Goulburn Broken Catchment Management Authority

Biodiversity Status and Condition Report

Goulburn Broken Catchment
Management Authority
– *January 2007*

GOULBURN BROKEN
CATCHMENT MANAGEMENT AUTHORITY

1. Introduction

1.1 Purpose and use of the Biodiversity Status and Condition Report

This report provides a snap-shot of the status and condition of biodiversity within the Goulburn Broken Catchment. The report aims to set a benchmark and where possible show trends in condition. The report also provides discussion on current assessment mechanisms and methods including their limitations.

The report will aid progress towards Resource Condition Targets (RCTs), provide a reference point for the biodiversity monitoring program and inform the review of strategies.

Data on biodiversity in the Goulburn Broken Catchment is held in various locations and formats and varies greatly in value. This report aims to compile data to provide a meaningful overview of the condition and values of biodiversity within the Catchment. To overcome data issues, two strategies have been employed:

(i) Data has been attributed a 'reliability rating' based on the objectivity and rigour of the data collection process, and its relevance to the issues discussed. Data of low reliability can still be meaningful; however its reliability needs to be considered in reporting and decision making. Investment in improving the reliability of available data may be a primary focus for future analysis and reporting needs.

(ii) Because data collection techniques and processes are continually changing, a brief section describing data sourcing methods is included. Comparisons need to consider whether differences between years are due to changes in condition, or changes in the way information has been collected and processed, or a mix of the two.

The report uses a series of "indicators" to represent the values and condition of biodiversity assets and where possible trends in the condition.

This report also highlights the difficulties in reporting on biodiversity condition annually and provides a format/ design for future five yearly status and condition reports.

1.2 Themes and Indicators

The condition and values of biodiversity in the Catchment are expressed through three themes in accordance with the RCTs as set out in the "Strategic Plan for Integrating Native Biodiversity 2004-07":

Theme 1. Native Vegetation Extent

Includes the following RCTs:

- *Maintain extent of all native vegetation types at 1999 levels in keeping with the goal of "net gain" listed in the Victorian Biodiversity Strategy 1997.*
- *Increase the cover of all endangered and applicable vulnerable EVCs to at least 15% of their pre-European vegetation cover by 2030.*

Theme 2. Native Vegetation Quality

- *Improve the quality of 90% of existing (2003) native vegetation by 10% by 2030.*

Theme 3. Threatened Flora and Fauna

- *Increase 2002 conservation status of 80% threatened flora and 60% threatened fauna by 2030.*

Each of the themes have a series of indicators (measures) which are used to describe and measure the status and condition of the themes. The indicators used in this report are either "direct measures of status and/or condition" or "predicted changes to status and/or condition through activities". Each indicator is labelled accordingly. Each of the indicators are then assessed in terms of:

Data reliability: how accurate is the data?
Reporting uses: can the information be used to report against the Catchment's progress towards RCTs?
Relevance to decision making: does the indicator provide information to help inform biodiversity programs and activities?

1. Introduction

1.3 Goulburn Broken Monitoring, Evaluation and Reporting Strategy (2004)

'Integrated' catchment management requires agency staff, GB CMA Board and Implementation Committee members to have a good understanding of issues that are often outside their areas of expertise. Modern technology means there is no shortage of data available, however there is an overwhelming need to sort this data so the decision-maker can be 'informed'.

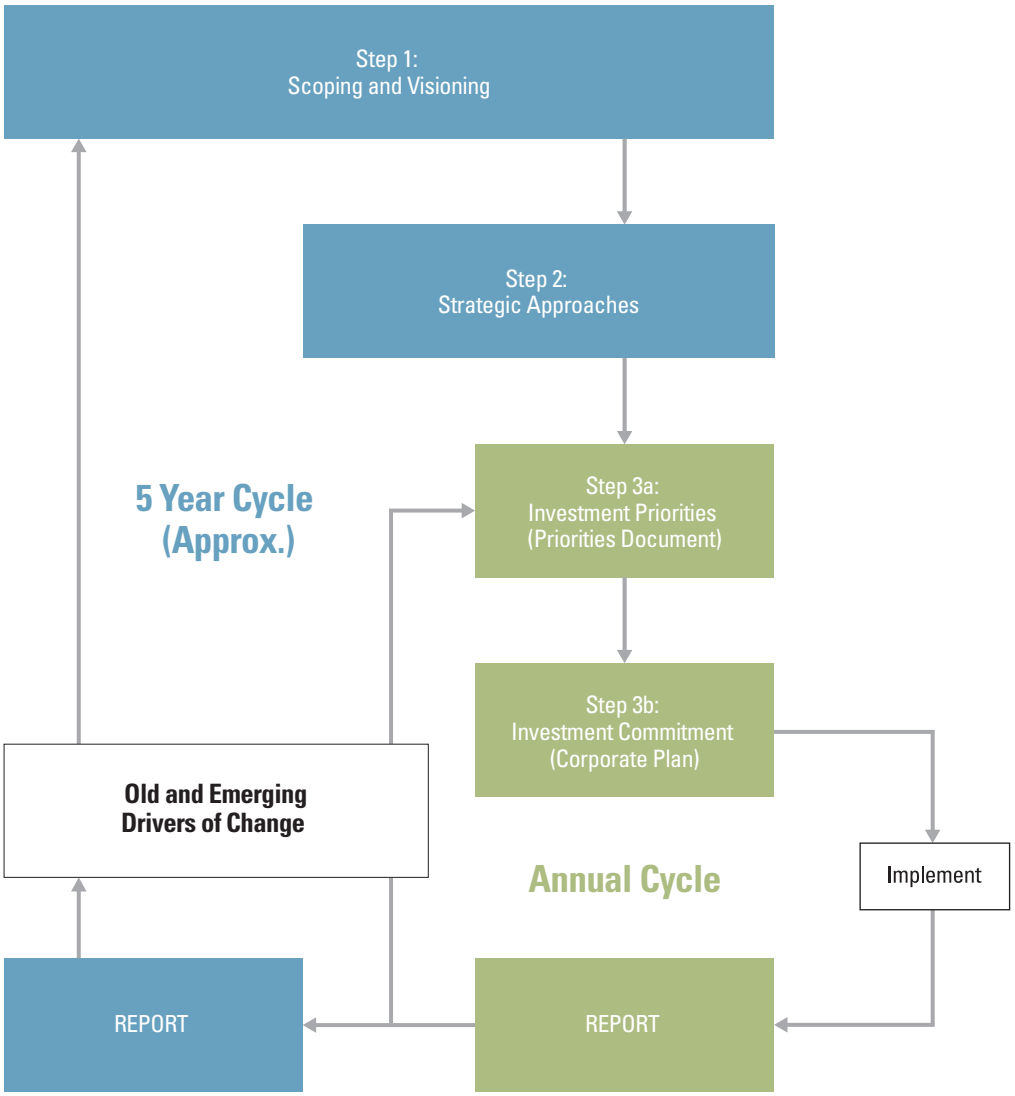
The GB CMA is systemising its reporting to help improve decision-making and identify data gaps.

The GB CMA produced a *Monitoring Evaluation and Reporting Strategy* (2004) following the advent of the National Action Plan for Salinity and Water Quality. The Strategy adopted a 'softly, softly' approach, recognising that a lot of monitoring, evaluation and reporting (MER) was already happening within the Catchment, starting formally with the advent of the salinity program in the late 1980s. Evolution rather than revolution is needed. The Strategy is set at a very high level and largely identifies institutional needs with an emphasis on actions needed to build capacity.

It is generally appropriate to prepare comprehensive biophysical reports, such as the *Biodiversity Values and Condition Report* for specific issues every five years, that link to updates of sub-strategies. This report complements similar reports on issues such as dryland salinity, irrigation salinity and the condition of rivers and streams.

Annual reports are also produced for biophysical issues, but these usually do not directly involve direct measures of biophysical outcomes. See Figure 1.1.

FIGURE 1.1 Time-frames for decision-making



1. Introduction

Biodiversity MER

The Catchment's biodiversity has been monitored for tens of thousands of years, and since European settlement there has been an enormous amount of valuable data collected by individuals and organisations.

Background documents that include monitoring data on biodiversity were prepared to help evaluate the status of biodiversity while developing the *Goulburn Broken Native Vegetation Management Strategy* (2000), the *Goulburn Broken Regional Catchment Strategy (RCS)* (2003), and the *Goulburn Broken Strategic Plan for Integrating Native Biodiversity* (2004).

This *Biodiversity Status and Condition Report* is the first monitoring report on biodiversity for the Catchment structured to inform decision-making at the whole of Catchment scale.

It uses the GB CMA's biodiversity mission statement and RCTs (listed in the *Strategic Plan for Integrating Native Biodiversity* (2004) and the RCS (2002)) as reference points for data collection.

Biodiversity Mission Statement (1999):
"The community will work in partnership with Federal and State Governments and other agencies to protect and enhance ecological processes and genetic diversity to secure the future of native species of plants, animals and other organisms within the Catchment."

Biodiversity Resource Condition Targets (2004):
As numbered in the RCS:

RCT 3.1 Maintain extent of all native vegetation types at 1999 levels in keeping with the goal of 'net gain' listed in Victoria's Biodiversity Strategy 1997.

RCT 3.2 Increase the cover of all endangered and applicable vulnerable EVC to at least 15% of their pre-European vegetation cover by 2030.

RCT 3.3 Improve the quality of 90% of existing (2000) native vegetation by 10% by 2030.

RCT 9.1 Increase 2002 conservation status of 80% threatened flora and 60% of threatened fauna by 2030.

2. Native Vegetation Extent – Introduction to Theme

The Goulburn Broken Catchment has two RCTs referring to vegetation extent:

- Maintain extent of all native vegetation types at 1999 levels in keeping with the goal of 'net gain' listed in the Victorian Biodiversity Strategy; and
- Increase the cover of all endangered and applicable vulnerable EVC to at least 15% of their pre-European vegetation cover by 2030.

In preparing this theme several tools were considered to determine the Catchment's progress towards the above targets, such as Australian Greenhouse Office data and comparing tree cover mapping layers. However it became evident through assessment of the mechanisms that there was very little data and a few tools that allowed for a direct comparison of vegetation gain or loss over time. It should be noted that the majority of the tools were designed for other purposes besides monitoring, reporting and evaluation.

The assessment of the available tools also highlighted the inability to determine the amount of clearing that has occurred, both through the permit process and illegal clearing as the information is not easily compiled and the satellite mapping currently available does not provide an accurate picture of vegetation loss. North East Department of Sustainability and Environment native vegetation team are now implementing a process to record vegetation removal and vegetation establishment as a result of the vegetation removal process.

As a result of the poor data for this theme only three indicators have been used:

- a snapshot of current cover using the Conservation Status Mapping based on EVC;
- maps showing revegetation occurring in the sub-catchments as recorded on CAMS (amount and distribution); and
- the outputs X assumptions = outcomes model.

Improvements in data to measure progress on the two above targets is required.

The Department of Sustainability and Environment (DSE) is currently developing new vegetation extent layers which will provide more accuracy by including grasslands etc. and a tree change model. The tree change model may prove to be a useful tool for reporting on the Catchment's progress towards the RCTs. The GB CMA will investigate the uses of these tools once they are readily available.

2. Native Vegetation Extent – Introduction to Theme

2.1 Indicator: Current Vegetation Extent and Bioregional Conservation Status

Indicator type: direct measure of status and/or condition

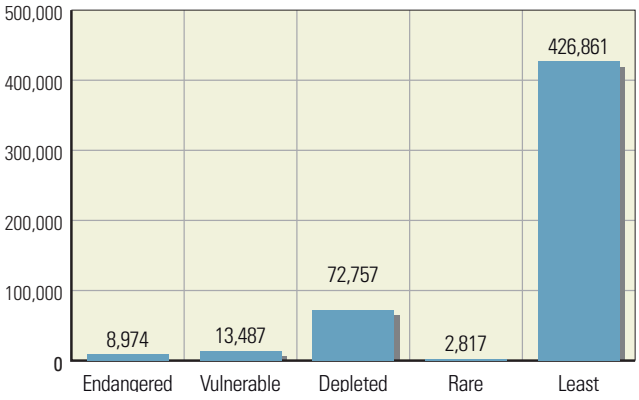
Aim:
To provide a snapshot of the current native vegetation cover in the Goulburn Broken Catchment.

Method:
This data set is derived from the Victorian bioregions dataset and the Extent EVC dataset. The Extent EVC dataset is derived from a model that uses various data including satellite imagery, expert knowledge, quadrat data model and soil types.

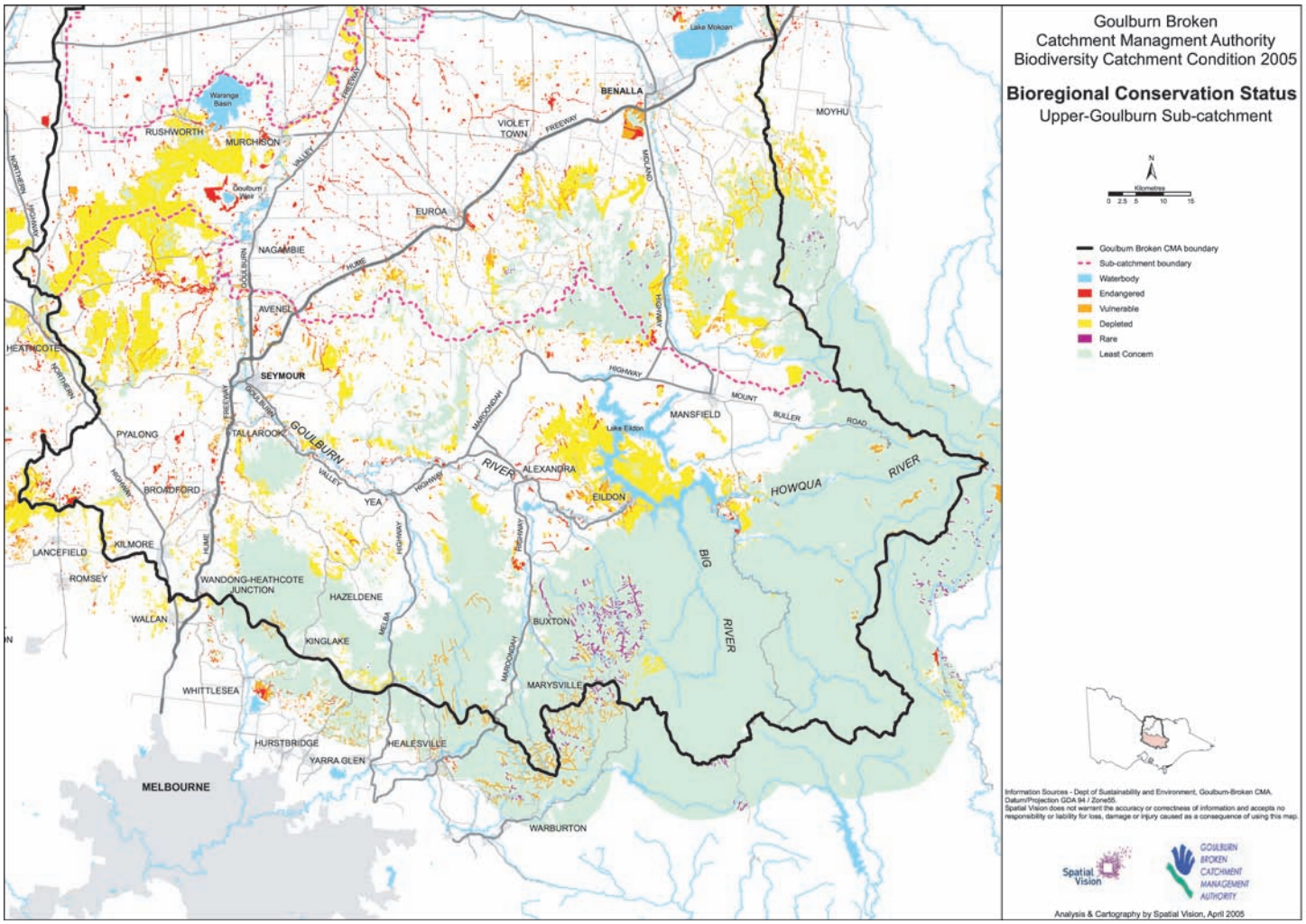
Results / Discussion:
The Upper Goulburn sub-catchment Region (1,000,000 ha) has a large amount of native vegetation in comparison to other sub-catchments of 524,900ha.

Most of this vegetation is in the reserve system and is of the 'least concern' conservation status. The 'endangered' and 'vulnerable' vegetation types are mostly on private land. Therefore, to make progress towards the RCTs a concerted effort to engage private landholders is still required in the upper catchment.

TABLE 2.1 Conservation Status of Existing Vegetation – Upper Goulburn sub-catchment

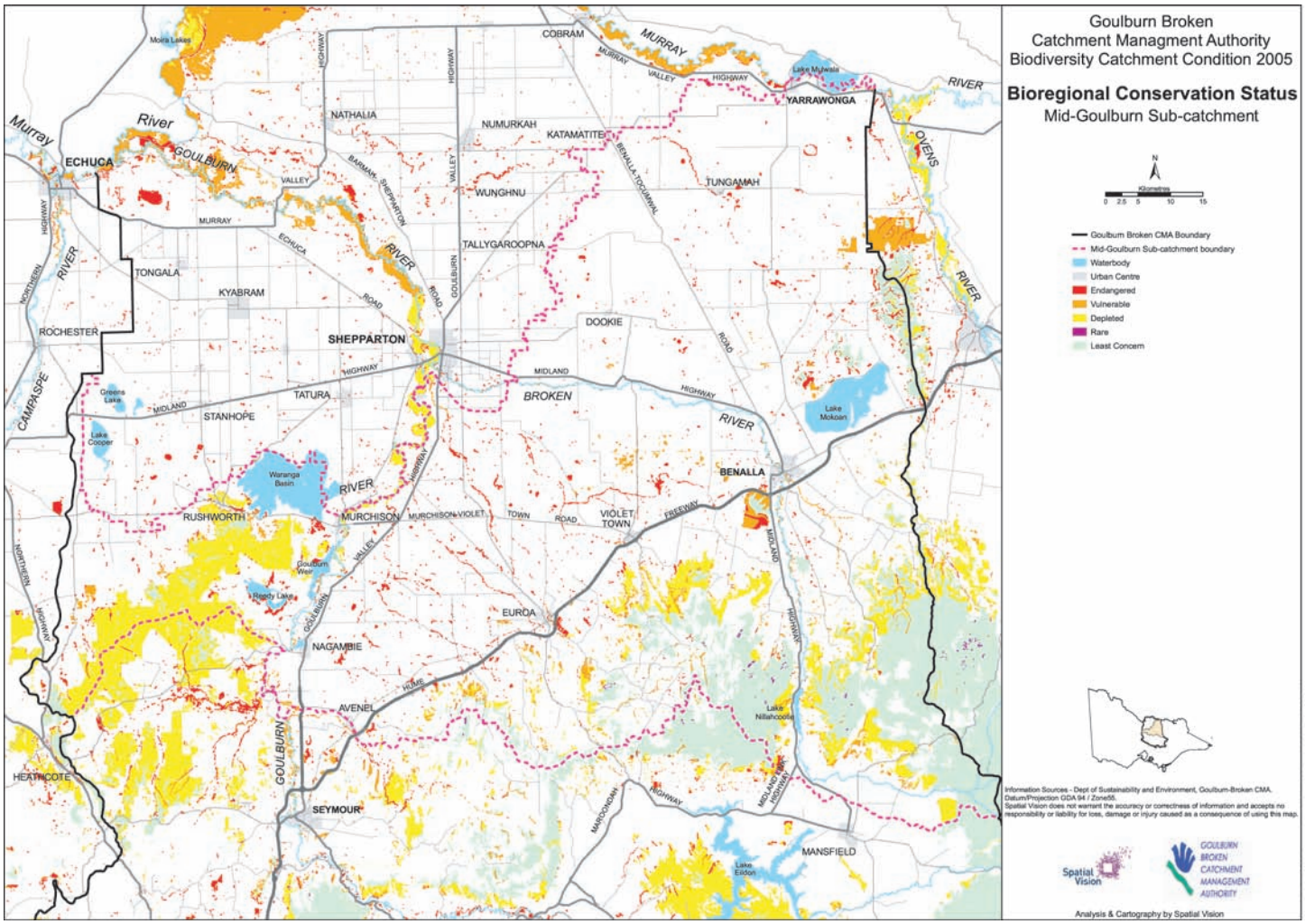


MAP 2.1 Bioregional Conservation Status – Upper Goulburn sub-catchment



2. Native Vegetation Extent – Introduction to Theme

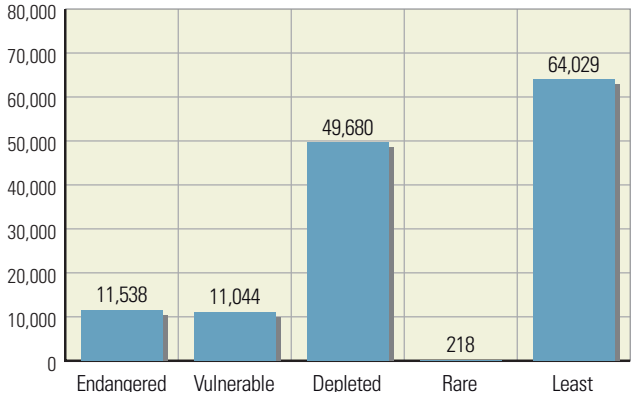
MAP 2.2 Bioregional Conservation Status – Mid Goulburn Broken sub-catchment



In the Mid Goulburn Broken sub-catchment region, vegetation covers approximately 136,500ha of the 800,000ha sub-catchment. Most of the vegetation is within reserves and is either of the conservation status 'least concern' or 'depleted'.

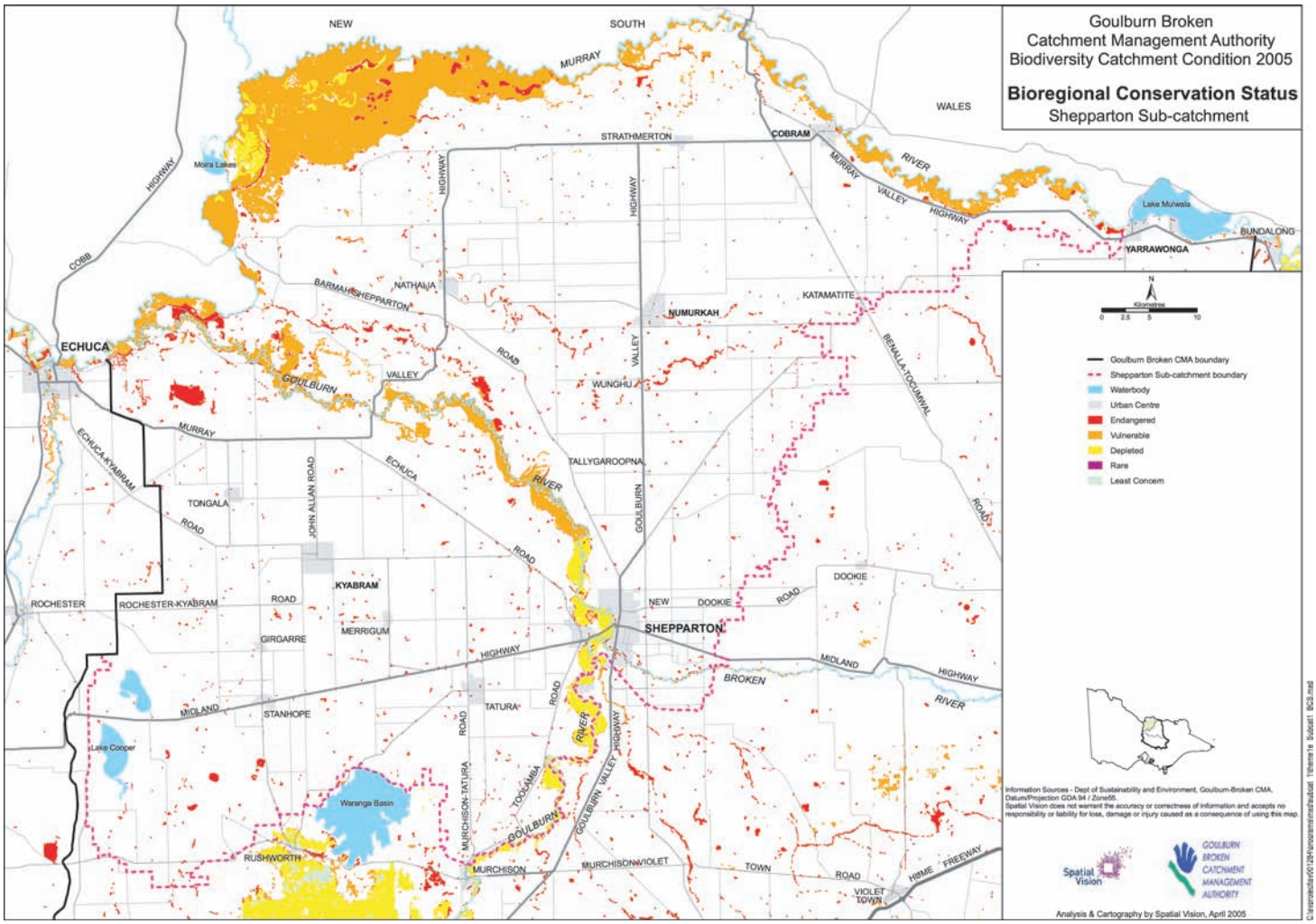
The 'endangered' and 'vulnerable' vegetation exists mostly along the riparian systems and within the fragmented agricultural landscape.

TABLE 2.2 Conservation Status of Existing Vegetation – Mid Goulburn Broken sub-catchment



2. Native Vegetation Extent – Introduction to Theme

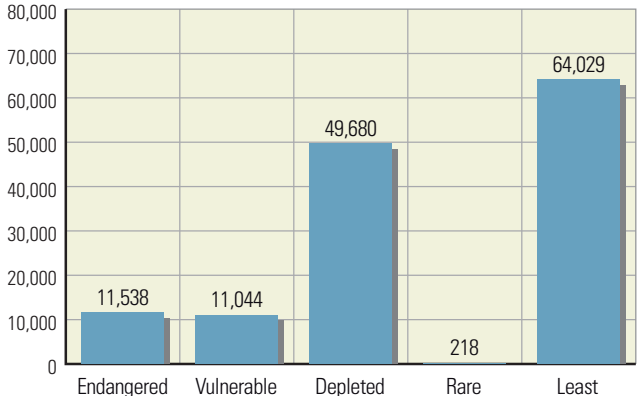
MAP 2.3 Bioregional Conservation Status –Shepparton Irrigation sub-catchment



The Shepparton Irrigation Region (SIR) is covered by 53,900ha of vegetation according to the Bioregional Conservation Status dataset, the sub-catchment is 650,000ha. As the map indicates, most of the vegetation is located in reserved land and along riparian areas. The vegetation is of the 'endangered' and 'vulnerable' types, which are the highest priority for increasing vegetation extent in the Catchment.

The 'endangered' vegetation is scattered throughout the Catchment and is highly fragmented. The Broken Boosey system provides good patches of the 'endangered' vegetation in the SIR. Waterways also link vegetation in the SIR.

TABLE 2.3 Conservation Status of Existing Vegetation – Shepparton Irrigation Region



2. Native Vegetation Extent – Introduction to Theme

Usefulness of Data:
This indicator is only able to provide a snapshot of the vegetation extent in the Catchment. The methodology is relatively coarse and it is only useful for setting long-term (30+ years) strategies. It can not be used to inform decision-making at five yearly or annual reviews. The outputs as described in section 2.3 will be used to estimate trends in relation to the RCTs.

Data reliability:

High	**Medium ✔**	Low

The Bioregional Conservation Status mapping used for this indicator was developed from the EVC extent mapping. EVC extent mapping is developed by botanists on the ground and is considered quite reliable. However, the mapping was digitised at 1;100,000 for much of the Goulburn Broken therefore it is very coarse and as a result not completely accurate as variation in vegetation is finer than the scale of mapping.

Reporting uses:

High	Medium	**Low ✔**

Trends in vegetation extent, via this indicator, as comparisons of the various spatial layers is not appropriate due to changes in techniques and quality of the data. 'Outputs' will be used to indicate trends, however this information does provide insight into the Catchment's current condition in relation to the above RCTs.

Relevance to decision-making:

High	**Medium ✔**	Low

This information provides a sub-catchment perspective on vegetation extent and some insight into where long-term catchment scale restoration needs to be undertaken to have a positive trend towards RCTs.

2.2 Indicator: Revegetation actions recorded on the Catchment Activity Management System (CAMS)

Indicator Type: Predicted changes to status and/or condition through activities

Aim:
To provide insight into where revegetation activities are occurring and assess the ability of the Catchment Activity Management System database to represent revegetation activities spatially. This theme highlights the importance of data collection and entry into data management systems such as CAMS to provide information on progress towards RCTs.

Method:
Spatial information was extracted from CAMS and displayed on maps of the sub-catchment. The sites are entered into CAMS by extension officers who administer the grants.

IMPORTANT NOTE: The maps used in this indicator are generated from CAMS. Work at sites shown on the maps has been completed and funded by incentive programs, all sites are described as either revegetation or enhancement within the CAMS system and spatial information is also provided. The maps are NOT completely representative of all revegetation activities in the Catchment. What they do represent are the sites that have been entered into CAMS where spatial information has been provided.

Details about the total amount of on-ground outputs as recorded through the RCIP Process) are expressed in indicator 2.3.

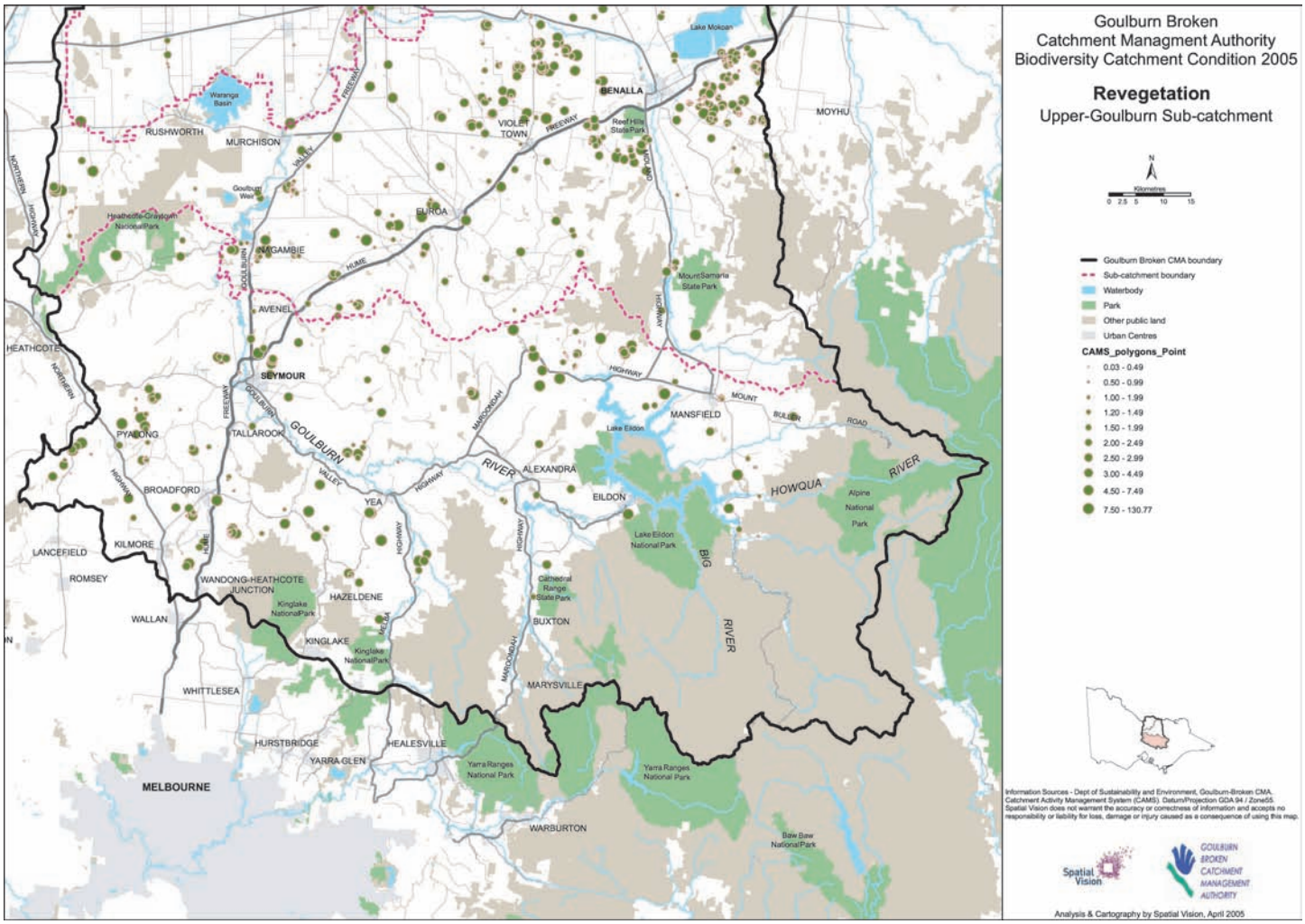
Note:
The following definitions of revegetation and enhancement are used by staff entering data into CAMS

Revegetation: Any area of indigenous revegetation using an appropriate mix of locally native species according to natural densities.

Enhancement: Any supplementary planting or direct seeding of locally native species according to natural densities, directly underneath or adjacent to (within 20 meters) existing remnant vegetation.

2. Native Vegetation Extent – Introduction to Theme

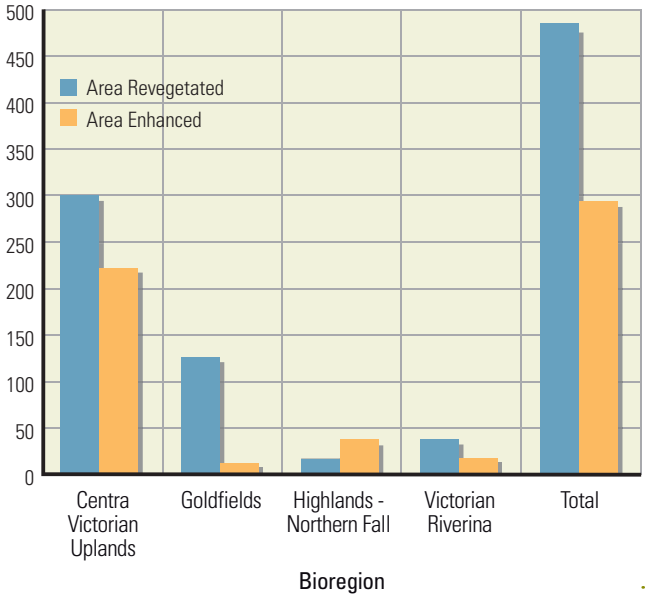
MAP 2.4 Revegetation activities as recorded in CAMS in the Upper- Goulburn Broken sub-catchment



Results / Discussion:

Revegetation activities in the Upper Goulburn sub-catchment are wide spread, however there appears to be major clusters of activity in the south west Goulburn Region and the Merton – Ancona Landcare area. The majority of work is occurring in the central Victorian uplands as much of the other bioregions in the upper catchment are already vegetated and public land reserved.

TABLE 2.4 Area of new vegetation as a result of grant sites recorded in CAMS in the Upper Goulburn sub-catchment region (October 2005)



2. Native Vegetation Extent – Introduction to Theme

MAP 2.5 Revegetation activities as recorded in CAMS in the Mid Goulburn Broken sub-catchment

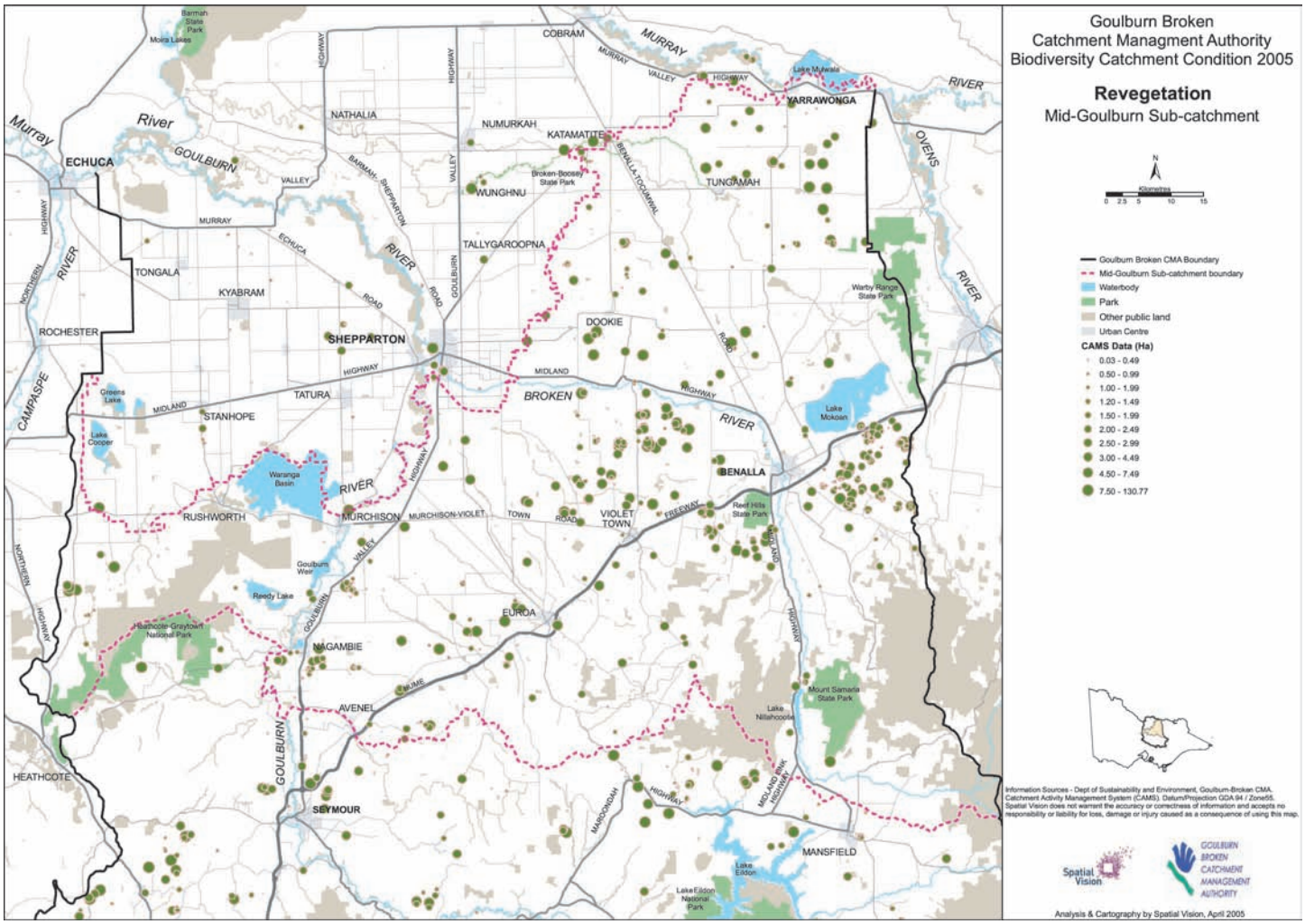
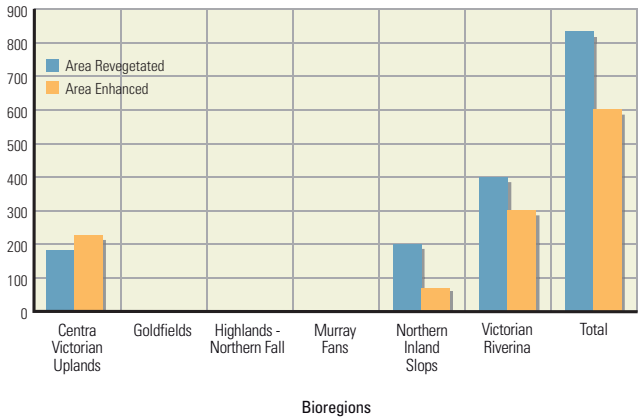


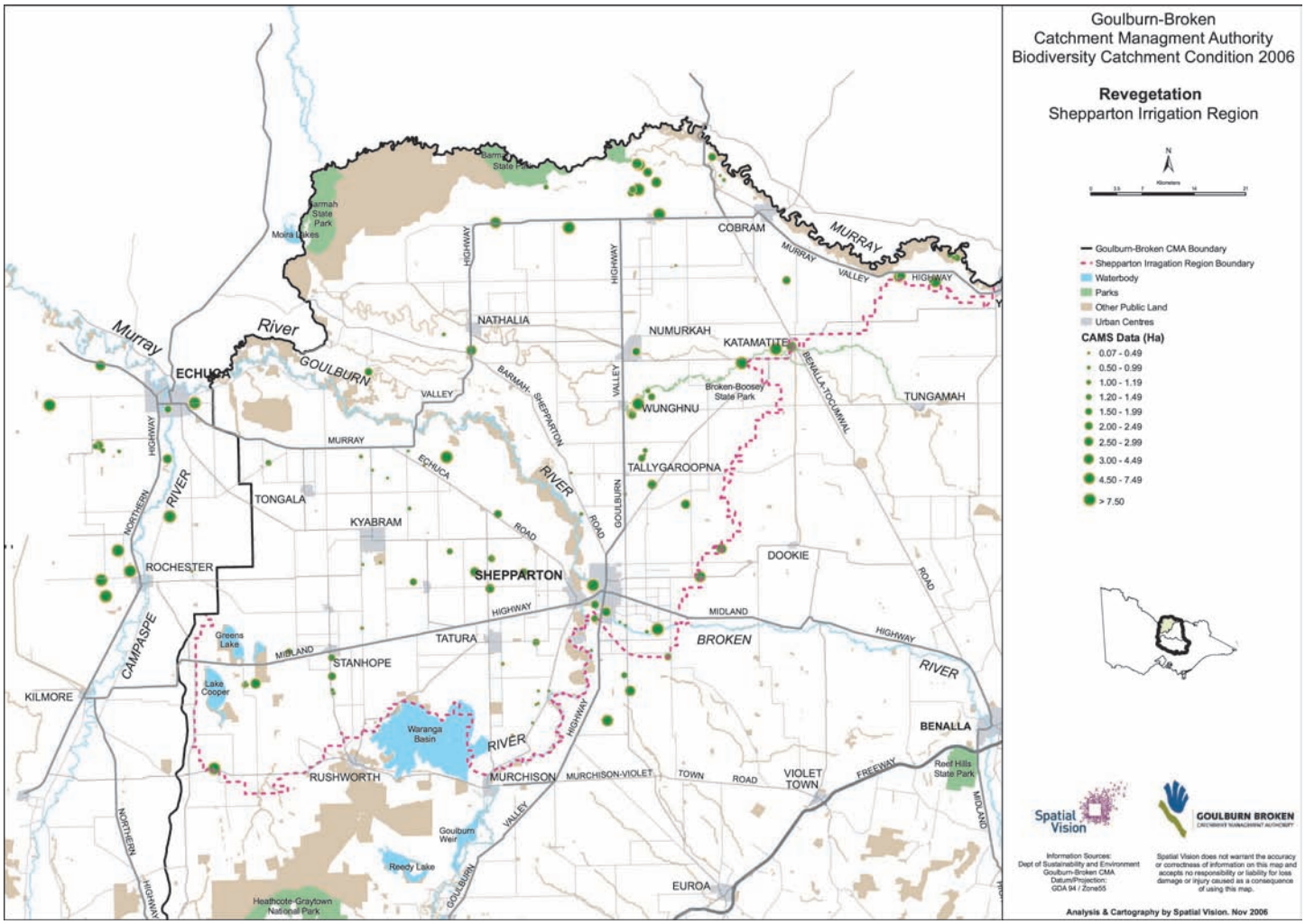
TABLE 2.5 Area of new vegetation as a result of grant recorded in CAMS in the Mid Goulburn Broken sub-catchment (October 2005)



The Mid Goulburn Broken sub-catchment has some distinct clusters e.g. the Heartland and Regent Honeyeater project areas where communities have undertaken a large amount of works over a number of years.

2. Native Vegetation Extent – Introduction to Theme

MAP 2.6 Revegetation activities as recorded in CAMS in the Shepparton Irrigation Region sub-catchment



The Shepparton Irrigation Region (SIR) has a long history of successful revegetation efforts. Approximately 500ha have been revegetated or enhanced and have been entered into CAMS. (December 2006)

The nature of the SIRs high intensity agriculture often restricts the size of the revegetation and enhancement efforts. However, large scale revegetation sites have been achieved along riparian areas and in the dryland areas of the sub-catchment.

The SIR is dominated by the Murray Fans and the Victorian Riverina bioregion, approximately half the revegetation and enhancement activities occur in each of the bioregions.

2. Native Vegetation Extent – Introduction to Theme

Usefulness of Data:
This indicator does not provide a large amount of insight into the condition of the Catchment and only provides part of the data that informs progress towards RCTs. However, it does paint a picture about revegetation activities in the Catchment since 2001, where they are occurring and the scale of these activities (size of the sites).

This theme also highlights the importance of ensuring correct and up-to-date data is entered into CAMS, in order for the Catchment to gather useful information from this database. It is a requirement of funding that the sites are entered into CAMS and whilst the Goulburn Broken Catchment is one of the few catchments that use the system, there is still a need for continued efforts by extension officers and relevant managers.

Data reliability:

High	**Medium ✔**	Low

As mentioned above, data that is extracted from the CAMS database is only as good as the information entered into CAMS. For the Upper Goulburn and Mid Goulburn catchments, the database shows the majority of sites entered into CAMS are mapped and therefore displayed on the above map, spatial data for the SIR has recently been updated resulting in a high level of accuracy.

Reporting uses:

High	**Medium ✔**	Low

CAMS data is useful in annual reporting by providing figures of hectares revegetated etc. It is anticipated that this system will become more and more useful in reporting against the Catchment's progress towards RCTs if data continues to be entered in the system and standard outputs used remain consistent.

Relevance to decisions-making:

High	**Medium ✔**	Low

Currently the CAMS system is not informing major decisions about programs and future direction, however as the database grows it will inform management about the types of works occurring and the ability of those works to assist the Catchment's progress towards the RCTs.

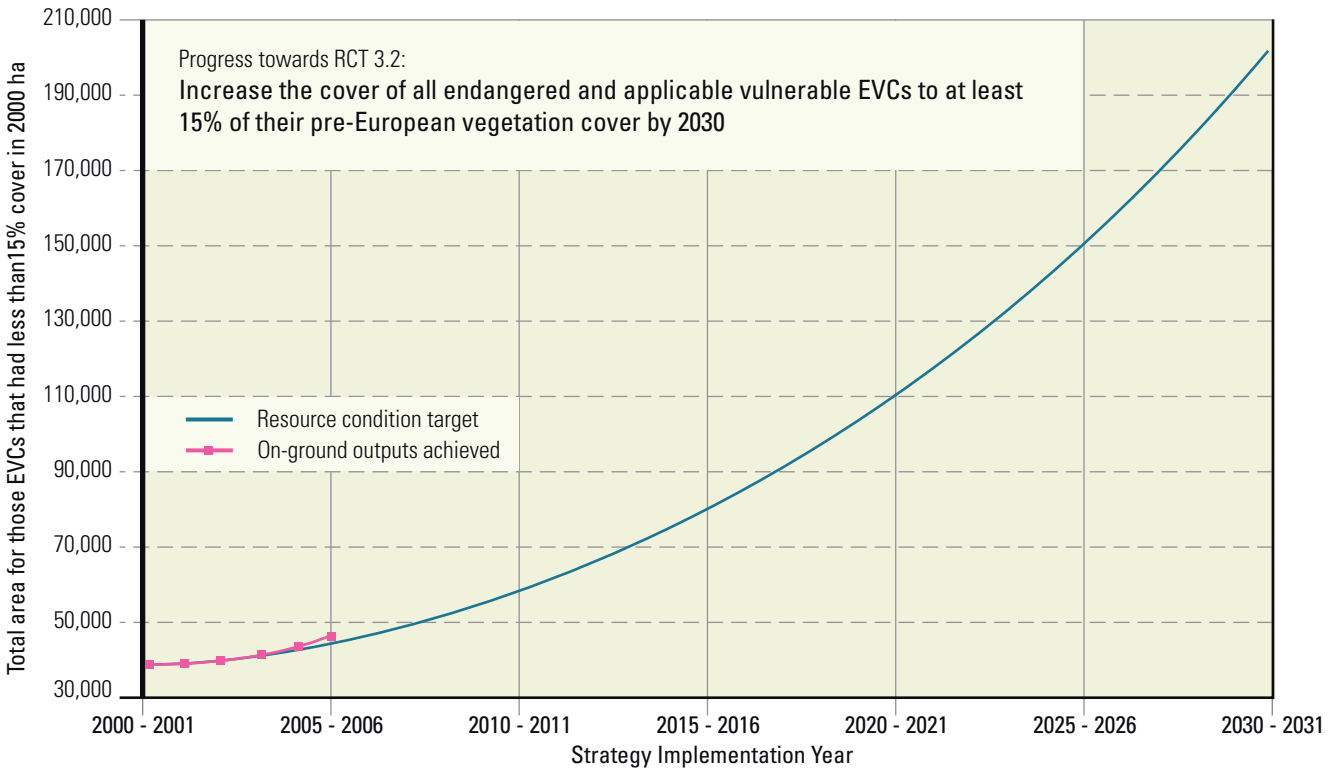
2. Native Vegetation Extent – Introduction to Theme

2.2.2 Indicator: Annual Report Card – Impact of Revegetation Activities

Indicator Type: Predicted changes to condition and/ or status from measuring actions.

Aim:
To use output data (e.g. hectares revegetated through incentives) and a series of assumptions to determine the Catchment's progress to RCTs concerning vegetation extent.

Results / Discussion:
Graph 2.1 Progress towards RCTs: Increase the cover of all endangered and applicable vulnerable EVCS to at least 15% of their pre-European vegetation cover by 2030



2. Native Vegetation Extent – Introduction to Theme

Assumptions	Uncertainty	Importance for decision-making
Area these types of EVCs increased =		
1. 2* x	H	VH
2. proportion of all actions focussing on these EVC types (0.75) x	H	M
3. {proportion of increased cover (0.05) from regeneration x	H	L
4. [area fenced (terrestrial, wetland or stream/river)] +	L	H
5. area revegetated}	M	H
6. Success rate of vegetation establishment = 100%.	VH	M
7. Composition of vegetation established matches original EVC.	VH	M
8. No lag-time between establishing vegetation and measuring cover.	inconsequential	
9. Data for actions undertaken 2000-01 to 2002-04 were interpolated from 2003-04 and 2004-05 results.	H	L
10. Annual increase in targets (progress towards RCTs) is not expected to be linear: new mechanisms will be developed to enable greater levels of works or de-stocking. Projects are underway in the Catchment to identify these mechanisms.	H	M
* *TOTAL increase is DOUBLE that supported by Government funds. This includes component assumptions (that need to be tested separately) of: – contributions without Government funds, including works undertaken and natural regeneration – reductions from direct native vegetation removed, and, – reductions from native vegetation dying.*		

Notes, including data management issues:

1. Report card compiler: Kate Brunt and Rod McLennan
2. Error bars (+/- 30%) are based on expert opinion (Kate Brunt and Tim Barlow) and are for a 95% confidence level. These error bars will become less than 30% as major assumptions are refined.
3. Satellite imagery is not yet a reliable means of measuring progress: ongoing imagery improvements result in finer patches of vegetation being detected and hence greater areas recorded. The lag time between seedling and detection also complicates the use of the data to verify that actions are translating into outcomes in the medium term (3-10 years).
4. A survey is expected to be undertaken during 2006 to determine the level of works undertaken (including destocking) without government funding.
5. Targets apply to private land only: this is where GB CMA has most influence. (Figures are being collated for public land and these will be included in future updates.)
6. Full referencing of assumptions will be included in future updates.

Outputs contributing to RCTs for 2005-06

	From funds received through GB CMA			
	Target	**Achieved**		**% achieved**
A. Fence terrestrial remnant vegetation	382	519	ha	136
B. Fence wetland remnant	13	6	ha	46
C. Fence stream/river remnant	92	115	ha	125
D. Revegetation – plant natives	2,337	1,293	ha	55

Calculation: progress towards RCTs

Formula 2 x 0.75 x {0.05 x [A + B + C] + D} Total (all sources) 1,988 ha with increased cover

Outputs achieved through Government funds that increase extent of native vegetation, 2003-04, 20004-05 and 2005-06

	From funds received through GB CMA		
	Achieved 2003-04	**Achieved 2004-05**	**Achieved 2005-06**
A. Fence terrestrial remnant vegetation	512	771	519
B. Fence wetland remnant	13	24	6
C. Fence stream/river remnant	218	91	115
D. Revegetation - plant natives	706	1,055	1,293

2. Native Vegetation Extent – Introduction to Theme

Usefulness of Data

This information shows that revegetation, as a result of incentives and other funded activities, is contributing to a positive trend with regard to the afore mentioned RCTs. This measures trends in vegetation extent in the short-term.

Several assumptions need to be refined to improve the certainty that actions are having the desired impact. Investigations required include the extent of clearing and "vegetation loss", rate and amount of vegetation condition change through activities such as fencing.

Data reliability:

High	**Medium ✔**	Low

The outputs data is highly reliable, however some of the important assumptions have not been tested.

Reporting uses:

High ✔	Medium	Low

This indicator is very useful in reporting the Catchment's progress towards RCTs.

Relevance to decisions-making:

High	**Medium ✔**	Low

This indicator assists in decision making by reporting on past activities. The indicator shows that the current on-ground activities are progressing the Catchment towards the targets, but also shows that the level of activity needs to continually increase. The indicator also provides valuable information about the monitoring programs that are required to improve assumptions and increase reliability of data. More information is needed on the effectiveness and efficiency of the Catchment's revegetation trends in terms of the size and location of sites.

2.4 Conclusion Vegetation Extent Theme

The indicators in this theme have attempted to paint a picture about current vegetation extent in the Catchment. It is difficult to get an accurate picture of the Catchment's vegetation extent and the way that vegetation cover is trending.

The Bioregional Conservation Status mapping provides a useful insight into the Catchment's vegetation cover and where in the Catchment further progress is needed in order to reach RCTs.

Revegetation efforts are contributing to a positive trend in native vegetation extent, however there are significant information gaps. Attention must be paid to measuring vegetation loss and collecting data (including spatial) at a Catchment scale.

The Catchment should continue to use the 'outputs x assumptions = outcomes' model as the basis for detecting trends. However, effort to improve assumptions is required and a willingness to embrace new technology such as new spatial layers and modelling tools including the tree change and new vegetation extent model.

3. Introduction to Theme – Native Vegetation Quality

The GB CMA has one target that refers to native vegetation quality:

- To improve the quality of 90% of existing vegetation (i.e. in 2003) by 10% by 2030.

This theme uses several indicators to provide a snapshot of vegetation condition in the Catchment and trends in vegetation condition, including complex models, field research data, information about on-ground activities (outputs) and assumptions. It highlights the complexities in gathering information to measure vegetation quality and determine trends in the quality of vegetation.

The modelled information used in this theme provides a useful snapshot into the current quality of vegetation in the Catchment, however this information does not currently inform progress towards RCTs. Data derived from outputs and assumptions has been collected annually and provides some information regarding progress towards RCTs.

Raw data collated and presented in this report provides valuable baseline data and assists in developing an accurate snapshot of vegetation condition.

3. Introduction to Theme – Native Vegetation Quality

3.1 Indicator: Vegetation Condition Model – Goulburn Broken Catchment

Indicator Type: Direct measure of status and/or condition

Aim:

- To use the " Vegetation Condition Model" to provide a snapshot of the quality of vegetation across the Catchment at a landscape scale.
- To provide baseline data to assess future increases/decreases in the quality of vegetation.

Method:

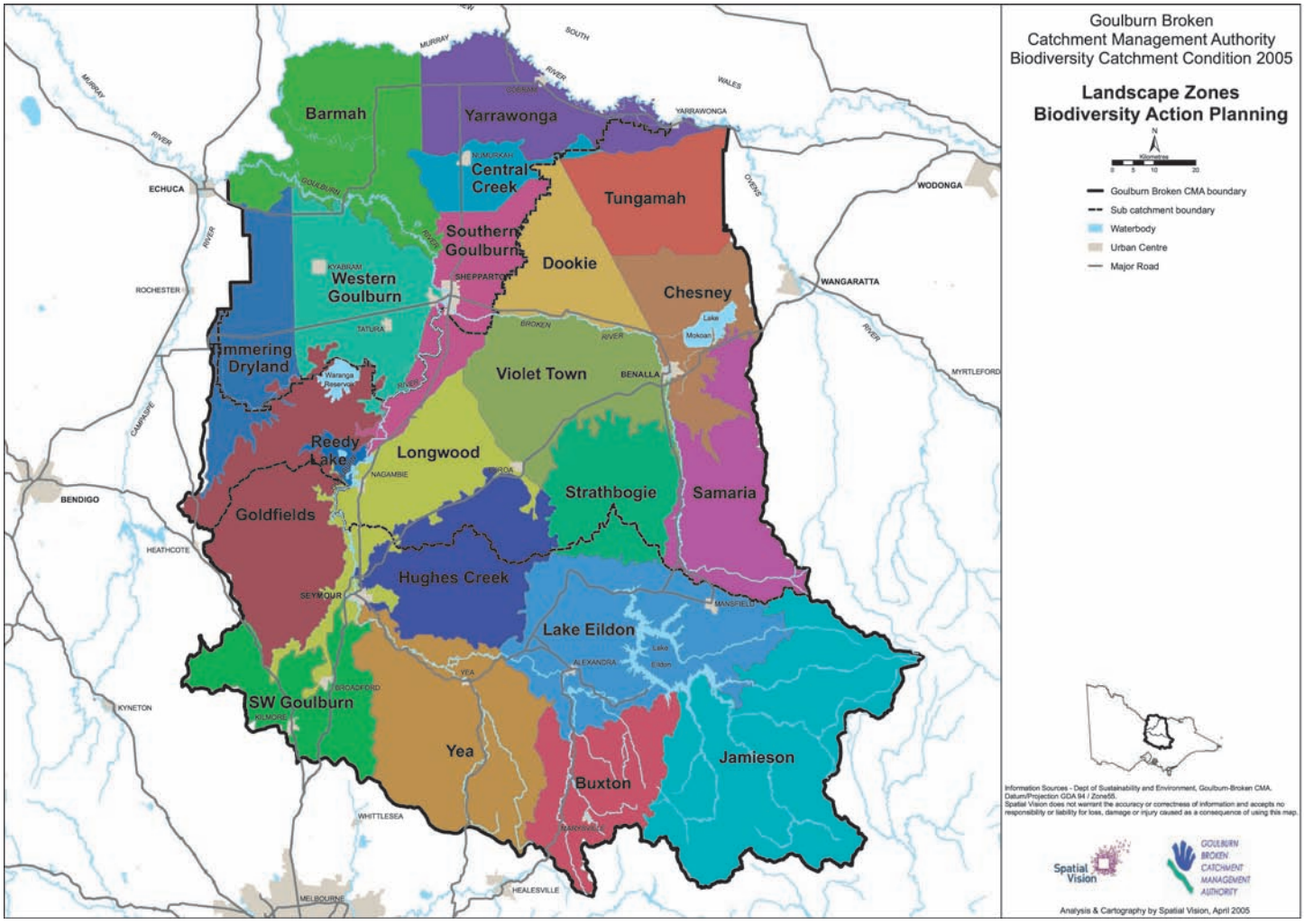
The Vegetation Condition Model was developed as a result of a joint project between the four northern Victorian CMAs. The model is based on habitat hectare scores collected from thousands of sites across northern Victoria, with of 1,092 sites in the Goulburn Broken Catchment. Several variables were then used in modelling condition scores for all of the Goulburn Broken remnant vegetation using the Tree25 mapping layer and tree density layers, based on the sample scores. Variables included: climate, radiometric data, tree density, digital elevation model, vegetation type and land use.

For a more detailed outline of the methodology see: Modelling the Condition of Native Vegetation in Northern Victoria - A report for the Northern Victorian Catchment Management Authorities (2004).

The vegetation condition model has been dissected into Biodiversity Action Planning (BAP) Zones using GIS interrogation to provide a more localised picture of vegetation condition in the Catchment.

Forested areas in the southern part of the Catchment (mostly public land) were not assessed in the initial study. A follow up study which aims to develop a state-wide condition model has since been initiated.

MAP 3.1. Biodiversity Action Planning Landscape Zones in the Goulburn Broken



3. Introduction to Theme – Native Vegetation Quality

Discussion:
Habitat scores extracted from the Vegetation Condition Model were ranked into six classes (0 – 19, 20 – 29, 30 – 39, 40 – 49, 50 – 59, 60 – 100).

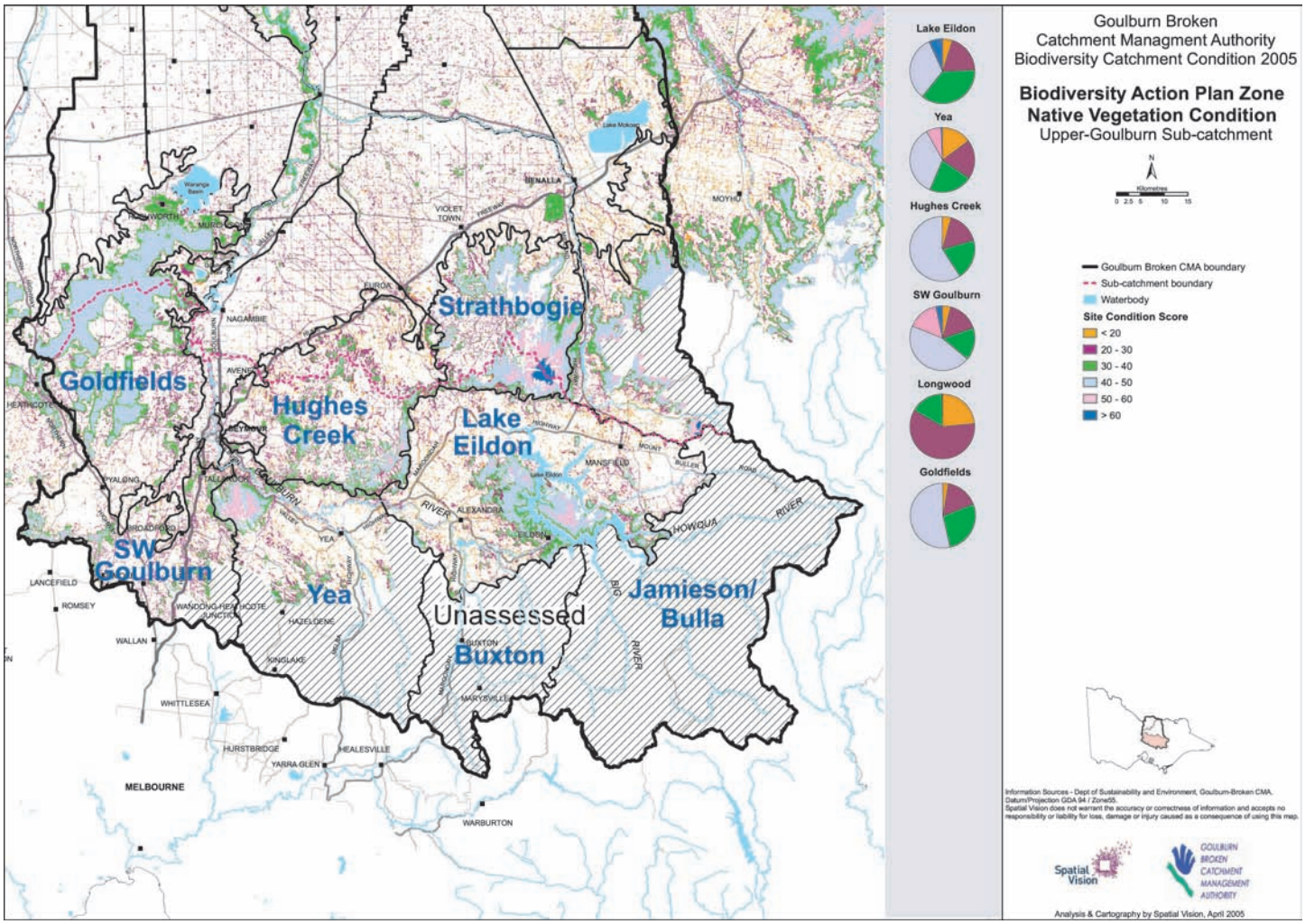
BAP Zones that contained large patches of vegetation (predominately public land) had a greater ratio of high scores than the highly fragment landscapes. Riparian areas also contribute significantly in terms of providing high quality vegetation. The following maps highlight this and show the range of vegetation quality across the Catchment.

The Upper Goulburn maintains some of the Catchment's best condition vegetation, which mainly occurs in large forested areas away from denser human activity.

Fragmentation characterises the remnant vegetation of the plains of the mid- Goulburn Broken and Shepparton Irrigation Region sub-catchments, and this is reflected in the generally poorer condition scores. A typical site in the Mid Goulburn Broken sub-catchment is likely to be small, invaded by weeds from agricultural land, and probably grazed, leading to loss of shrub layer and ground storey flora. This is reinforced by the higher condition scores found in larger blocks such in the Strathbogie Ranges, and along the Goulburn River (e.g. Barmah).

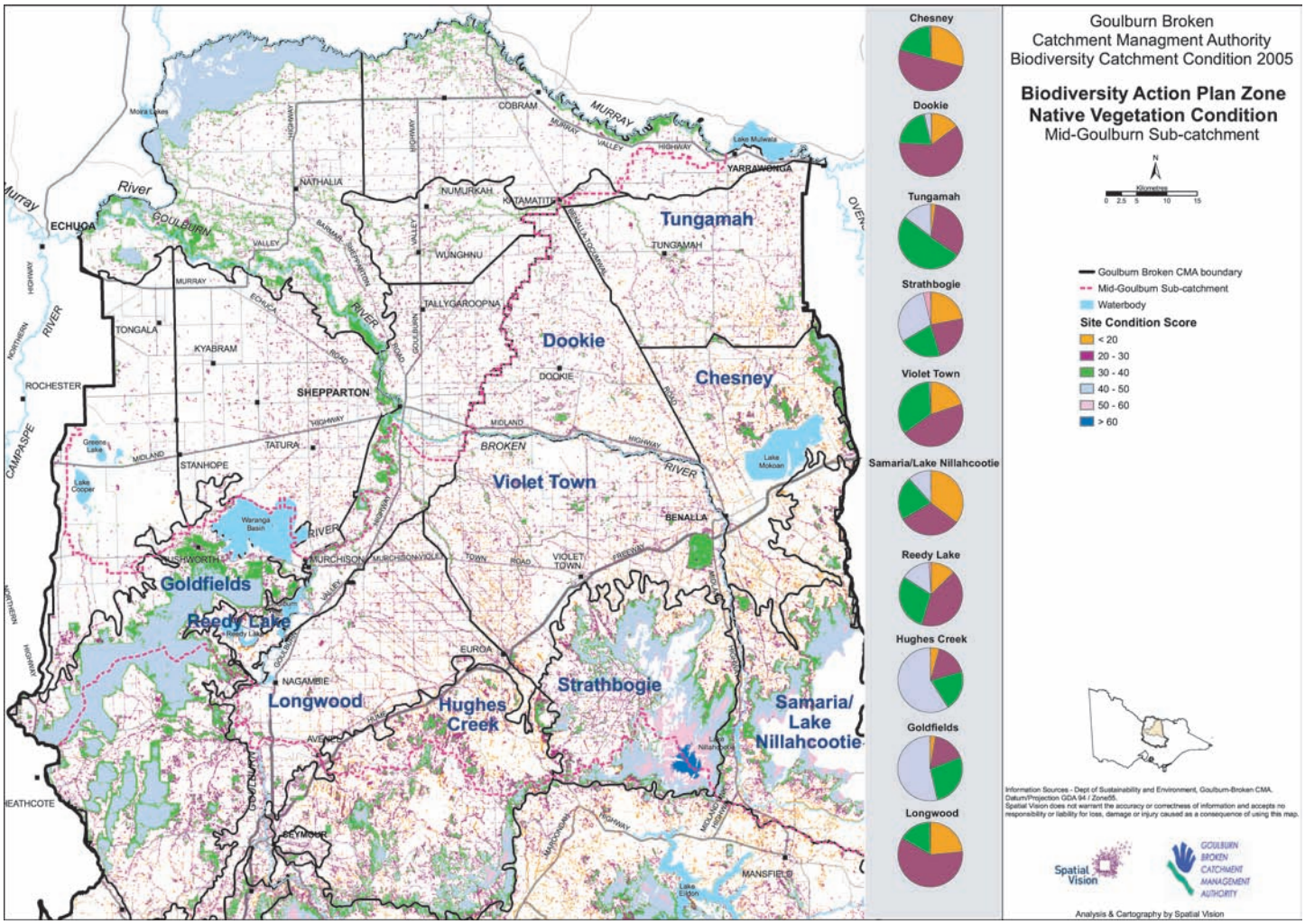
The model helps identify what parts of the Catchment need most attention in order to reach RCTs. This information can assist programs to determine where the focus for management is required, e.g. good quality areas before poor quality areas. The information also highlights the importance of large blocks of vegetation for good vegetation condition and highlights the importance of vegetation linkages.

MAP 3.2 Native Vegetation Condition in the Upper Goulburn sub-catchment



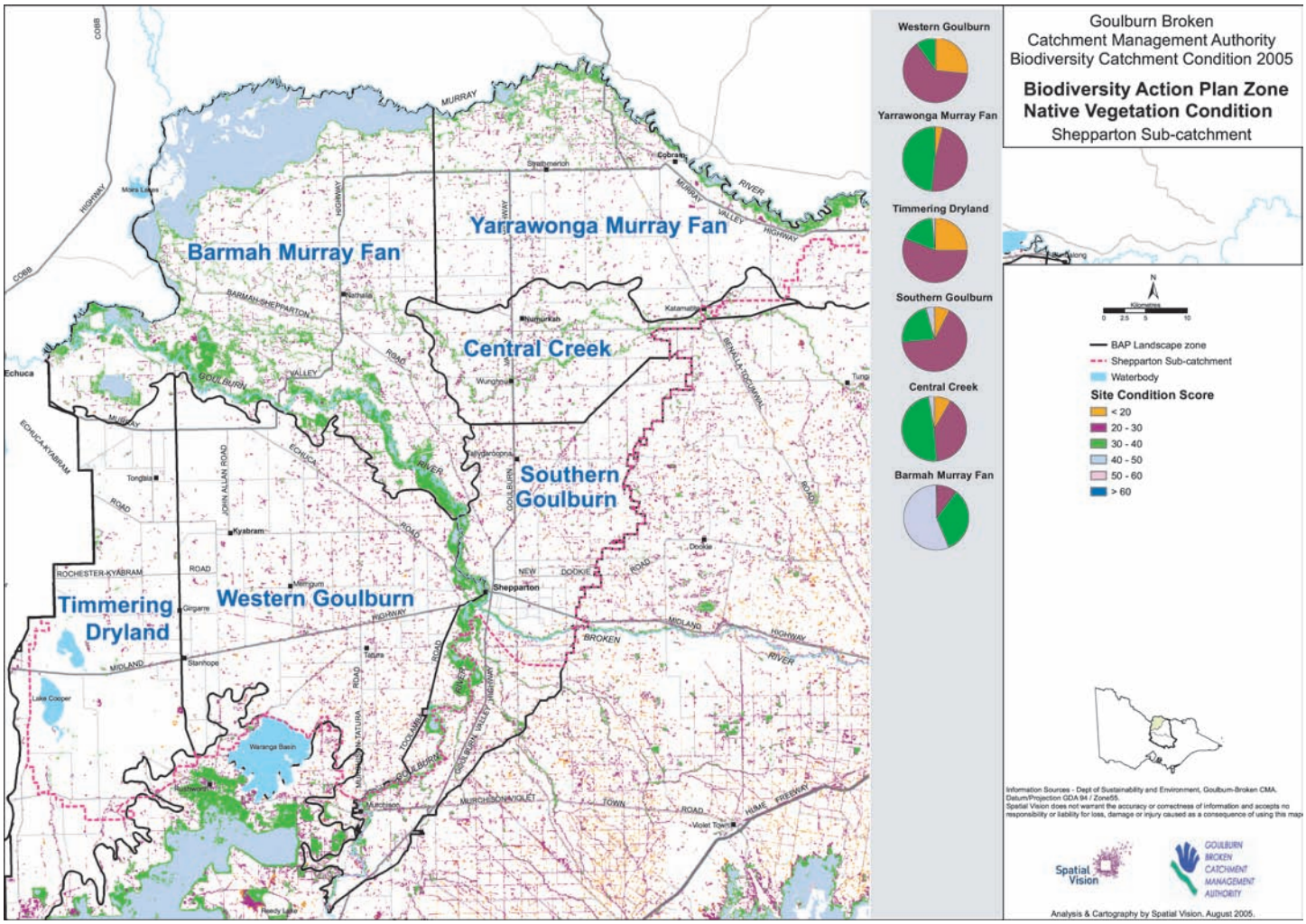
3. Introduction to Theme – Native Vegetation Quality

MAP 3.3 Native Vegetation Condition in the Mid Goulburn Broken sub-catchment



3. Introduction to Theme – Native Vegetation Quality

MAP 3.4 Native Vegetation Condition in the Shepparton Irrigation Region



Usefulness of Data:
The Vegetation Condition Model illustrates the relationship between the quality of individual remnants and the amount of native vegetation in the landscape. Zones that contained large patches of vegetation (predominately public land) had a greater ratio of higher scores than highly fragment landscapes. It also illustrates the nature of 'edge effects', where vegetation on the perimeter of larger remnants (such as the Barmah and Whroo forests) tends to be of lesser quality than deeper within the remnants. Edge effects on vegetation largely manifest as increased levels of weed invasion from surrounding agricultural land.

The Model also highlights the importance of large intact patches of vegetation and the importance of linkages within the landscape, especially riparian linkages, in maintaining high quality vegetation. Riparian areas also contribute significantly in terms of providing high quality vegetation.

For example, in the SIR the Western Goulburn BAP zone, which is extensively cleared with only tiny remnants remaining, contains the largest proportion of poor quality sites (scores less than 20/100), while the more intact Barmah Murray Fan has no sites scoring less than 20, and is the only zone in the SIR to support vegetation with scores greater than 40.

3. Introduction to Theme – Native Vegetation Quality

Data Reliability:

High	**Medium ✔**	Low

The Vegetation Condition Model is a model (e.g. tree layer models) based on a model (as described in the methods) and therefore can only be used as a rough guide to the condition of vegetation in the Catchment. Whilst the field sampling provides highly accurate information on sites that were sampled, the data reliability becomes less when extrapolating to additional sites. The Vegetation Condition Model was verified at about 50-60% correct. Whilst this may not appear high, it is a good result considering the complexities of the Model. The data is considered reliable for reporting on condition at the Catchment scale, but less so for individual sites.

Reporting uses:

High	**Medium ✔**	Low

The Model provides a landscape-scale overview of the distribution of current condition of vegetation across the Catchment. As such, its suitability for reporting on trends in condition change is limited to a snapshot in time. The metric used in the Model (habitat hectares) involves summing the weighted scores of a number of components that are considered to contribute to condition. It is not designed to be a monitoring tool, and it is unlikely any of the components will change substantially in value in any one year.

Reporting on trends in condition can only be done over longer time frames. It would be valuable to revisit the sampling after 5 and 10 years to provide further data upon which to detect trend.

Relevance in decision-making:

High	**Medium ✔**	Low

The Model provides an excellent overview to support planning at the catchment scale and is useful as a decision support tool when used in conjunction with additional data. However, because of scale limitations, it is not appropriate that the model inform decision-making about individual sites in the absence of any field truthing.

3.2 Indicator: Parameters of the Habitat Hectare Assessment

Indicator Type: Direct measure of status and/or condition

Aim:

- To display individually the components of the habitat hectare scores in order to assess the strengths and weaknesses of native vegetation condition in the Goulburn Broken Catchment.
- To provide a snapshot of the state of the different parameters deemed important in improving vegetation quality in the Goulburn Broken Catchment.

Methods:

A number of habitat hectare assessments have been undertaken across the Goulburn Broken Catchment in recent years. Habitat hectare assessments have two main components "site condition score" and "landscape context score". The "site condition score" has seven main parameters: Large trees, tree canopy cover, understorey, weeds, regeneration, organic matter, and logs.

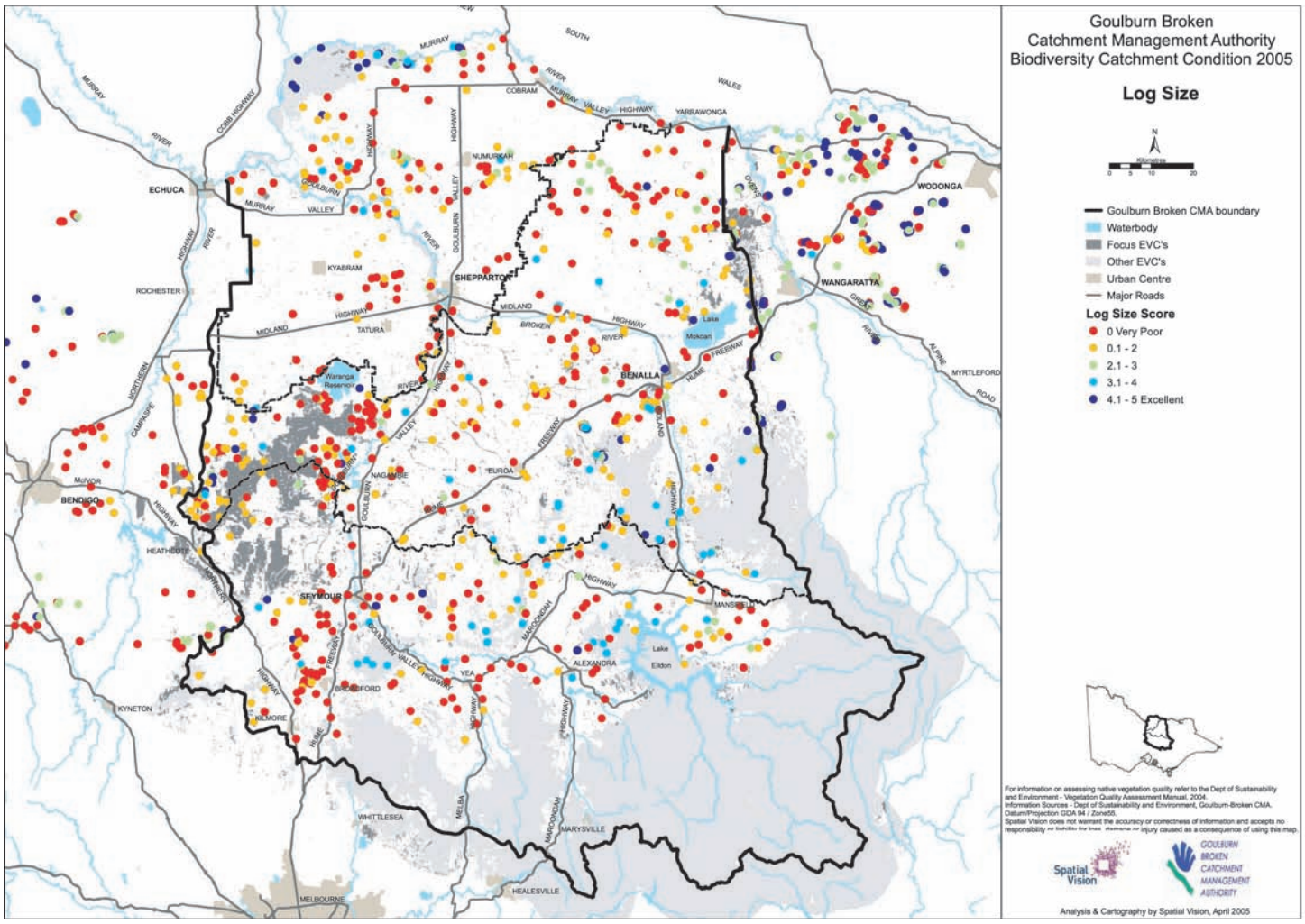
Each of these components is scored against the EVC benchmark and weighted differently in terms of impact on vegetation condition. For example understorey has a greater influence and is weighted four times more on vegetation quality than leaf litter.

A series of maps has been developed using the individual scores for each component. These maps help highlight the relative condition of each parameter. This information is then assessed to draw conclusions about the condition of the components at a Catchment scale.

3. Introduction to Theme – Native Vegetation Quality

Results/ Discussion:
Habitat Hectare Assessment – Log Size
Few sites exhibit log sizes representative of the EVC benchmark and the Catchment in general scores low for this habitat component. Generally speaking fallen timber is missing from the landscape.

MAP 3.5 Habitat Hectare Component - Log Size



Log Size – Catchment Rating

Poor ✔	Medium	Good

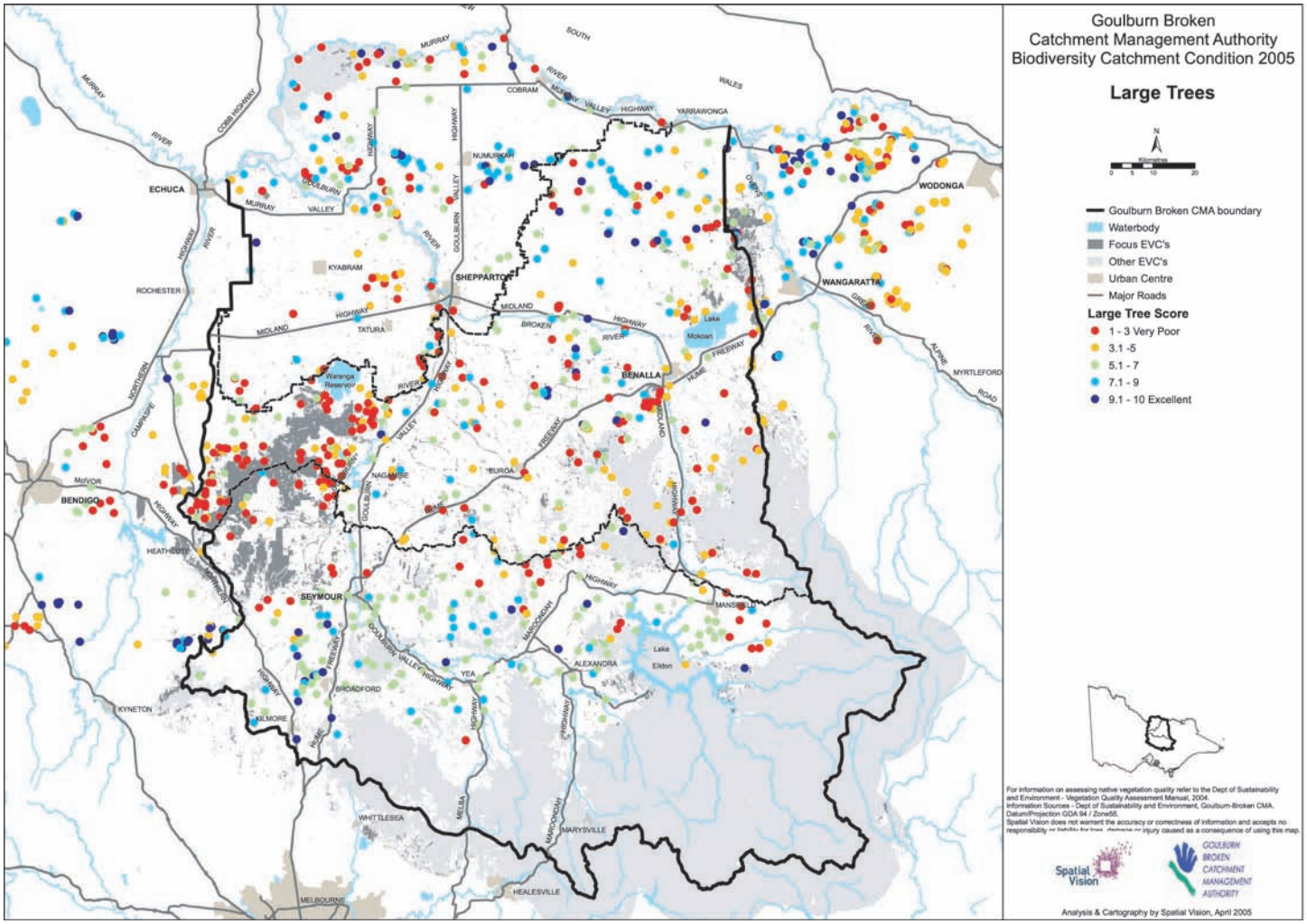
Only approximately 8% of sites in the Goulburn Broken Catchment had scores in the top two categories.

3. Introduction to Theme – Native Vegetation Quality

Results/ Discussion:
Habitat Hectare Assessment – Large Trees

The presence of large trees varies across the Catchment. The upper Catchment has a large proportion of sites that score well for this component. The Mid Goulburn and SIR scores varied greatly. The assessment also shows good scores for this component along major waterways. Areas of the Box Ironbark Ecological Vegetation Community generally score very poorly. The conservation of large trees are vital in the private land areas. Often these scattered trees are the only remaining vegetation.

MAP 3.6 Habitat Hectare Component – Large Trees



Large Trees – Catchment Rating

Poor ✔	Medium	Good

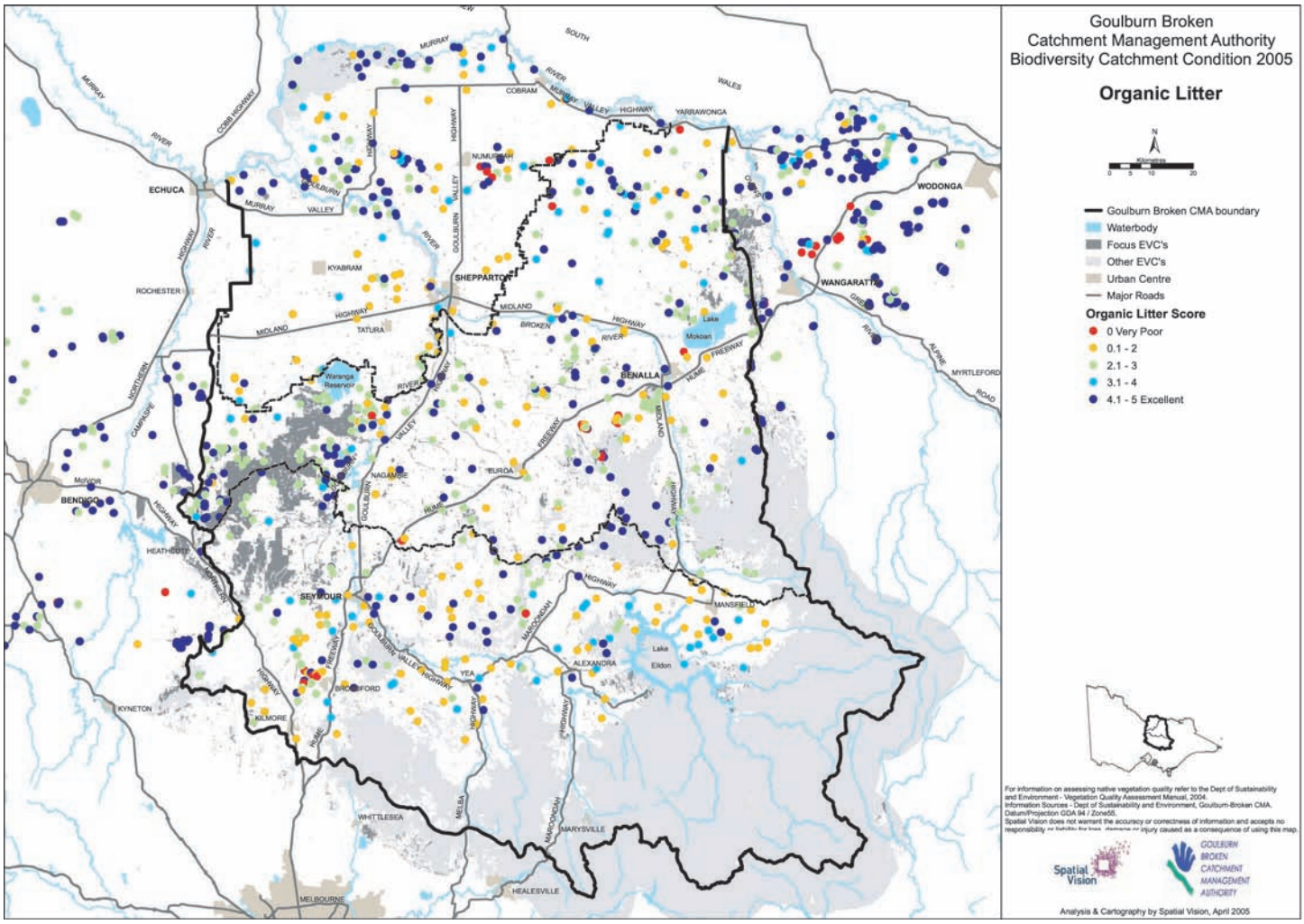
Seventy per cent of the sites were situated in the lowest categories for this habitat condition component.

3. Introduction to Theme – Native Vegetation Quality

Results / Discussion:
Habitat Hectare Assessment – Organic Litter

The level of organic litter at sites assessed across the Catchment was wide ranging, however there were very few sites that received the lowest possible score. There are a large number of sites that received the highest possible score indicating that these sites are at the benchmark for organic litter. There are no obvious patterns within this parameter.

MAP 3.7 Habitat Hectare Component – Organic Litter



Organic Litter – Catchment Rating

Poor	**Medium ✔**	**Good ✔**

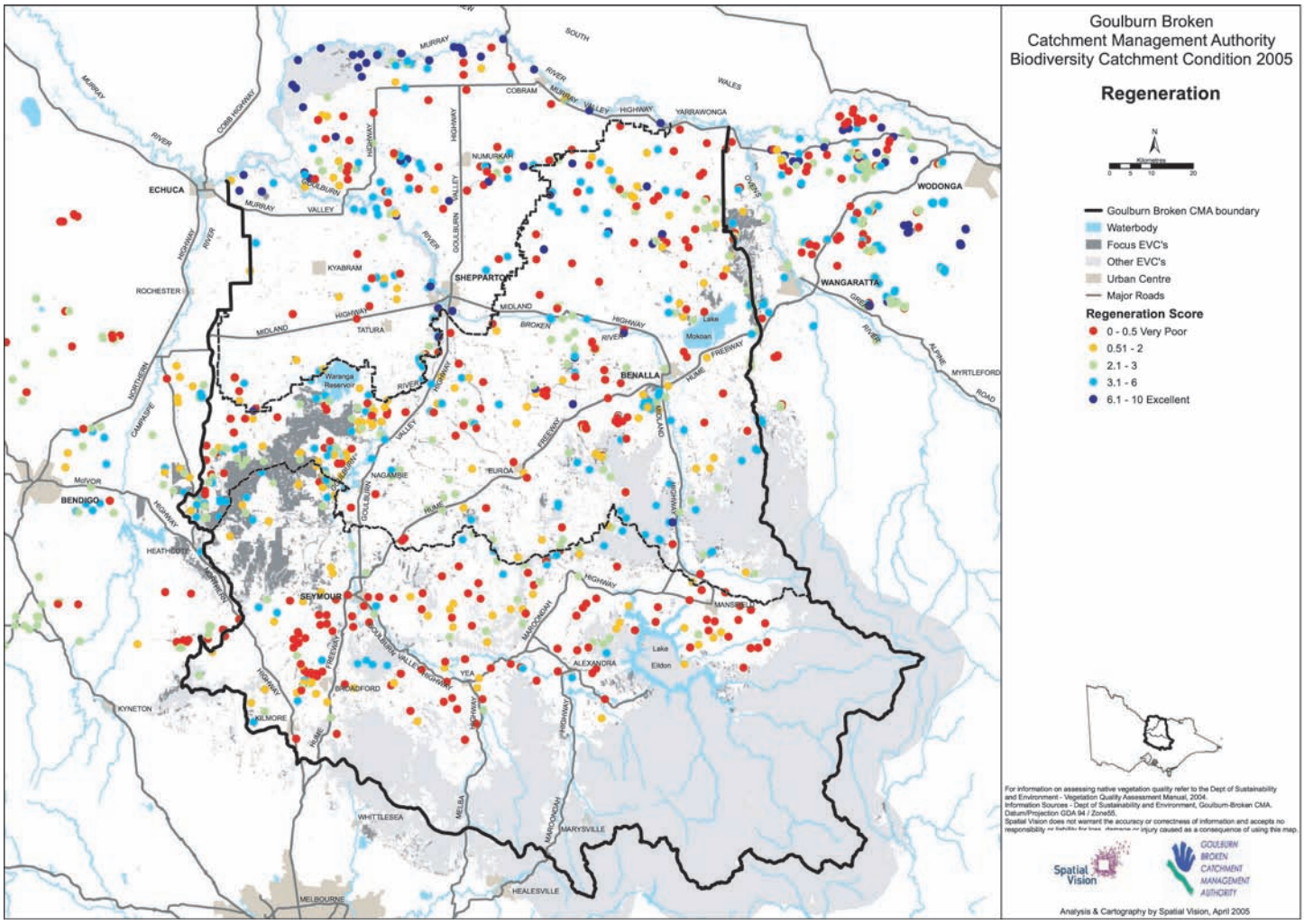
The majority of sites ranged between the middle category and the lowest category with only 20% of sites in the top two categories.

3. Introduction to Theme – Native Vegetation Quality

Results / Discussion:
Habitat Hectare Assessment – Regeneration

The results show that the majority of the sites assessed have low scores for regeneration. The riparian areas appear to be the areas providing the best regeneration results. The upper catchment scores for regeneration are particularly poor. This component will have a major influence on the Catchment's vegetation quality into the future.

MAP 3.8 Habitat Hectare Component – Regeneration



Regeneration – Catchment Rating

Poor	**Medium ✔**	Good

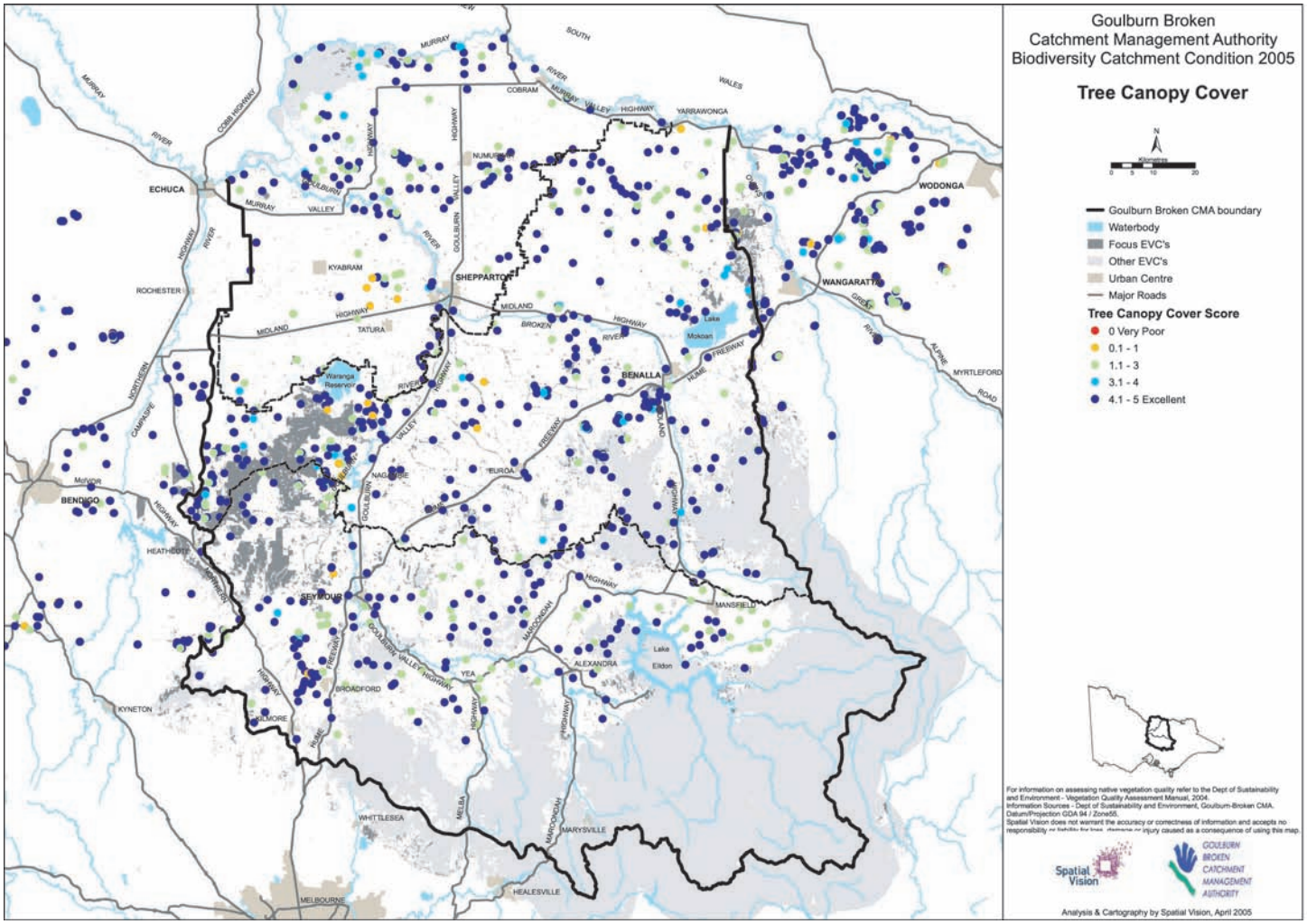
This habitat condition component is wide ranging in it scores across the Catchment.

3. Introduction to Theme – Native Vegetation Quality

Results / Discussion: Habitat Hectare Assessment – Tree Canopy Cover

Most sites surveyed either met or came close to the benchmark for canopy cover. This was consistent across the whole Catchment. This may indicate generally good health of mature trees or the dense clumps of old regeneration.

MAP 3.9 Habitat Hectare Component – Tree Canopy Cover



Tree Canopy Cover – Catchment Rating

Poor	Medium	**Good ✔**

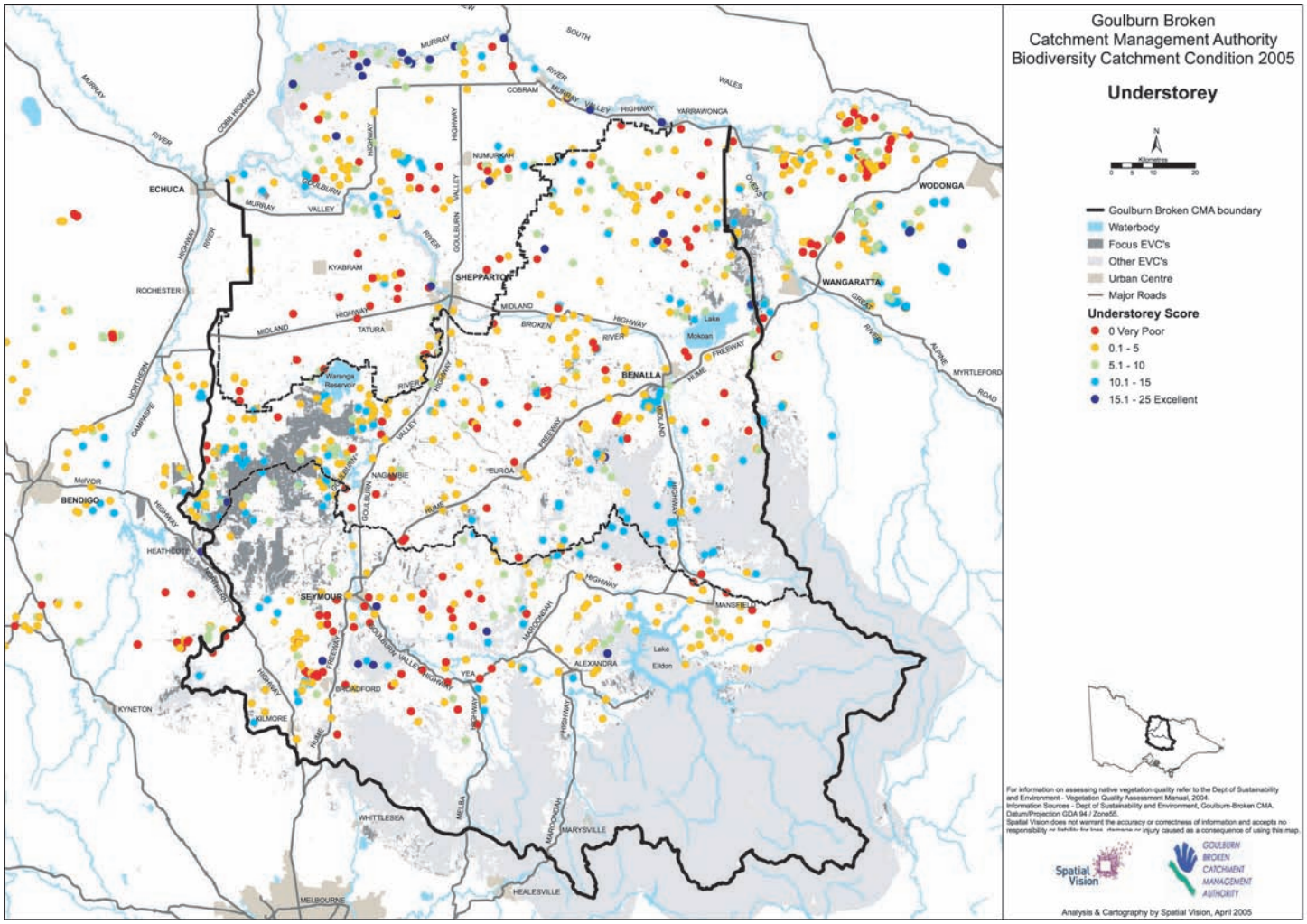
Over 50% of the sites in this component were scored in the top two categories.

3. Introduction to Theme – Native Vegetation Quality

Results / Discussion: Habitat Hectare Assessment – Understorey

Understorey is vital to a functioning landscape and is often a good indicator of the condition of the vegetation. This habitat hectare component consistently scored poorly across the whole of the Catchment, with very few sites scoring the benchmark or close to the benchmark.

MAP 3.10 Habitat Hectare Component – Understorey



Understory – Catchment Rating:

Poor ✔	Medium	Good

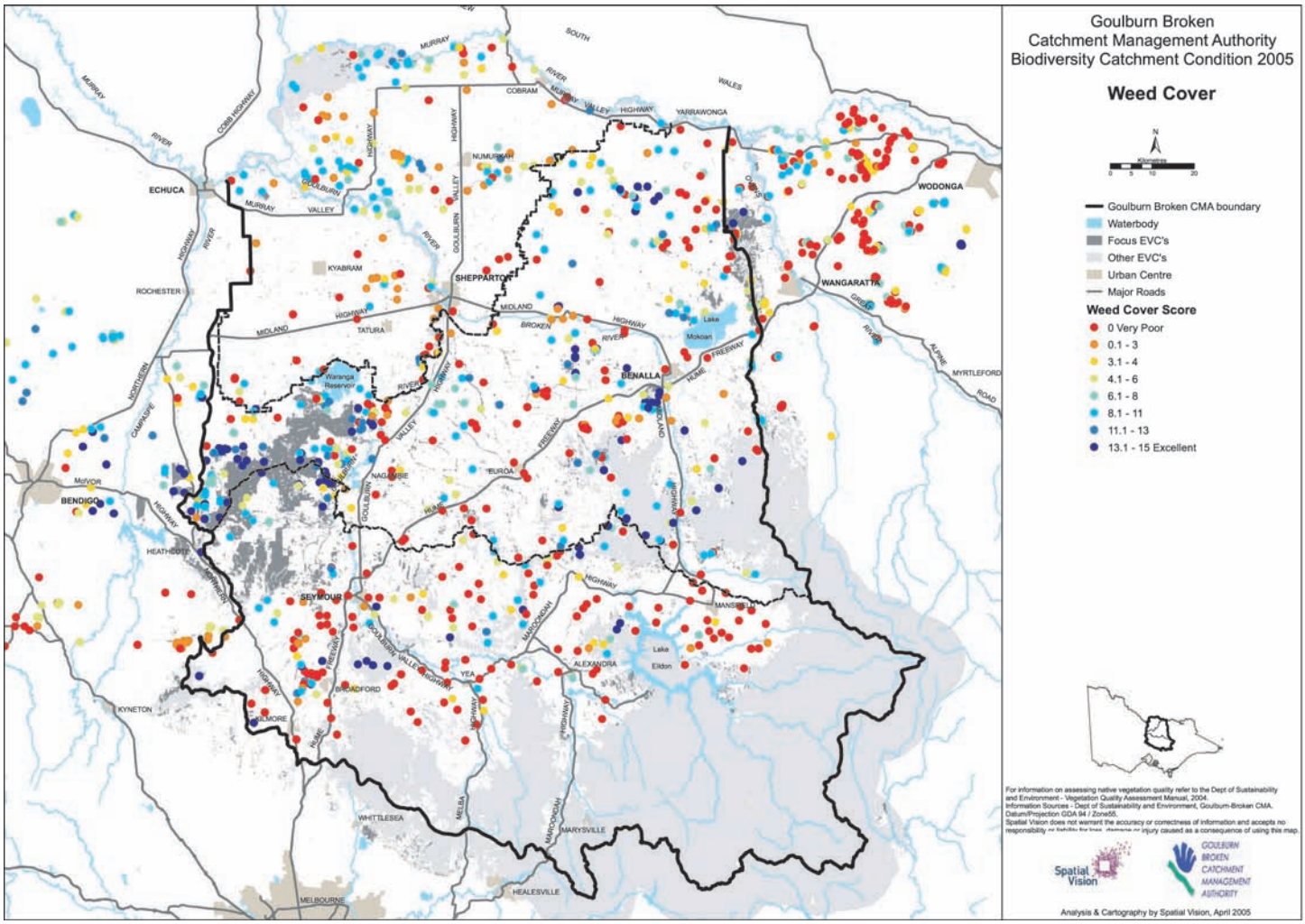
Most of the sites in the Catchment are in the lowest two categories.

3. Introduction to Theme – Native Vegetation Quality

Results / Discussion: Habitat Hectare Assessment – Weed Cover

The assessment indicates a wide spread of results across the Catchment for weed cover, however the majority of the sites scored poorly, particularly in the upper catchment. The Box Ironbark areas of the Mid Goulburn catchment have very high scores indicating the area has a low weed cover. Generally weed cover in the Goulburn Broken Catchment is a major concern.

MAP 3.11 Habitat Hectare Component – Weed Cover



Weed Cover – Catchment Rating:

Poor ✔	Medium	Good

This habitat condition component has wide ranging scores, however there is a large proportion of sites with the lowest possible score.

3. Introduction to Theme – Native Vegetation Quality

Usefulness of Data:
By separating the habitat hectare components and displaying them individually, it is possible to identify and consider the major factors influencing the condition of vegetation. It also highlights the need to manage and address several factors when designing and implementing techniques for improving vegetation condition.

The assessment indicates that some components are of more concern in some areas than in others. For example, weed cover is less severe in the Box Ironbark areas compared to other parts of the Catchment. This is partly due to the inherently lower nutrient fertility of the area.

Comparison of components is not recommended (e.g. comparing large trees to organic litter) as they are weighted differently. Each component should be assessed and considered individually.

Data reliability:

High ✔	Medium	Low

The data used in the maps for this indicator is raw data and therefore quite reliable. Every attempt has been made in the development of the habitat hectare assessment to reduce the amount of subjectivity when assessing a site.

Reporting uses:

High ✔	Medium	Low

This indicator provides some good baseline data. In the future it may be possible to reassess the sites using the same methodology in order to determine trends in condition. However, no trends in condition can be determined at this point due to lack of data.

Relevance to decision-making:

High ✔	Medium	Low

The information provided by this indicator highlights a number of factors that can assist decision-making. The maps highlight what factors need to be considered and focused on in terms of on-ground management that will improve the quality of vegetation. This will assist in designing and implementing programs.

3.3 Indicator: Tenure of Vegetation in the Goulburn Broken Catchment

Indicator Type: Predicted changes to Condition and/ or Status from measuring actions.

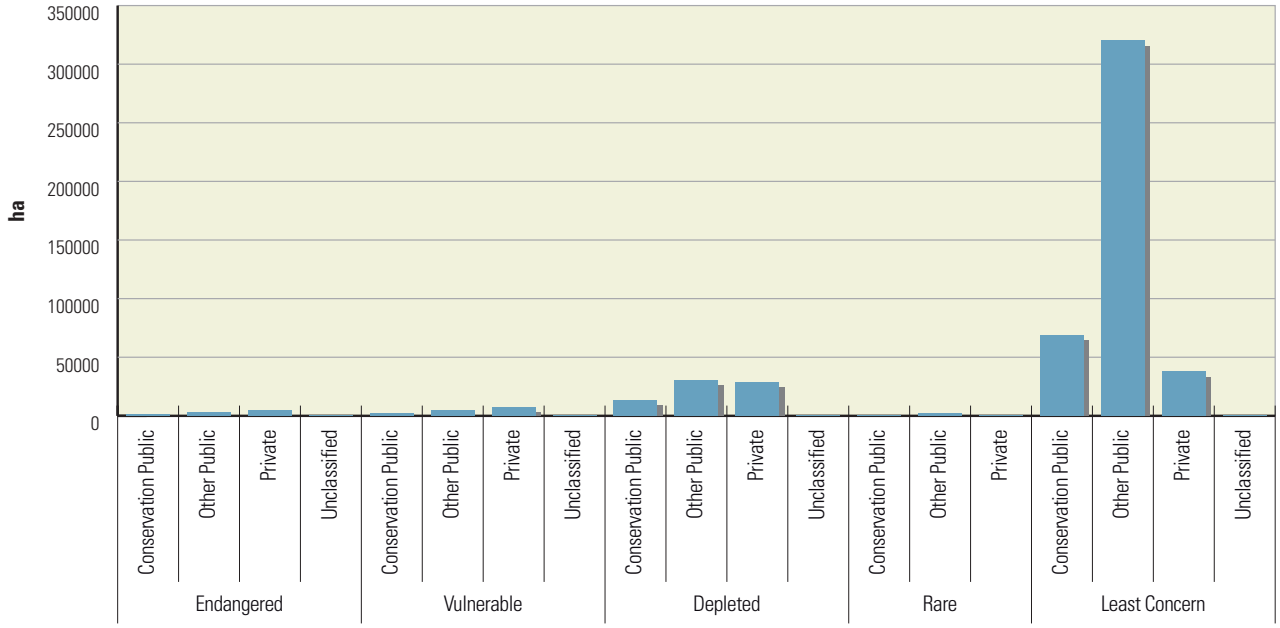
Aim:
To document the amount of vegetation across the Catchment reserved for conservation, and the conservation status of that vegetation.

Method:
The Bioregional Conservation Status GIS Layer developed by the Department of Sustainability and Environment (DSE) was intersected with a GIS layer of land tenure to determine the amount of vegetation under different management regimes (on the assumption that tenure is indicative of conservation management input).

Data usefulness:
A key principle in natural resource management is that areas of high conservation importance should be protected by 'securing' the tenure of land title. Where land (and vegetation) is specifically reserved for conservation in this way (e.g. national park, conservation covenant) it follows that management will contribute more to improving condition than would otherwise occur. For example, such areas are not going to be subject to the destructive impacts of stock grazing, timber extraction etc, and are more likely to (or should) have more resources dedicated for fire and pest plant & animal management. Thus increases in areas under conservation management is a good indicator of benign management occurring, and biodiversity values being protected.

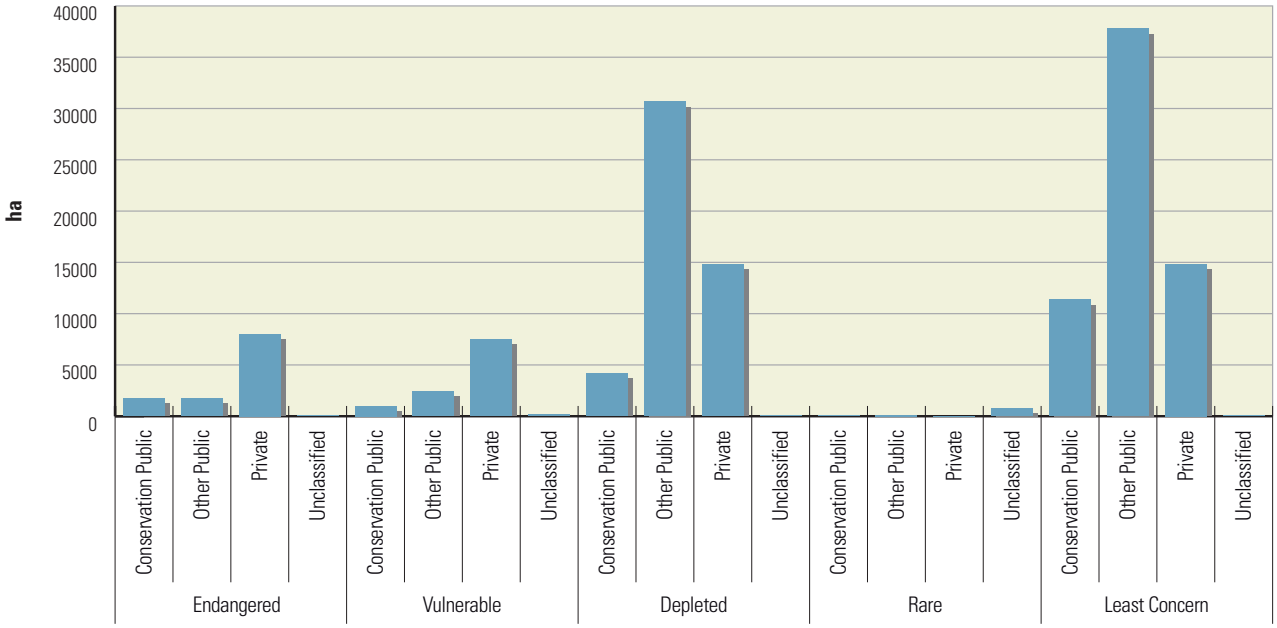
3. Introduction to Theme – Native Vegetation Quality

TABLE 3.1 Existing vegetation, conservation status and tenure in the Upper Goulburn sub-catchment



Most of the vegetation in the upper Goulburn region is on public land, however only a small proportion is reserved for conservation. Most of the vegetation in the reserve system and in the upper catchment generally is of "least concern". This vegetation plays a vital role in the catchment's health through the provision of ecosystem services (water quality, erosion control, oxygen production, carbon sequestration etc).

TABLE 3.2 Existing vegetation, conservation status and tenure in the Mid Goulburn Region

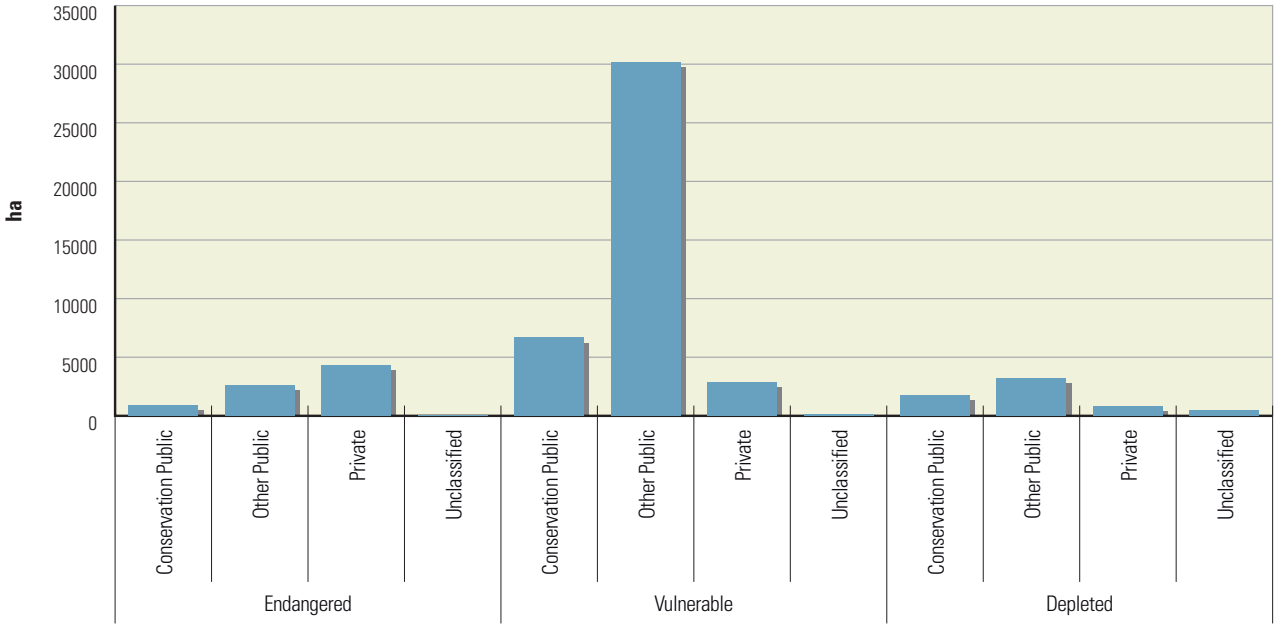


Most of the vegetation in the Mid Goulburn Broken sub-catchment region is found on public land, however only a small proportion of this is reserved for conservation, including areas such as forest.

The vegetation that is of most concern to the Catchment, the endangered and vulnerable vegetation classes, exist predominately on private land resulting in a higher chance of decline in quality than that under management for conservation.

3. Introduction to Theme – Native Vegetation Quality

TABLE 3. Existing vegetation, conservation status and tenure in the Shepparton Irrigation Region



Most of the vegetation remaining in the SIR is on public land but as with the Mid Goulburn Broken sub-catchment region a large proportion is not reserved for conservation but for other purposes. Once again, vegetation of most concern e.g. endangered vegetation, is poorly represented within the conservation reserve system. There is also a large amount of vulnerable vegetation within the SIR which is again not reserved for conservation purposes. The continuing degradation of quality through stock grazing, feral animals (including pigs and horses), timber extraction and off-road vehicle use is not compatible with sound natural resource management practises, nor with the achievement of RCTs.

Discussion:

While information on tenure does not provide a direct link to the trend of vegetation condition in the Catchment it does provide a useful insight into the security of vegetation quality. Using the assumption that vegetation quality is likely to be maintained or improved in areas reserved for conservation compared to areas reserved for other purposes or private land, (while all native vegetation is protected on private land improvement of the vegetation is less likely than vegetation reserved for conservation and actively managed), some conclusions can be drawn about the amount of vegetation that has the potential to improve and also the amount of vegetation that requires a change in use/management. The exception to this is areas of private land that have vegetation managed for conservation through incentive schemes or conservation covenants. This information is addressed through other indicators.

Data reliability:

High ✔ Medium Low

The Bioregional Conservation Status mapping used to derive this indicator was developed from the EVC extant mapping. This information was intersected with tenure mapping.

Reporting uses:

High **Medium ✔** Low

This information is very useful in providing a snapshot of the current reservation status of the Catchment's vegetation. Assumptions can then be added to quantify trends in vegetation condition. Further refinements of the assumption for public land are required.

Relevance to decision-making:

High **Medium ✔** Low

The information displayed through this indicator helps to identify where greater effort is required in securing areas of vegetation for conservation. The indicator also highlights the level of security of the vegetation in the Catchment. The Catchment's target for improving the quality of 90% of vegetation does not distinguish between tenure, therefore the Catchment managers must consider public land that is not reserved for conservation in managing for an increase in vegetation quality.

3. Introduction to Theme – Native Vegetation Quality

3.4 Indicator: On-Ground Actions

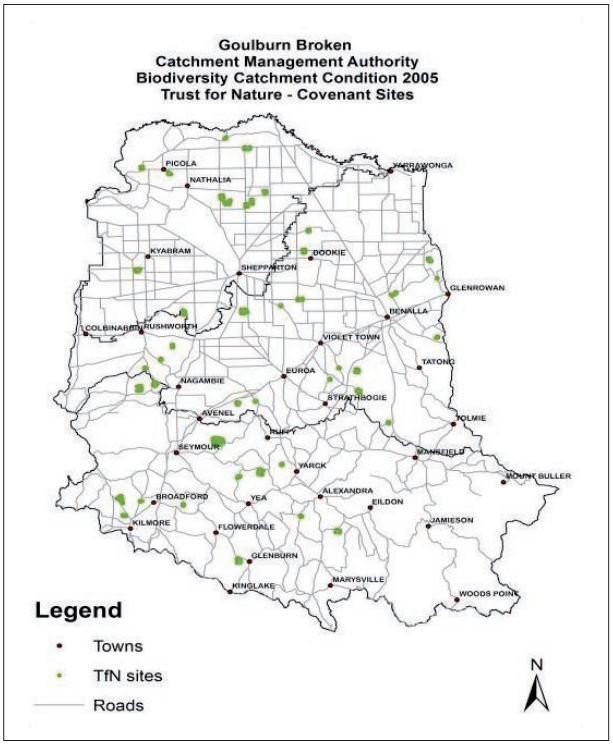
3.4a Vegetation Protected Through Covenants or Government Funded Environmental Incentives

Indicator Type: Predicted changes to Condition and/ or Status from measuring actions.

Aim:
To provide baseline data on the amount of private land vegetation under permanent protection through covenants and areas of remnant vegetation fenced through environmental management grants (EMG), SIR incentives and waterway grants.

Method:
Trust for Nature covenant sites have been displayed on a map and the size of the sites recorded. An assumption is applied to these sites that they will improve in quality by 10% in 10 years. EMG, SIR incentives and waterway grant information has been collated from CAMS relating to area protected through EMG (i.e. sites that have been identified as completed and funded).

MAP 3.12 Trust for Nature Covenant Sites across the Goulburn Broken



Usefulness of Data:
Four thousand three hundred hectares of remnant vegetation has been protected through conservation covenants administered through Trust for Nature (TFN) since 1987 up until June 2006, although the rate of uptake has increased significantly in recent years. One thousand eight hundred hectares of remnant vegetation have been fenced through EMG and the waterways program since the inception of the CAMS data recording system in 2001 across the Catchment up until June 2006.

TFN covenants play a major role in achieving the RCTs. It is anticipated that 4300ha under covenants will improve by 10% in quality in 10 years from the time of the initial intervention. There is, however, a lag time in the actual improvement of condition which needs to be considered. Further monitoring is required to determine the level of vegetation condition improvement as a result of conservation covenants.

EMG and waterways grants also contribute to the improvement of vegetation quality, however the level of security of these sites is less than the covenants therefore it may take longer for these sites to improve in quality by 10%, however no survey data is available to provide insight into the different levels of vegetation improvement.

This information is output-based and does not provide insight into the Catchment's progress without a number of assumptions being applied which then may provide some measure against the RCTs. (see section 3.5)

Data reliability:

High ✔	Medium	Low

This information is based on real data and is highly reliable, however the assumption that the vegetation managed through covenants or EMG will improve by 10% in 10 years is less reliable and further monitoring of the sites is required to determine if this predicted change in condition is realistic.

Reporting uses:

High	**Medium ✔**	Low

Both sets of data are outputs only and do not provide an indication of progress towards the RCTs without further interpretation by using assumptions. This data can then be used to predict some trends in condition, however it is not conclusive. All covenanted sites within the Catchment do have habitat hectare assessments and EMG have vegetation quality assessments completed, that maybe useful in measuring trends into the future.

Relevance in decision-making:

High	Medium	**Low ✔**

This information can help plan future activities if monitoring activities are undertaken to determine with more certainty the activities role in achieving the RCTs.

3. Introduction to Theme – Native Vegetation Quality

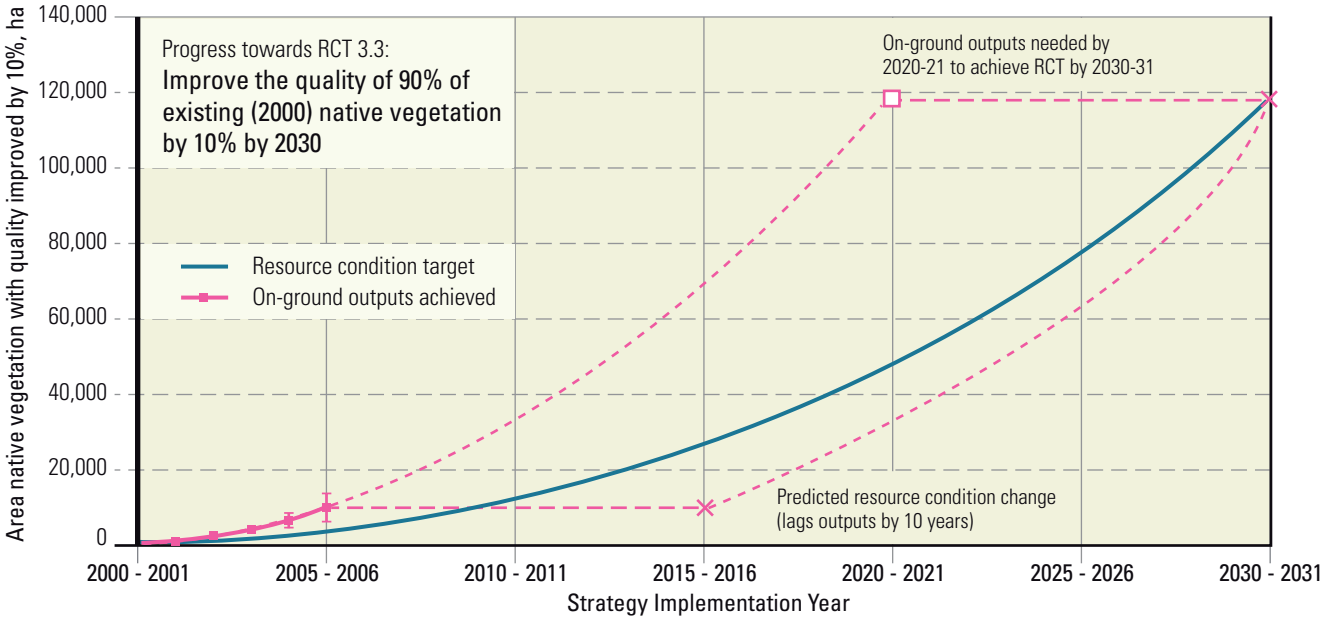
3.5 Indicator: Annual Report Card – Impact of Vegetation Protection Activities

Indicator Type: Predicted changes to Condition and/ or Status from measuring actions.

Aim:
To use output data (e.g. ha protected through incentives) and a series of assumptions to determine the Catchment's progress to the RCTs.

Results:
Previous indicators have shown quality of vegetation in the Catchment is generally poor. However, while the following report card indicates a positive trend towards the target of improving vegetation quality by 10%, meeting this target is behind schedule due to the time it takes on-ground activities to have an effect on improving the quality of vegetation.

GRAPH 3.1 Progress towards RCT – Improve the quality of 90% of existing (2000) native vegetation by 10% by 2030



3. Introduction to Theme – Native Vegetation Quality

Assumptions	Uncertainty	Importance for decision-making
Area native vegetation quality improved by 10% =		
1. 2* x	H	VH
2. [area remnant fenced (terrestrial, wetland or stream/river) +	H	M
3. area covenanted]	H	M
4. Lag time between action and 10% improvement is 10 years (indicated by X). (This will mean that sufficient actions will need to be undertaken 10 years before RCTs date of 2030-31, indicated by ☐).	VH	H
5. Data for actions undertaken 2000-01 to 2002-04 were interpolated from 2003-04 and 2004-05 results.	H	L
6. Cumulative actions achieved in 10 years to 2000-01 = 1,000 ha.	VH	M
7. No further decline in quality on private land will occur. (Most of the damage was done in the first 50 years of European settlement and the quality of remnants will be maintained or improved.)	VH	H
8. Annual increase in targets (progress towards RCTs) is not expected to be linear: new mechanisms will be developed to enable greater levels of works or destocking. Projects are underway in the Catchment to identify these mechanisms. In now seems unlikely that existing mechanisms will result in the rate of change required to achieve the long-term RCTs. The implications of achieving less than the RCTs require significant research.	H	VH
* TOTAL increase is DOUBLE that supported by Government funds. This includes component assumptions (that need to be tested separately) of: – contributions without Government funds, including works undertaken and natural regeneration – reductions from direct native vegetation removed, and, – reductions from native vegetation dying.		

Notes, including data management issues:

1. Report card compiler: Kate Brunt and Rod McLennan.
2. Error bars (+/- 30%) are based on expert opinion (Kate Brunt and Tim Barlow) and are for a 95% confidence level. These error bars will become less than 30% as major assumptions are refined.
3. Satellite imagery is not yet a reliable means of measuring progress: ongoing imagery improvements result in finer patches of vegetation being detected and hence greater areas recorded. The lag time between seedling and detection also complicates the use of the data to verify that actions are translating into outcomes in the medium term (3-10 years).
4. A survey is expected to be undertaken during 2006 to determine the level of works undertaken (including destocking) without government funding.
5. Targets apply to private land only: this is where GB CMA has most influence. (Figures are being collated for public land and these will be included in future updates.)
6. Two possible sources for "covenant": Information in GB CMA 2004-05 Annual Report on page 37 provided by Trust for Nature's Doug Robinson has been used. 1,440 ha permanent protection (23 covenants, mean size 42 ha; one permanent purchase, three Revolving Fund purchases and one brokered Crown land purchase). The alternative in the compiled figures on page 8 was not used. Similarly, the figure from Doug in the 2003-04 Annual Report was used (only the total number of covenants was recorded in the combined outputs table earlier in the Report).
7. Full referencing of assumptions will be included in future updates.

Outputs contributing to RCTs for 2005-06:

	From funds received through GB CMA			
	Target	**Achieved**		**% achieved**
A. Fence terrestrial remnant vegetation	382	519	ha	136
B. Fence wetland remnant	13	6	ha	46
C. Fence stream/river remnant	92	115	ha	125
D. Binding management agreement (license, Section 173, covenant)	1,000	758	ha	76

Calculation: progress towards RCTs:

Formula	2 x [A+B+C+D]	*Total (all sources)*	2,796	ha with vegetation quality improved

3. Introduction to Theme – Native Vegetation Quality

Usefulness of Data:
This framework is presently used to measure trends in vegetation condition and the Catchment's progress towards RCTs.

This information should be interpreted as showing a positive trend towards the RCTs, however the rate of that change requires further investigation through improving the assumptions that the graph is based on. The assumptions will be continually improved as further information becomes available.

Data reliability:

High	**Medium ✔**	Low

The outputs data is highly reliable, however some important assumptions have not been tested, therefore further improvement is required to make the data more reliable. These include:

1. Understanding the amount of activities/change occurring outside the grant system.
2. Understanding the real effects on improvement of quality through a covenant or an incentive program.
3. Gaining a better understanding about the amount of loss of quality through such things as natural decline or grazing and clearing.
4. Gaining an understanding about the time lag between implementing works and real change in condition.

Reporting uses:

High ✔	Medium	Low

This indicator is very useful in reporting against the Catchment's progress towards RCTs and provides an insight into the return on investment in on-ground activities on private land. As shown already in this report, previous themes are not able to detect trends towards RCTs, therefore this process is needed even though there is a heavy reliance on assumptions.

Relevance in decision-making:

High	**Medium ✔**	Low

This indicator assists in future decision-making by reporting on past activities. The indicator shows that the current on-ground activities are progressing towards our target, but also shows that the level of activity needs to continually increase. The indicator will help track this progress. The indicator also provides valuable information about monitoring programs required to improve assumptions and increase reliability of the data.

3.6 Conclusion Vegetation Condition Theme

The theme has provided a number of ways to assess the value and condition of vegetation. This theme has compiled all the most relevant data relating to the RCTs: "Improve the quality of 90% of existing (2003) native vegetation by 10% by 2030". Continued refinement of the monitoring and reporting on vegetation quality is required.

The information shows that while we have some major patches of high quality vegetation especially in public land areas and riparian areas, the highly fragmented landscape in many areas of the Catchment has resulted in poor quality vegetation across most of the Catchment. Smaller remnants with high edge to area ratios are highly susceptible to disturbance pressures such as weed invasion.

The habitat component indicator also shows that there are a number of components that should be considered when assessing vegetation condition, and as a result of this, all of these components must be considered in any on-ground management activities e.g. fallen timber and weeds.

On-ground activities contribute to improving the vegetation condition on private land. However, further monitoring is required to gain greater certainty about the accuracy of assumptions made to determine progress towards the RCTs and further investigation into the best tools to achieve this is required.

The theme also highlights the importance of public land in sustaining high quality vegetation and that further consideration of the contribution public land is making is required when determining the Catchment's progress towards the RCTs.

4. Introduction to Theme – Threatened Flora and Fauna

The Regional Catchment Strategy outlines the RCTs for threatened species as: "Increase 2002 conservation status of 80% threatened flora and 60% threatened fauna by 2030".

Currently the GB CMA does not have any adequate tools or indicators to enable measurement of progress towards the above RCTs. Further investigation into the relevance of this target (as currently expressed) is required and it may be appropriate in the future to alter the RCTs to enable monitoring and reporting progress towards threatened species conservation.

The DSE's biodiversity and natural resources group has developed a draft framework for establishing indicators, setting targets, monitoring and reporting on outcomes of threatened species and threatened ecological communities. This framework was then trialled in the Goulburn Broken Catchment in 2005.

4. Introduction to Theme – Threatened Flora and Fauna

4.1 Indicator: Framework for Indicators, Target Setting, Monitoring and Reporting for Threatened Species and communities – Trial of Framework in the Goulburn Broken Catchment

Aim:
To use the draft framework and trial assessment undertaken in the Goulburn Broken Catchment to provide a snap-shot and show trends in threatened species in the Catchment.

Method:
As part of the trial of the draft framework, 20% of the Catchment's threatened species were assessed. If the framework is adopted, 20% of species will be assessed annually. Each species is monitored in relation to three attributes: populations, environment and "future risk". A series of questions are asked of the expert for that species and the level of confidence is also recorded based on expert opinion. The information is then analysed and graphs are developed.

Population attributes are characteristics of the item itself. This category includes broad attributes such as the extent of range, through to specific attributes, such as population counts and genetic diversity.

Environmental attributes include all factors of items -physical and chemical environment, ranging from soil pH and salinity, through to presence of predators and competitors.

The "future risk" of the population is defined as non-habitat base threats where a reduction in the threat would improve the outlook of the species.

For example, reducing grazing effects.

Results / Discussion:
The framework aims to estimate the status (current and past) and the trend (differences between current and past) of species at the level of population and occurrence. This estimate is carried out in three categories: Population, environment and "future risk". A number of attributes are assessed under each of these categories by asking a series of questions to an expert of that particular species. These qualitative estimates have different degrees of reliability or uncertainty, therefore a state or level of confidence is applied to each category. The cost of implementing this framework needs to be carefully considered.

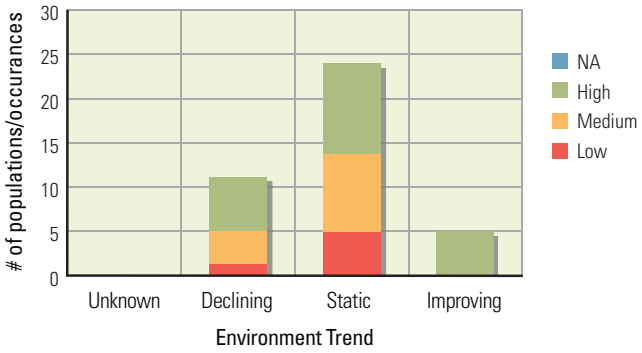
GRAPH 5.1 Population trend of threatened species in the Goulburn Broken

Category: POPULATION

	UNKNOWN	DECLINING	STATIC	IMPROVING	
Low		6	12	0	
Medium		3	6	4	
High		8	7	3	
NA	6				55

GRAPH 5.2 Environment trend for threatened species in the Goulburn Broken

Category: ENVIRONMENT

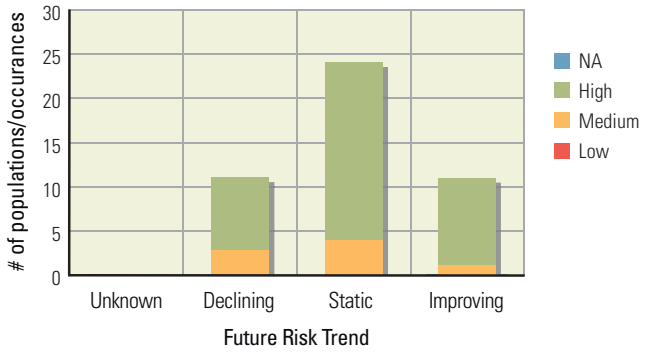


	UNKNOWN	DECLINING	STATIC	IMPROVING	
Low		1	5	0	
Medium		4	8	0	
High		6	11	5	40
NA	0				

4. Introduction to Theme – Threatened Flora and Fauna

GRAPH 5.3 Future risk trend for threatened species in the Goulburn Broken

Category: FUTURE RISK



	UNKNOWN	DECLINING	STATIC	IMPROVING	
Low		0	0	0	
Medium		3	4	1	
High		4	21	10	43
NA	0				

The trial implementation of the framework shows that the majority of populations are static in nature at present. There are very few populations that are believed to be improving, however those populations that are improving in all three categories have a high reliability and confidence.

Of concern is the number of populations that are believed to be declining. Also of concern is the large degree of uncertainty about the population trends, which indicates the need to improve the collection and quality of baseline data about population trends.

Data Reliability:

High	**Medium ✔**	Low

This model for monitoring threatened species trends has a reliability or confidence level built into the process, resulting in a tool that provides a clear picture of the quality of the assessments, however there were a number of assessments that were identified as low in reliability.

Reporting uses:

High	**Medium ✔**	Low

Currently the model and information cannot be used for reporting on the Catchments progress towards the RCTs as the information does not link to the current RCTs. A review of the RCTs for threatened species will be undertaken in the next couple of years to coincide with the review of the Regional Catchment Strategy. It is anticipated that this framework will influence and change the threatened species target, and as a result, provide meaningful information in regards to progress towards the RCTs.

Relevance to decision-making:

High ✔	Medium	Low

This Framework is linked to the Actions for Biodiversity Conservation (ABC) Database which stores information about Actions required for threatened species populations. The ABC System stores information about locations and actions for threatened species and provide for the setting of priorities for both locations and actions. The proposed approach would link the recording of state and trend information to the locations for species recorded on the ABC System.

Conclusion: Threatened Species Theme

Currently there is very little information that can inform reports on the Catchment's progress towards the RCTs and also very few indicators that can provide a snapshot of threatened species in the Catchment.

The framework developed by DSE, Melbourne, and trialled in the Goulburn Broken is the first attempt at gaining some understanding about how threatened species are trending in the Catchment. Although this information cannot be used to determine progress towards the RCTs, the framework does provide direction for the development of revised targets for threatened species conservation.

5. Conclusion

This report provides an insight into the values and in some cases the condition of Biodiversity in the Catchment. The report details the mechanisms available to paint the picture about Biodiversity.

The report shows that whilst there are a large number of mechanisms available to tell us about Biodiversity, they range in their ability to detect progress towards resource condition targets, the quality of the data and how useful the information is in informing decision makers.

Very few mechanisms are able to detect progress towards the Resource Condition Targets, however it must be acknowledge that most of the mechanisms were not developed as monitoring tools.

This report will be valuable in the development of the next Regional Catchment Strategy and provides some thinking in terms of Biodiversity Resource Condition Targets.

The development of the report also informed the recently completed "Biodiversity Monitoring Action Plan" Brunt and McLennan. This action plan highlights biodiversity monitoring needs.

The report has been successful in bringing a wide range of biodiversity information together and relating that information to the targets for biodiversity.

Acronyms

EVC: Ecological Vegetation Communities
CAMS: Catchment Activity Management System
BCS: Bioregional Conservation Status
RCT: Resource Condition Targets
GIS: Geographical Information Systems
CMA: Catchment Management Authority
BAP: Biodiversity Action Planning
DSE: Department of Sustainability and Environment
ABC: Actions for Biodiversity Conservation