Project Plan SP 2000-010

Land-use and vegetation mapping: Western Australia

BCS Biogeography

Project Core Team

X X **Supervising Scientist** Angus Hopkins
Data Custodian

Project status as of Jan. 10, 2023, 9:41 a.m.

X X Completed and closed

Document endorsements and approvals as of Jan. 10, 2023, 9:41 a.m.

X X
Project Team granted
Program Leader granted
Directorate granted
Biometrician required
Herbarium Curator not required
Animal Ethics Committee not required

Land-use and vegetation mapping: Western Australia

Program

BCS Biogeography

Departmental Service

Service 6: Conserving Habitats, Species and Communities

Project Staff

X	X	X	Role	Person	Time allocation (FTE)
			Supervising Scientist	Angus Hopkins	0.0
			Supervising Scientist	Angus Hopkins	0.02

Related Science Projects

1994/003

Proposed period of the project

None – None

Relevance and Outcomes

Background

This project is being conducted as part of the State's contribution to the National Land and Water Resources Audit (a program under NHT) and is subject to relevant Partnership Agreements etc, It overlaps two of the Audit themes (there are seven in total): Theme 3 - Vegetation cover, condition and use, and Theme 5 - Land use change, productivity, diversibility and sustainability of agricultural enterprises. We are providing a detailed property-scale land-use map for the State, and a series of 1:250,000 scale vegetation map products : pre-European vegetation type and extent, present vegetation type and extent, and vegetation condition.

Aims

To produce a series of map products and associated databases covering the State to pre-agreed specifications for the themes land-use, pre-European vegetation type and extent, present type and extent and vegetation condition. In addition, we will develop a database of metadata of vegetation survey datasets.

Expected outcome

The project will produce a range of spatial datasets to pre-determined nationally agreed specifications that together will be readily available to all State and Commonwealth Government Departments and Agencies and to local Governments and eventually to the public. The products are designed to enhance Government decision-making.

Outputs

1. a digital map of pre-1750 vegetation of Western Australia attributed according to agreed national standards and at scales of 1:250,000 for the areas of intensive land use and 1:1,000,000 for the areas of extensive land use.

2. a digital map of present vegetation of Western Australia attributed according to agreed national standards, at scales of 1:250,000 for the areas of intensive land use and 1:1,000,000 for the areas of extensive land use, derived from the intersection of the pre-1750 data with the land-use and vegetation cover data.

3. a digital map of 1995 cover of deep-rooted perennial vegetation and other vegetation, throughout Western Australia, attributed according to an agreed national classification at scales of 1:250,000 for the areas of intensive land use and 1:1,000,000 for the areas of extensive land use.

4. a digital map of estimated 1997 condition of natural vegetation throughout Western Australia, attributed according to an agreed national classification at scales of 1:250,000 for the areas of intensive land use and 1:1,000,000 for the areas of extensive land use.

5. a digital land-use map for Western Australia that is accurate to the scale of 1:100,000 or better over the whole State compatible with agreed national standards for land use mapping classes.

6. a database with a geocode for each agricultural enterprise related to an outer boundary, a broad classification of the enterprise and a land-use classification for individual parcels within each enterprise.

Knowledge transfer

The data sets will be available to all State Government Departments and Agencies including staff of CALM

Tasks and Milestones

Date

Comments

16/04/1999

1. Completion of the land use classification scheme in collaboration with BRS and the vegetation classification scheme in collaboration with the Audit Management Unit.

2. Completion of metadata for all vegetation datasets, floristic datasets and rangeland datasets.

3. Completion of digital map of pre-1750 vegetation for both intensive and extensive land use zones.

Achievement criteria

1. Acceptance of the land use classification scheme and detailed project working plan by the Audit Management Unit.

2. Acceptance of the metadata for all vegetation datasets, floristic datasets and rangeland datasets by the Audit Management Unit.

27/08/1999

Milestone 2

1. Completion of a digital map of 1995 cover of deep-rooted perennial vegetation and other vegetation for both intensive and extensive land-use zones.

2. Completion of a digital map of present vegetation for both intensive and extensive land-use zones.

3. Completion of a database of geocoded agricultural enterprises for extensive land-use zone and intensive land-use zones 1 and 3.

4. Completion of broad classification of enterprise for extensive land-use and intensive land-use zones 1 and 3.

5. Completion of land-use classifications using WASLUC for extensive land-use zone and intensive land-use zones 1 and 3.

6. Completion of digital land-use maps for extensive land-use zone and intensive land-use zones 1 and 3.

Achievement criteria

Acceptance of progress report by the Audit Management Unit.

28/01/2000

Milestone 3

1. Completion of a digital map of estimated 1997 condition of natural vegetation for both intensive and extensive land-use zones.

2. Completion of geocoding of the agricultural enterprise for intensive land-use zones 2, 4B and 4C.

3. Completion of broad enterprise classification for intensive land-use zones 2, 4B and 4C.

4. Completion of land-use classification for individual parcels using WASLUC for intensive land-use zones 2, 4B and 4C.

5. Completion of digital land-use maps for intensive land-use zones 2, 4B and 4C.

Achievement criteria

Acceptance of progress report by the Audit Management Unit.

18/08/2000

Milestone 4

1. A final report of the vegetation and land use mapping project.

2. Completion of the Western Australia vegetation and land use data sets with full attributes and metadata.

Achievement criteria

1. Acceptance of the final project report by the Audit Management Unit.

2. Acceptance of the final Western Australia vegetation and land use datasets, metadata and any other project material by the Audit Management Unit.

References

Study design

Methodology

This project uses existing vegetation data and geo-coded ABS agricultural survey data to generate the vegetation and land use data sets by intersecting the vegetation and land use coverages. The strength of this approach lies in the ability to cross-validate aspects of the vegetation theme data with land-use data and vice versa. It also ensures that derived data sets eg vegetation cover derived through intersecting vegetation map data with land use and vegetation cover data are reliable. The cross-validation and intersection requires that the data sets be comparable in terms of scale and accuracy.

This project also deals with the intensive and extensive land use regions differently according to the available data sources. Methodologies will be applied to different regions are described as follows.

1. Vegetation type - vegetation maps

For the pre-1750 Vegetation, this project will modify existing vegetation map database to conform with the proposed classification based on NVIS core attributes, and produce attributed linework for maps at a scale of 1:250,000 for the intensive land use regions. For the extensive land use regions, the project will first check existing vegetation map database against recent pastoral systems mapping and up-date as necessary. The final database will be modified to conform to the proposed classification based on NVIS core attributes, and produce attributed linework for a map at a scale of 1:1,000,000.

For present Vegetation, this project will intersect the two generated pre-1750 vegetation map data sets with the related land-use and vegetation cover data to produce attributed linework of present vegetation for a map at scales of 1:250,000 for the areas of intensive land use and 1:1,000,000 for the areas of extensive land use.

2. Vegetation Cover and Vegetation Condition

Intensive Land-use Zones: This project will work on two Intensive Land-use Zones for vegetation cover and vegetation condition. These are the Southwest Agricultural Region and the Ord Agricultural Area. However, the project methods for these two areas are different because of different data availability.

For the Southwest Agricultural Region, the project will commence with the collation of on-ground vegetation survey data that can be used to provide benchmarks of vegetation condition, and collation of data on land protected under the Remnant Vegetation Protection Scheme and Land for Wildlife scheme. Land-use data will also be used to identify Crown reserves and vacant Crown land where necessary.

Land Cover data will be used to enhance attribution of polygons of perennial vegetation, together with co-registered, rectified digital orthophotos. Assuming non-perennial vegetation is agricultural crops and/or pasture.

On-ground vegetation survey data, orthophoto data and data on fencing/grazing and other land-use data as necessary, will be used to derive a condition/disturbance rating for each patch of remnant vegetation or sub-samples within each patch. These data sets will then be integrated to develop a first-approximation condition map for the Region. For all remnant vegetation throughout Region, check position in the landscape with SACRED data and assign an "at Risk" (from salinisation) rating. The final data sets will be validated by comparing land-use data with vegetation cover data.

For the Ord Agricultural Area, there may be some substantial change in vegetation cover and condition in the very near future as the Ord Stage II project gets underway. An opportunity exists to monitor the vegetation cover and condition changes closely using coverage of aerial photography at approximately 5-yearly intervals. The changes can be reported against a 1:50,000 topographic map base prepared for the Ord Stage II project.

For Ord Stage I area, use recent aerial photography combined with the land-use data and to derive vegetation cover and condition map datasets. (Aerial photography will provide cross-validation of land-use data).

Extensive Land-use Zone: The extensive land-use zone includes the Pastoral Region, Crown reserves, and vacant Crown land

For pastoral lands, this project will collate data from a number of sources including rangelands survey condition rating data and/or pastoral condition report data where available, rangelands monitoring (WARMS) data, AgWA data on woody weeds, invasive annual grasses etc., AussieGRASS traverse data and data from local rangelands personnel. Other on-ground vegetation survey data for pastoral lands and all categories of Crown land will also be collated.

NDVI data will be used to identify those areas of the rangelands and adjacent Crown land where vegetation appears to be in good condition and also those areas where perennial vegetation cover appears to be greatly reduced. The assumption for the rangelands is continuous cover of native vegetation except where there are

known irrigated horticultural projects or extensive mine developments etc (from land-use component) and where NDVI data suggest cover of perennial vegetation is greatly reduced. (It may be possible to develop a relationship between stocking rate data derived from land-use data set and vegetation cover and condition: this may emerge as the project proceeds).

All extensive vacant Crown land is assumed in moderate to good condition (except where there are extensive mining developments - derived from land-use component). (Parcels of Crown land within the Pastoral Region may have been subjected to grazing, so this assumption is unlikely to hold true).

Analyse on-ground survey and monitoring data, NDVI data and land-use ratings to give a first-approximation condition map for all pastoral lands and adjacent Crown lands, and other vacant Crown lands where data are available. (It may be possible to develop a relationship between stocking rate data derived from land-use data set and vegetation cover and condition: this may emerge as the project proceeds).

3. Land Use

The land use mapping will cover the whole state but the Intensive Land-use Zone (Southwest Agricultural Region and Ord Agricultural Region) and Extensive Land-use Zone (Pastoral Region including Crown reserves, and vacant Crown land) will be treated slightly differently. The project will:

- Complete definition of individual agricultural enterprises and geocode each property. Complete field coding of individual agricultural enterprises using the Western Australian Land Use Classification (WASLUC) Coding scheme.

- Provide geo-coded agricultural enterprise data to the Australian Bureau of Statistics.

- Use ABS census data, industry-specific data and WASLUC data to rate each agricultural enterprises/property by degree of intensity of land-use. Assign a WASLUC code or equivalent to each property for 1996/97.

- Integrate vegetation cover data and Crown reserves cadastres, data on mining activities to produce a comprehensive land-use map for the Region.

Biometrician's Endorsement

required

Data management

No. specimens

N/A

Herbarium Curator's Endorsement

not required

Animal Ethics Committee's Endorsement

not required

Data management

The project will be conducted at the Spatial Resource Information Group, Ag WA using both ORACLE and integraph software. The data sets will be copied to CALM on completion of the project.

Budget

Consolidated Funds

to | X | X | X |

Source	Year 1	Year 2	Year 3
FTE Scientist			
FTE Technical			
Equipment			

Vehicle
Travel
Other
Total

External Funds

to | X | X | X |

Source	Year 1	Year 2	Year 3
Salaries, Wages, OVertime			
Overheads			
Equipment			
Vehicle			
Travel			
Other			
Total			