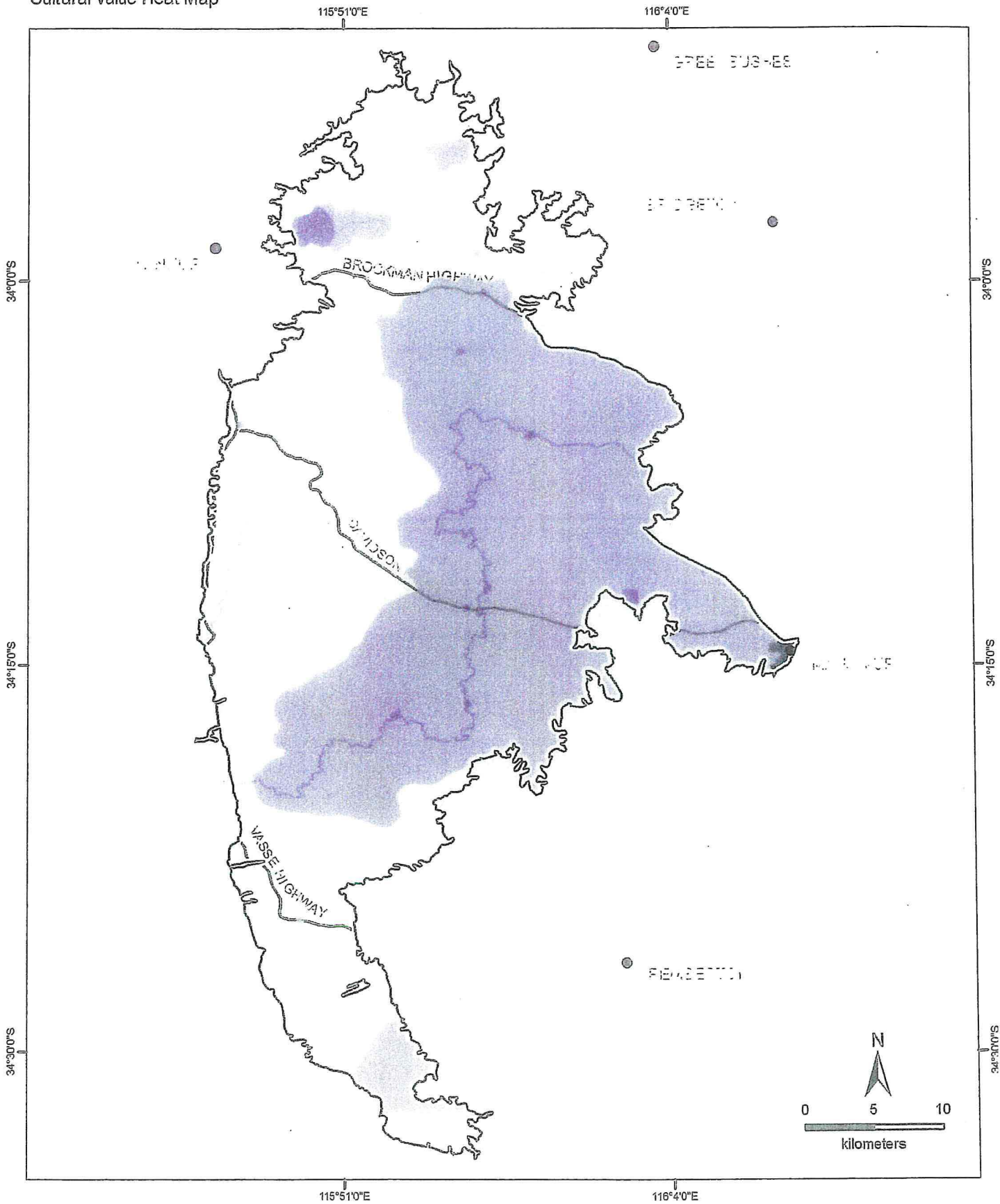


Project: Conservation Value LMUs
 Scale: 1 : 650 000
 Date: 20 Feb 2012
 Author: MM: Gaia Resources Pty Ltd
 Projection: GDA94
 Reference: GR243_050_0

- Central Jarrah LMU
- Town locations
- Main roads
- Major Rivers
- Data density
- Low High

Background Data: Geoscience Australia TOPO 250K, Coastline, Lakes, Watercourses, Roads, Populated Places and Built Up Areas
 Heat Map Data: Department of Environment and Conservation Land Management Unit boundaries, DEFL sites, Threatened Fauna sites, Forest Risk Disease Areas, Environmentally Sensitive Areas, Fauna Habitat Zones and Isohyets (900 to 1100mm to indicate areas high at risk to Dieback) data * Unless specified all categories were used
 Reference: SCNRM Project Dieback *Phytophthora cinnamomi* Strategic Atlas (Uninfested categories 6 to 8)

Northern Karri Land Management Unit
Cultural Value Heat Map



Project:	Conservation Value LMUs		Northern Karri LMU		Town locations
Scale:	1 : 365 000		Built up areas		Main roads
Date:	20 Feb 2012		Major Rivers		
Author:	MM: Gaia Resources Pty Ltd				
Projection:	GDA94				
Reference:	GR243_054_0				
Background Data:	Geoscience Australia TOPO 250K: Coastline, Lakes, Watercourses, Roads, Populated Places and Built Up Areas				
Heat Map Data:	Department of Environment and Conservation, Land Management Unit boundaries, RATIS sites, Heritage Commission sites, Public Drinking Water Source Area, Public Drinking Water Protection Zones				
Data:	Department of Aboriginal Affairs, Heritage sites				