

# 2016 South West Vegetation Complex Statistics – Report Readme

Current as of December 2016 (based on most recent date of input datasets)

Remote Sensing and Spatial Analysis Section

Geographic Information Services Branch

Department of Parks and Wildlife (DPaW)

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## Table of Contents

1.	Required files .....	2
2.	Purpose of the Report .....	2
3.	How to cite this report .....	2
4.	CAR reserve system in brief .....	2
5.	Vegetation Complex mapping .....	3
5.1.	Current Vegetation Complex Mapping .....	3
5.2.	Historical Context and 2016 Review .....	3
6.	Limitations (READ ME) .....	5
6.1.	Scale .....	5
6.2.	Remnant Vegetation .....	5
6.3.	SW Forests (2016) vegetation complex mapping .....	6
6.4.	Currency of analysis .....	6
7.	Metadata (spatial data information and currency) .....	7
8.	Items of note for the 2016 report .....	7
8.1.	First Annual Statistics Report using 2016 vegetation complex datasets .....	7
8.2.	Updates to the input spatial datasets .....	7
8.2.1.	DPaW managed lands and waters .....	7
8.2.2.	Remnant vegetation .....	7
9.	Definition of statistics presented in the report .....	8
9.1.	SCP Reports .....	8
9.2.	SW Forest Report .....	10
10.	Definition of the DPaW tenure and IUCN categories used in the report .....	12
11.	How to access the reports .....	12
12.	Other supporting information within the Excel spreadsheet .....	12
13.	Who should I contact if I need more information? .....	12
14.	Bibliography .....	13



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Parks and Wildlife



*Note: Some hyperlinks are to a DPaW intranet site so are intended for use by DPaW personnel only. Details of how external organizations can access the reports are provided in Section 11.*

## 1. Required files

The South West Vegetation Complex Statistics Report consists of two files:

1. An Excel spreadsheet **Vegetation\_Statistics\_SouthWest\_2016\_Report.xls** with four worksheets containing the statistics and two worksheets containing vegetation descriptions. *Note: the delivery to some WA State Government Agencies will include additional 'internal' report worksheets and the Excel filename will include an Agency suffix.*
2. **README document** (this file) which provides information on the purpose of the report, definition of the statistics, input spatial dataset metadata and information on the limitations of the report.  
**PLEASE READ THIS INFORMATION PRIOR TO EXTRACTING/USING STATISTICS FROM THE EXCEL REPORTS**

## 2. Purpose of the Report

This report provides statistics on the pre-European and current extent of the vegetation complexes of the south-west of Western Australia (Figure 1). The mapping does not extend to IBRA sub-region boundaries so it does not report by IBRA sub-region rather by the extent of the available mapping of the complex. A CAR reserve analysis is also included in the report. Only **reserves managed by the Department of Parks and Wildlife under the CALM Act** are considered for inclusion in the "CAR Reserve Analysis".

These statistics should be used to provide a general overview of the status of vegetation complexes noting the limitations below related to scale, remnant vegetation mapping and currency of the analysis. The statistics can be used to guide land use planning, assess clearing and development applications and assess progress towards retention and reservation targets.

Care should also be taken when using these analyses and reports to inform reserve acquisitions. Other information on biodiversity values of an area should also be considered and information from people who are familiar with the vegetation complex and vegetation condition of the area should also be sought.

*Note: throughout this report and document the term "DPaW Managed Land" is used. This includes land that is managed jointly with Aboriginal Traditional Owners.*

## 3. How to cite this report

Government of Western Australia. (2017). *2016 South West Vegetation Complex Statistics. Current as of December 2016*. WA Department of Parks and Wildlife, Perth.

## 4. CAR reserve system in brief

The CAR reserve system is based on three principles:

1. **Comprehensive** – includes the full range of ecological/forest communities recognised at an appropriate scale within and across a region.
2. **Adequate** – level (extent) of reservation that will ensure viability and integrity of populations, species and ecological communities. An extent protected threshold (target) is usually adopted
3. **Representative** – those areas reserved should reasonably reflect the biotic diversity of the communities

For vegetation complexes, the assessment of the reserve system against CAR principles is done at the mapping area scale. The assessment cannot be undertaken at the IBRA bioregion or sub-region scale as the mapping does not extend to these boundaries. However note that for the Swan Coastal Plain bioregion the vegetation complexes systems align to the IBRA sub-regions.

The **CAR statistics provided** in the Excel reports **can** be used to **assess** how **comprehensive** and **adequate** the reserve system is. The report **cannot** provide information on **representativeness**, rather this requires on ground assessment by an experienced ecologist who has knowledge of the vegetation complex.

The **CAR statistics** provided in the report are (please see Section 9 for definitions):

- Pre-European extent (ha)
- Current extent (ha)
- Percentage remaining (%)
- Pre-European extent protected (IUCN I – IV) for conservation (ha)
- Current extent protected (IUCN I – IV) for conservation (ha)
- Current percentage remaining within lands protected (IUCN I-IV) for conservation (%)

Based on input from a number of key stakeholders in 2007 and 2011, **lands protected for conservation are defined in the CAR Reserve Analysis as being listed in the DPaW–managed lands and waters dataset as either Crown reserves or lands managed under Section 8a of the CALM Act that have an IUCN category of I – IV.**

Detailed background information on the CAR reserve system for ecological communities in Australia is available from [http://www.agriculture.gov.au/SiteCollectionDocuments/rfa/publications/nat\\_nac.pdf](http://www.agriculture.gov.au/SiteCollectionDocuments/rfa/publications/nat_nac.pdf) and <https://www.environment.gov.au/land/nrs/science/scientific-framework>

## 5. Vegetation Complex mapping

### 5.1. Current Vegetation Complex Mapping

The vegetation complex mapping datasets used are (Figure 1):

- 1:250,000 Swan Coastal Plain Vegetation Complexes (Heddle *et al.* 1980) as updated by Webb *et al.* (2016) (hereafter referred to as the SCP dataset);
- 1:50,000 Mapping of Vegetation Complexes in the South West Forest Region of Western Australia (Mattiske & Havel 1998) as updated by Webb *et al.* (2016) (hereafter referred to as the SW Forest dataset).

The SCP dataset (1:250,000) extends from Lancelin in the north, east to the Darling Plateau and all areas of Perth and Dandaragan IBRA sub-region to the south. The SW Forest dataset (1:50,000) defines vegetation complexes at a finer scale and has extensive, but not complete, coverage of the JAF01, JAF02 and WAR01 IBRA sub-regions including the Darling Scarp. The mapping covers the full extent of the Whicher Scarp.

### 5.2. Historical Context and 2016 Review

The vegetation complexes were first mapped at 1:250,000 scale by Heddle *et al.* (1978 and 1980) across portions of the Swan Coastal Plain and Darling and Blackwood Plateaus. In the late 90's 1:50,000 scale mapping of vegetation complexes was undertaken for the Regional Forest Agreement (Mattiske and Havel 1998 and Havel and Mattiske 2000). In 2016 these datasets were reviewed (Webb *et al.* 2016) primarily to:

- Extend single scale mapping to landform boundaries with a particular focus on the Busselton Plain, Whicher Scarp and portions of the Darling Scarp;
- Remove mapping overlaps, consolidating different scales of mapping within landforms.

The review removed different interpretations of the original Heddle *et al.* (1978) and Mattiske and Havel (1998) datasets thereby improving the robustness of extent statistics.

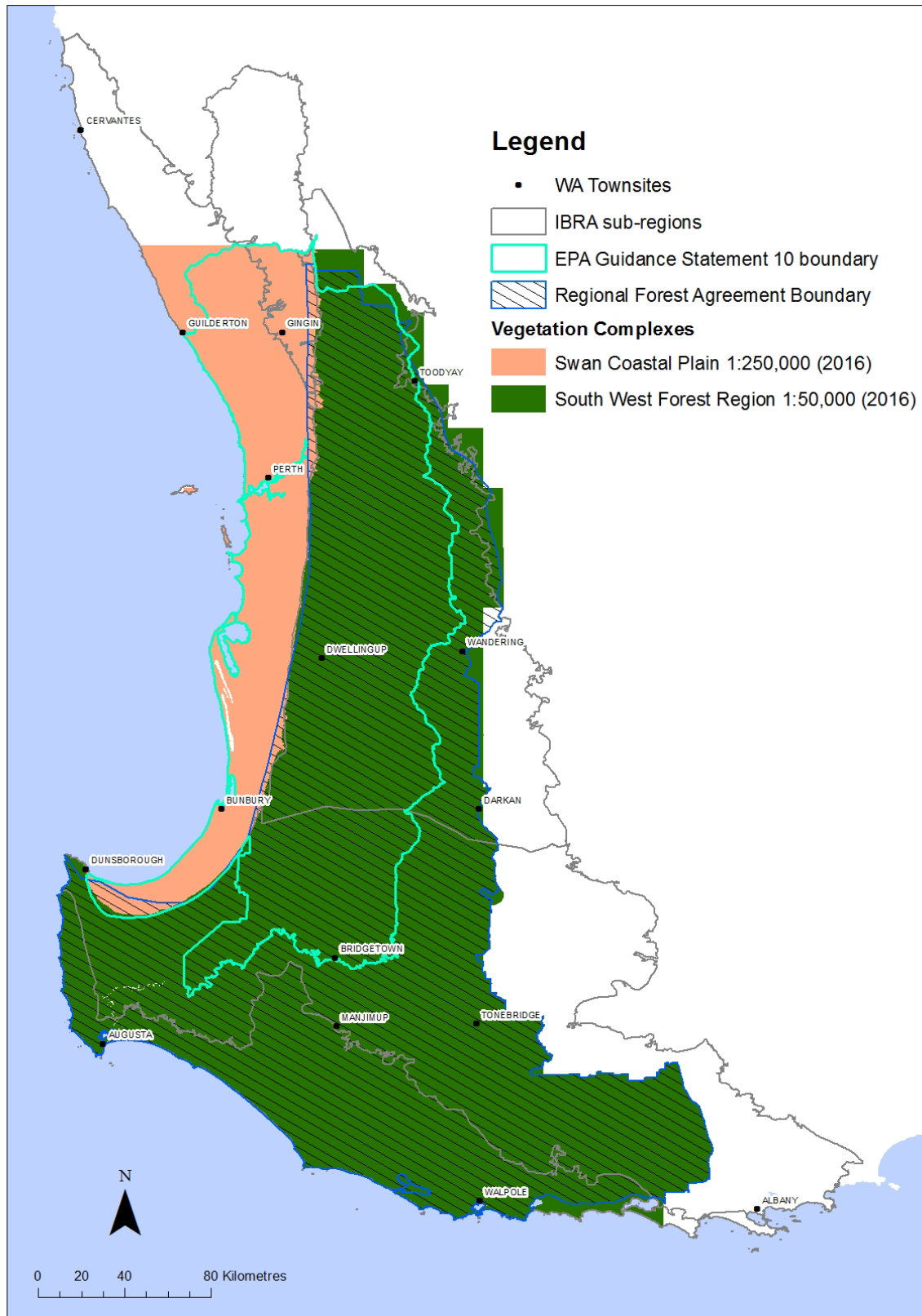


Figure 1: Extent of vegetation complex mapping datasets used in the production of these reporting statistics.

## 6. Limitations (READ ME)

### 6.1. Scale

The vegetation complexes were either mapped at scales of 1:250,000 (SCP) or 1:50,000 (SW Forests) and are not designed to inform at a finer scale. Care should be taken when using, as is the case of this analysis, vegetation complexes in combination with finer scale mapping such as remnant vegetation mapping (1:20,000 or finer). It cannot be assumed that in heavily cleared areas that the range of ecological communities described by one vegetation complex/class will be represented in the few remaining remnants. In these instances advice from an experienced ecologist with knowledge of the ecological communities of the area should be sought. More detailed vegetation mapping may be required before an assessment of the levels of retention and protection of a vegetation complex/class can be undertaken.

It is recommended by the data custodians that the combined current extent and pre-European vegetation complex/class data should be used at scales no finer than:

- 1:250,000 for the SCP
- 1:50,000 for the SW Forests

### 6.2. Remnant Vegetation

The remnant vegetation mapping has the following limitations:

1. There are inconsistencies in the distinction between cleared areas and non-vegetated "natural areas". The non-vegetated "natural areas" could include open water, sand dunes, non-woody wetland vegetation or rock outcrops (this list is not exhaustive).
2. Not all islands are included in the remnant vegetation mapping.
3. The updates are based on interpretation of aerial photography and are captured at scales between 1:5,000 and 1:20,000. No field checking is undertaken.
4. The remnant vegetation data does not represent a snapshot in time rather the data is progressively updated when new aerial photography becomes available (Figure 2). In the Perth metropolitan region, high resolution imagery is available on an annual basis. Generally updates are more frequent in areas where there are high levels of urban and mining development and to a lesser extent agricultural development.

If these limitations are not taken into account then, potentially, the extent of areas cleared could be overestimated or underestimated. To prevent this, a number of measures can be put in place:

1. Always read the descriptions of the vegetation complexes to ascertain if, in their undisturbed state, they are areas that could have no or low vegetation cover. Also advice from an ecologist should be sought.
2. In a GIS package overlay and view the vegetation complex, remnant vegetation, DPaW-managed lands and waters, WA coastline and aerial photography spatial datasets. Also use other available habitat mapping which delineates non-vegetated "natural areas".

Checks can then be done in the GIS to see if:

- Non-vegetated areas that have not been disturbed are mapped as remnant vegetation mapping (check against aerial photography);
- If offshore islands which are part of a vegetation complex have been included in the remnant vegetation mapping (check against aerial photography and WA coastline datasets)

If they are not, then consider utilising the pre-European extent statistic rather than the current extent. Put a qualifier statement in any reporting "*these statistics are indicative only due to the limitations of the mapping*".

Also in the GIS, review the currency of the remnant vegetation mapping for the area of interest by checking the currency of the aerial photography used to capture the data (see "ORTHOPHOTO" field). If you feel that the currency of the mapping is not sufficient then put the aforementioned qualifier statement in any reporting.



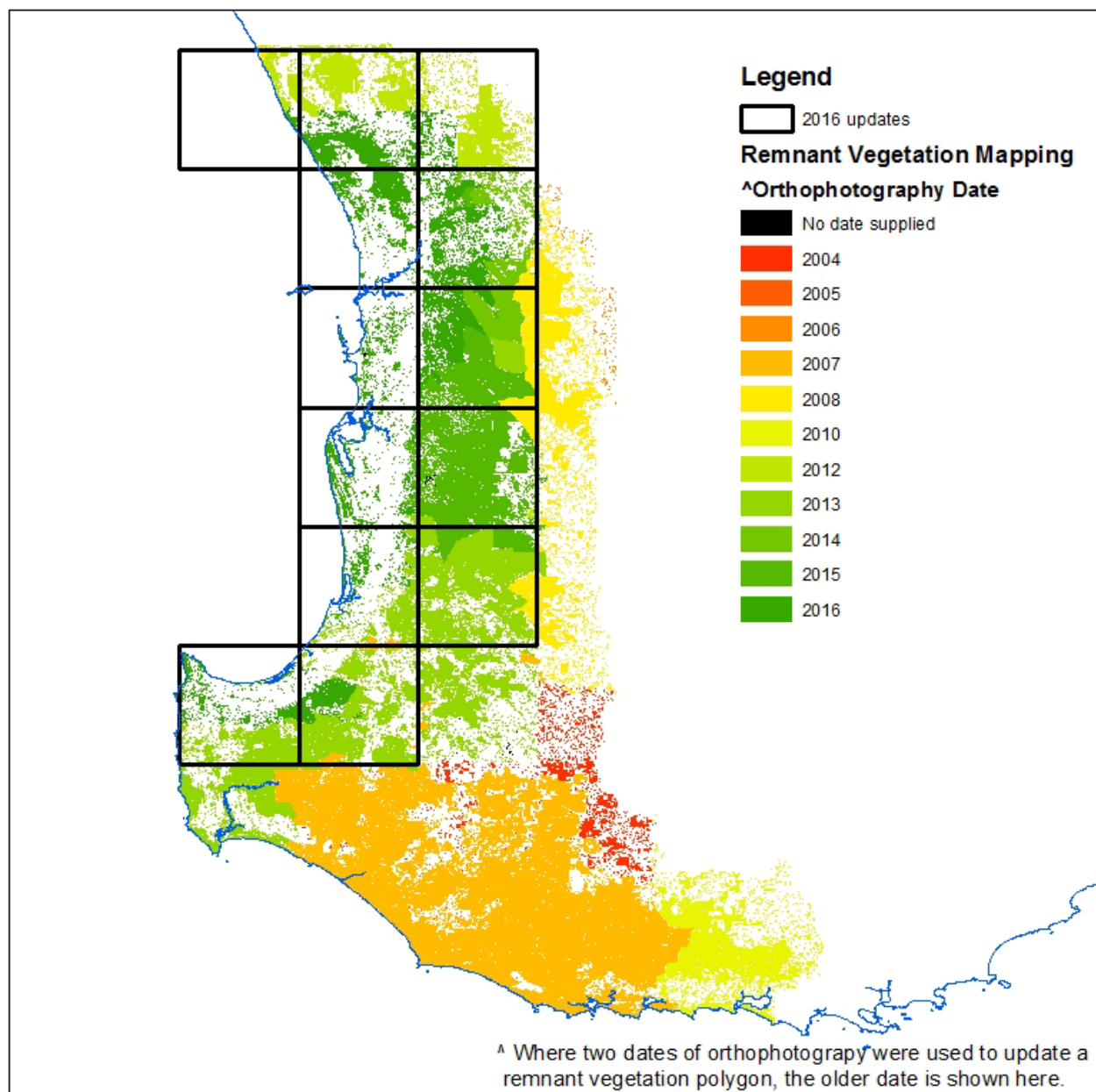


Figure 2: Currency of remnant vegetation used in this analysis. The areas identified as “2016 updates” have been updated in the last 12 months.

### **6.3. SW Forests (2016) vegetation complex mapping**

One vegetation complex class (Rev) is under review and is reported on separately. This class needs to be reviewed by experts within the DPaW Forest Management Branch (FMB) before it can be either assigned to an existing code or described separately. For the most part it is within DPaW managed land.

### **6.4. Currency of analysis**

The accuracy of this analysis depends on the currency of the input spatial datasets. See METADATA section 7 for details of the currency of the datasets used in this analysis. DPaW reproduces these statistics on an annual basis to include the most up-to-date spatial datasets. Before using these statistics check that it is the current report (see section 11 for details on how to access the reports).

## 7. Metadata (spatial data information and currency)

Data	Custodian	Date
Native vegetation extent (referred to as remnant vegetation)	DAFWA	10 <sup>th</sup> November 2016
Swan Coastal Plain Vegetation Complexes (1:250,000)	DPaW	December 2016
Mapping of Vegetation Complexes in the South West Forest Region of Western Australia (1:50,000)	DPaW	December 2016
DPaW-managed lands and waters	DPaW	30th June 2016
Local Government Authorities	Landgate	September 2016

## 8. Items of note for the 2016 report

### ***8.1. First Annual Statistics Report using 2016 vegetation complex datasets***

This 2016 annual report is the first one completed since the 2016 review of the SCP and SW Forests datasets. Comparison of the statistics in this report to statistics in previous analyses should be done carefully as the 2016 review did change the Pre-European extent of some vegetation complexes. See Webb *et. al.* (2016) for more details including a comparison with the EPA Guidance Statement 10 (EPA 2006) statistics.

### ***8.2. Updates to the input spatial datasets***

Each year the analysis incorporates the latest available spatial datasets. See Section 7 for details of the currency of the spatial datasets.

The DPaW-managed lands and waters and remnant vegetation datasets are updated on a continuous basis whilst the Local Government Authority dataset is updated regularly and the vegetation complex datasets are updated very occasionally and were last reviewed in 2016.

The following information is provided to give an indication of the nature of the significant updates to remnant vegetation and DPaW managed lands spatial datasets over the past 12 months. Note: this list is not exhaustive as updates in other targeted areas would have continued to be undertaken, especially for the remnant vegetation dataset.

#### **8.2.1. DPaW managed lands and waters**

Each year additional land is acquired or re-assigned by the State Government to be managed by DPaW and therefore is included in this dataset.

Please note that Crown Freehold Department lands that are being managed by DPaW under Section 8a of the CALM Act have not been included in the analysis as some of this land in the long-term will not be managed by DPaW.

#### **8.2.2. Remnant vegetation**

As part of the ongoing review process, areas previously mapped as remnant vegetation that have been cleared or no longer meet the 20% cover threshold (including areas around rural properties and along tracks and fire breaks) were removed from the dataset. Conversely natural areas, which have previously been disturbed due to fire, timber harvesting or mining and now meet the 20% cover threshold, have been brought back into the dataset. Plantations or agricultural plantings that have been previously erroneously mapped as remnant vegetation have been removed. Some general realignment of the remnant vegetation boundaries has also been undertaken. This list is not exhaustive but provides an indication of the nature of the updates to the dataset that are not related to the clearing of remnant vegetation.

## 9. Definition of statistics presented in the report

### 9.1. SCP Reports

In the excel report the CAR statistics are highlighted in yellow (assessed only at the mapping area scale)

Statistic (column title in Excel report)	Definition	Report
<b>Vegetation Complex Mapping Information</b>		
Geomorphological Province	Geomorphological province of the Swan Coastal Plain	All SCP reports
Landform for each Geomorphological Province	The landform and geomorphological province of each vegetation complex.	All SCP reports
Vegetation Complex	Vegetation Complex name.	All SCP reports
System6	Unique identifier for each vegetation complex (link to spatial data)	All SCP reports
<b>LGA</b>		
Local Govt. Authority Name	Local government authority name	LGA SCP Report - External
<b>Region extents</b>		
Local Govt Authority Extent within mapping area (ha)	Total extent of the local government authority area that is covered by the pre-European extent of the Swan Coastal Plain vegetation complex mapping (areal extent over marine waters is not included). Note: cannot total this column as values are duplicated within a LGA.	LGA SCP Report - External
<b>Total vegetation extent</b>		
Pre-European Extent (ha)	Total pre-European extent (hectares)	All SCP reports
Current Extent (ha)	Total extent of areas mapped as remnant vegetation* (hectares)	All SCP reports
% Remaining	Proportion, of pre-European extent, of areas mapped as remnant vegetation* (%)	All SCP reports
<b>Vegetation extent broken down into reservation categories</b>		
Pre-European Extent Protected (IUCN I-IV) for Conservation (ha)	Pre-European extent of areas that are <b>protected (reserved) for conservation</b> (categorised as IUCN I - IV and are within DPaW-managed land) (hectares) <i>Note: Use this pre-European extent statistic instead of the one directly below if the vegetation complex contains naturally non-vegetated vegetation ecological communities. See limitations section 6.2 for more information.</i>	CAR Report SCP - External
Current Extent Protected (IUCN I-IV) for Conservation (ha)	Extent of areas mapped as remnant vegetation* that are <b>protected (reserved) for conservation</b> (categorised as IUCN I - IV and are within DPaW-managed land) (hectares)	CAR Report SCP - External
Current percentage remaining within lands Protected (IUCN I-IV) for Conservation (%)	Proportion, of the pre-European extent, of areas mapped as remnant vegetation* that are <b>protected (reserved) for conservation</b> (categorised as IUCN I - IV and are within DPaW-managed land) (%).	CAR Report SCP - External



<b>Statistic (column title in Excel report)</b>	<b>Definition</b>	<b>Report</b>
IUCN V - VI Pre-European Extent (ha)	Pre-European extent of areas that are categorised as IUCN V - VI and are within DPaW-managed land (hectares)	CAR Report SCP - External
IUCN V - VI Current Extent (ha)	Extent of areas mapped as remnant vegetation* that are categorised as IUCN V - VI and are within DPaW-managed land (hectares)	CAR Report SCP - External
No IUCN Pre-European Extent within DPaW-Managed Land (ha)	Pre-European extent of areas that have not been categorised as IUCN and are within DPaW-managed land (hectares)	CAR Report SCP - External
No IUCN Current Extent within DPaW-Managed Land (ha)	Extent of areas mapped as remnant vegetation* that have not been categorised as IUCN and are within DPaW-managed land (hectares)	CAR Report SCP - External
Pre-European Extent in All DPaW-Managed Land (ha)	Pre-European extent of areas that are within DPaW-managed land <sup>#</sup> (hectares)	CAR Report SCP - External
Current Extent in All DPaW-Managed Land (ha)	Extent of areas mapped as remnant vegetation* that are within DPaW-managed land <sup>#</sup> (hectares)	CAR Report SCP - External
Current percentage remaining within all DPaW managed land* (%)	Proportion, of the pre-European extent, of areas mapped as remnant vegetation* that are within DPaW-managed land <sup>#</sup> (%)	CAR Report SCP - External
Proportion of the Vegetation Complex within the LGA (%)	Proportion, of the total pre-European extent of the vegetation complex over the mapping area, of areas within the LGA (pre-European extent).	LGA SCP Report - External

\* The remnant vegetation mapping does not distinguish between cleared areas and some non-vegetated 'natural areas' within the intensive land use zone so it cannot be assumed that this represents the area not cleared. See Section 6.2 for more information.

<sup>#</sup> Those lands that are categorized as CFDI and are managed under section 8A of the CALM Act are not included in this total. See section 8.2.1 for more information.

## 9.2. SW Forest Report

In the excel report the CAR statistics are highlighted in yellow (assessed only at the mapping area scale).

Statistic (column title in Excel report)	Definition	Report
<b>Vegetation Complex Mapping Information</b>		
Subregion of the South-West Forests	Subregions of the South-West Forests	All SWForests reports
Broad landform	The landform of each vegetation complex class.	All SWForests reports
Vegetation Complex Name	Vegetation Complex name	All SWForests reports
Vegetation Complex Class	Vegetation complex class code	All SWForests reports
Combined Vegetation Complex and Code	Combined vegetation complex name and code	All SWForests reports
SWFor_ID	Unique identifier for each vegetation complex class (link to spatial data)	All SWForests reports
<b>LGA</b>		
Local Govt. Authority Name	Local government authority name	LGA SWForests Report - External
<b>Region extents</b>		
Local Govt Authority Extent within mapping area (ha)	Total extent of the local government authority area that is covered by the pre-European extent of the SW Forest vegetation complex mapping (areal extent over marine waters is not included). Note: cannot total this column as values are duplicated within a LGA.	LGA SWForests Report - External
<b>Total vegetation extent</b>		
Pre-European Extent (ha)	Total pre-European extent (hectares)	All SWForests reports
Current Extent (ha)	Total extent of areas mapped as remnant vegetation* (hectares)	All SWForests reports
% Remaining	Proportion, of pre-European extent, of areas mapped as remnant vegetation* (%)	All SWForests reports
<b>Vegetation extent broken down into reservation categories</b>		
Pre-European Extent Protected (IUCN I-IV) for Conservation (ha)	Pre-European extent of areas that are <b>protected (reserved) for conservation</b> (categorised as IUCN I - IV and are within DPaW-managed land) (hectares) <i>Note: Use this pre-European extent statistic instead of the one directly below if the vegetation complex class contains naturally non-vegetated vegetation ecological communities. See limitations section 6.2 for more information.</i>	CAR Report SWForests - External
Current Extent Protected (IUCN I-IV) for Conservation (ha)	Extent of areas mapped as remnant vegetation* that are <b>protected (reserved) for conservation</b> (categorised as IUCN I - IV and are within DPaW-managed land) (hectares)	CAR Report SWForests - External
Current percentage remaining within lands Protected (IUCN I-IV) for Conservation (%)	Proportion, of the pre-European extent, of areas mapped as remnant vegetation* that are <b>protected (reserved) for conservation</b> (categorised as IUCN I - IV and are within DPaW-managed land) (%).	CAR Report SWForests - External

<b>Statistic (column title in Excel report)</b>	<b>Definition</b>	<b>Report</b>
IUCN V - VI Pre-European Extent (ha)	Pre-European extent of areas that are categorised as IUCN V - VI and are within DPaW-managed land (hectares)	CAR Report SWForests - External
IUCN V - VI Current Extent (ha)	Extent of areas mapped as remnant vegetation* that are categorised as IUCN V - VI and are within DPaW-managed land (hectares)	CAR Report SWForests - External
No IUCN Pre-European Extent within DPaW-Managed Land (ha)	Pre-European extent of areas that have not been categorised as IUCN and are within DPaW-managed land (hectares)	CAR Report SWForests - External
No IUCN Current Extent within DPaW-Managed Land (ha)	Extent of areas mapped as remnant vegetation* that have not been categorised as IUCN and are within DPaW-managed land (hectares)	CAR Report SWForests - External
Pre-European Extent in All DPaW-Managed Land (ha)	Pre-European extent of areas that are within DPaW-managed land <sup>#</sup> (hectares)	CAR Report SWForests - External
Current Extent in All DPaW-Managed Land (ha)	Extent of areas mapped as remnant vegetation* that are within DPaW-managed land <sup>#</sup> (hectares)	CAR Report SWForests - External
Current percentage remaining within all DPaW managed land* (%)	Proportion, of the pre-European extent, of areas mapped as remnant vegetation* that are within DPaW-managed land <sup>#</sup> (%)	CAR Report SWForests - External
Proportion of the Vegetation Complex within the LGA (%)	Proportion, of the total pre-European extent of the vegetation complex class over the mapping area, of areas within the LGA (pre-European extent).	LGA SCP Report - External

\* The remnant vegetation mapping does not distinguish between cleared areas and some non-vegetated 'natural areas' within the intensive land use zone so it cannot be assumed that this represents the area not cleared. See Section 6.2 for more information.

<sup>#</sup> Those lands that are categorized as CFDI and are managed under section 8A of the CALM Act are not included in this total. See section 8.2.1 for more information.

## 10. Definition of the DPaW tenure and IUCN categories used in the report

Based on input from a number of key stakeholders in 2007 and 2011, **lands protected for conservation are defined in the CAR Reserve Analysis as being listed in the DPaW-managed lands and waters dataset as either Crown reserves or lands managed under Section 8a of the CALM Act that have an IUCN category of I – IV.**

Category	Definition
IUCN I - IV	Land in DPaW-managed land that have been categorised as IUCN protected areas I - IV Note: currently no DPaW- managed lands are categorised as IUCN Ib
IUCN V - VI	Land in DPaW-managed land that have been categorised as IUCN protected areas V - VI
No IUCN	Land in DPaW-managed land that has not been categorised as IUCN protected areas
DPaW-Managed Land	This includes all land managed by DPaW. Please contact DPaW Land Unit Section for full definitions of DPaW tenure categories.

Detailed definitions of the IUCN categories are available from the IUCN website [http://www.iucn.org/about/work/programmes/gpap\\_home/gpap\\_quality/gpap\\_pacategories/](http://www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_pacategories/).

For more information on the DPaW tenure categories or IUCN categories of reserves in your area of interest:

- Refer to the DPaW-managed lands and waters spatial data on the CDDP (DPaW personnel only).
  - For ArcMap and QGIS users select Tenure > DPaW Tenure/Managed Lands > DPaW Estate on the Corporate Data Menu and look at the information under CATEGORY, TENURE, ACT and IUCN in the attribute table.
  - For GIS Viewer users select the theme Planning and Cadastre/DPaW Tenure
- Refer to the 'DPaW-Managed Lands and Waters' spatial data on <https://data.wa.gov.au/>. The data can be viewed in a map viewer in this portal. Alternatively if you have access to desktop GIS software, details of the WMS layer is provided on this portal or a shapefile can be downloaded.

## 11. How to access the reports

1. By contacting Janine Kinloch (see contact details below) or the DPaW Spatial Database Administrator (ph 9219 9562).
2. The reports can be downloaded from DataWA. <https://data.wa.gov.au/>. Search on "vegetation complex". Note: the reports will be lodged on DataWA over the next 12 months.

For DPaW personnel only, the reports are also available at the following locations:

1. Through the CDDP on V:\GIS1-Corporate\Data\Vegetation\Analysis
2. GIS Branch intranet site on the page [Reservation and Vegetation Statistics](#).

## 12. Other supporting information within the Excel spreadsheet

The following worksheets within the excel file provides additional supporting information

- **SCP Vege Cplx Descriptions** – vegetation complex descriptions for the SCP vegetation complexes.
- **SWForest Vege Cplx Descriptions** – vegetation complex descriptions for the SW Forest vegetation complex classes.

## 13. Who should I contact if I need more information?

Janine Kinloch (Technical Custodian)  
Research Officer (Spatial Analysis)

Bok Ho (Information Custodian)  
Land Services Coordinator

Geographic Information Services Branch  
Department of Parks and Wildlife  
[Janine.Kinloch@dpaw.wa.gov.au](mailto:Janine.Kinloch@dpaw.wa.gov.au)  
(08) 9219 9568

Land Unit, Parks & Visitor Services Division  
Department of Parks and Wildlife  
[Bok.Ho@dpaw.wa.gov.au](mailto:Bok.Ho@dpaw.wa.gov.au)  
(08) 9219 8771

Address details:

17 Dick Perry Avenue, Kensington WA 6151  
Locked Bag 104 Bentley Delivery Centre WA 6983

## 14. Bibliography

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Mattiske, EM and Havel JJ. 1998. *Vegetation Mapping in the South West of Western Australia and Region Forest Agreement vegetation complexes. Map sheets for Pemberton, Collie, Pinjarra, Busselton-Margaret River, Mt Barker, and Perth, Western Australia*. Scale 1:250,000. Department of Conservation and Land Management, Perth.

Webb, A., Kinloch, J., Keighery, G. and Pitt, G. 2016. *The Extension of Vegetation Complex Mapping to Landform boundaries within the Swan Coastal Plain Landform and Forested Region of South West Western Australia*. Department of Parks and Wildlife, Bunbury, WA.