REGIONAL ECOSYSTEM ASSESSMENT KIT

Queensland Herbarium and Biodiversity Science
Department of Environment and Science
Version 2.0

Queensland Government

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INTRODUCTION

The regional ecosystem framework and associated mapping are used for a wide range of land use planning, assessment, and management purposes throughout Queensland. The latest version of regional ecosystem (RE) maps can be downloaded free of charge from the Queensland Government website[1]. These maps are living documents undergoing careful improvement in scale, scope, and accuracy over time.

Users of the regional ecosystem framework and mapping often require detailed assessment of a particular area to verify the regional ecosystems present and the mapping of their extent. The explanatory notes and associated assessment sheets in this document detail the information required to verify an assessment the regional ecosystems of an area and/or to verify and update existing regional ecosystem mapping of an area.

This kit should be used in conjunction with the regional ecosystem survey and mapping methodology which includes detailed definitions of terms and survey and mapping methods (Neldner *et al.* 2022).

This kit includes: a decision pathway, explanatory notes, associated assessment sheets and worked examples. A checklist is also provided to help ensure that all components of an assessment are complete.

REGIONAL ECOSYSTEM ASSESSMENT

ASSESSMENT PATHWAY

Generally, RE assessments are made to:

1) determine whether vegetation is remnant or non-remnant and/or to verify the regional ecosystem classification and extent in an area of interest or,
2) to change the mapped RE/s for a large area showing

The information needed to complete an assessment of the regional ecosystems in an area will vary with the complexity and size of the area being assessed.

A full assessment of regional ecosystems at a complex site would require detailed information on the plant species present, community structure (height and cover by strata), geological, soil, landform and other information. Alternatively, in some instances a limited amount of information may be sufficient for an assessment. For example, just the data on the height of the dominant species compared to a reference site may be enough to verify the existing mapped RE status or, support a change to the mapped remnant status in some circumstances. For details see the survey and mapping method by Neldner *et al.* (2022).

The flow chart below (Figure1) shows the pathway showing which assessment sheets to use in different situations.

The explanatory notes below describe the specific information required to fill in each assessment sheet (A – E). These assessment sheets can be used to document the information needed to assess the regional ecosystems mapping for an area. In making an

[1] Request a map of Biodiversity Status or Broad Vegetation Group | Environment, land and water | Queensland Government (www.qld.gov.au)

application for a mapping change the relevant information can be compiled in the assessment sheets or other formats (such as excel spreadsheets) as long as the appropriate information is collected. Blank assessment sheets are provided in Appendix 2.

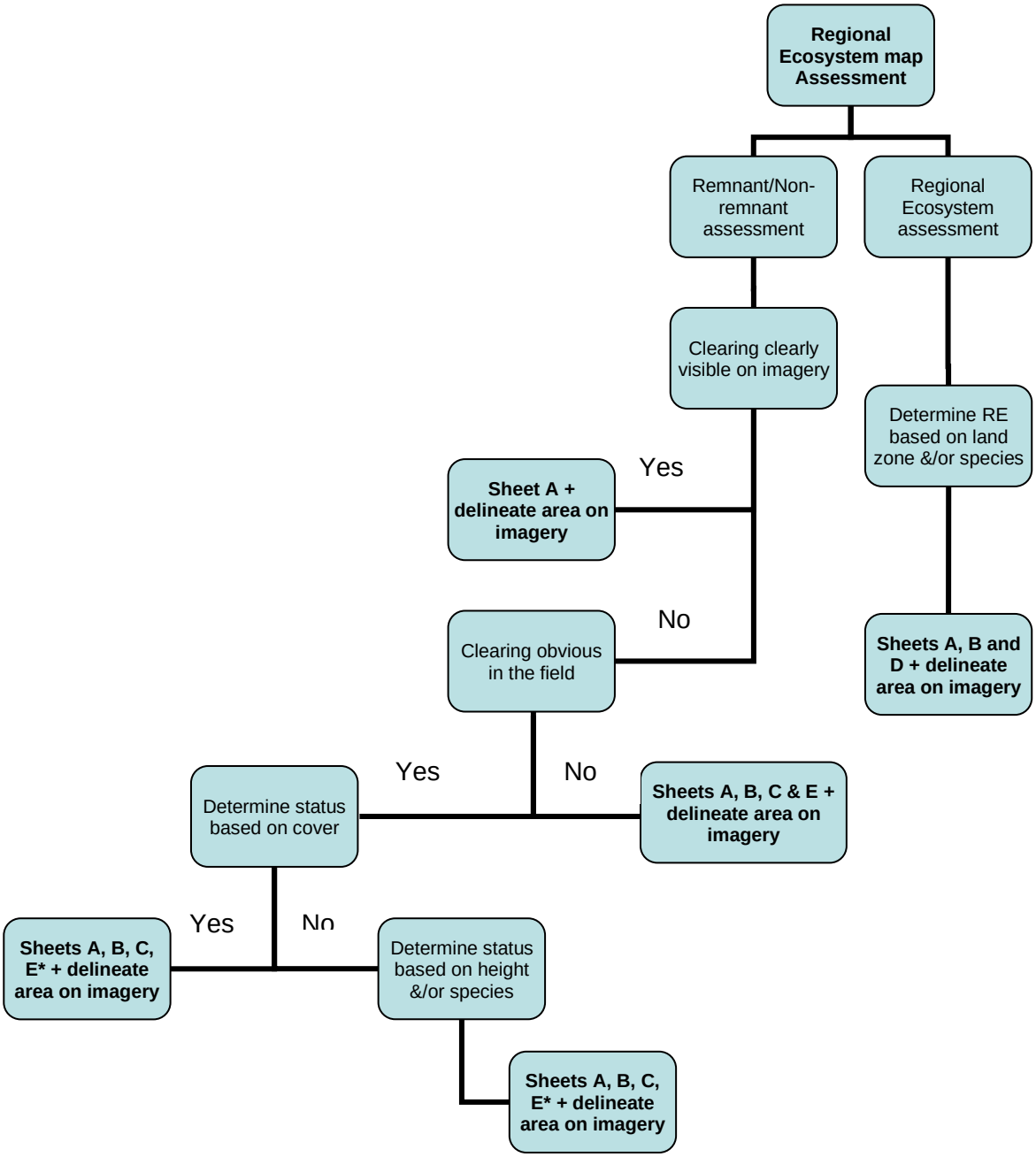


Figure 1: Pathway for compilation of regional ecosystem map assessments.

Bolded text indicates requirements to substantiate the regional ecosystem issue for each situation.

Sheet A - summary of assessment area

Sheet B – summary of assessment method

Sheet C - Site Form, Vegetation structure

Sheet D - Site Form, Regional ecosystem type

Sheet E* - Reference site/transect form

* Reference site (sheet E) may not be necessary if the measured cover threshold is clear.

ASSESSMENT SHEET EXPLANATORY NOTES

Remnant status assessment

In general, there are three broad levels of assessment appropriate to supply the necessary information to verify regional ecosystem mapping in an area. These are:

- an assessment of remnant versus non-remnant which is clearly visible on aerial photographs and/or satellite images requires information from:
    - sheet A, including details of the date and description of treatment of the area(s) in question in the “Notes” section
    - an aerial photograph or satellite image showing the cleared area(s) and the property boundary clearly, carefully, and accurately delineated on the photo or image.
- an assessment where remnant status not clearly evident on the photo and/or image, but is obvious on field inspection (height and/or cover greatly reduced compared to the normal canopy):
    - sheet A
    - sheet B
    - an aerial photograph or satellite image showing the cleared area(s) and the property boundary clearly and accurately delineated on the photo or image; and
    - one or more sheet C’s (crown cover estimate).
- an assessment where remnant status is not evident on the photo and/or image and is not obvious in the field:
    - sheet A
    - sheet B
    - an aerial photograph or satellite image showing the cleared area(s) and the property boundary clearly and accurately delineated on the photo or image; and
    - one or more Sheet Cs (crown cover measured) and one or more of Sheet E (reference sites).

Regional ecosystem assessment

A request to change the RE for a large area showing some internal diversity on the aerial photos and/or satellite image would appropriately consist of:

- sheet A
- sheet B outlining field survey and number of sites reflecting the internal diversity of the area
- several or more Site Forms Regional Ecosystem (Sheet D).

For unfilled assessment sheets see Appendix 2 (pages 19-26). For examples of filled in assessment sheets see pages 9-14.

Sheet A – summary of assessment area

The information needed to complete Sheet A includes:

- details of the location of the site and the person making the assessment
- a list of the imagery used to assess the area of interest
- a concise summary of the conclusions reached for example, “Areas A and B: remnant to non-remnant; Area C: RE code change”, preferably supported by a linked image.

An example of a filled-out sheet A is given Example 1, on page 9.

Sheet B – summary of assessment method

The information needed to complete Sheet B includes:

- a description of the survey method used to assess the area
- the rationale for method used, demonstrating the validity of the assessment
- where site information is provided, the purpose or intent for the selection of the site together with the area to which it refers should be recorded.

An example of a filled-out sheet B is given Example 2, page 10.

In cases where remnant to non-remnant is shown clearly by imagery, the relevant aerial photographs or satellite images showing the cleared area(s), before and after disturbance, and notes on the date and description of treatment for the proposed change(s), are sufficient (see Example 3, page 12).

For assessment of remnant vs. non-remnant status where the photo/image history does not clearly show the change, details of clearing history and survey method used to assess the area are required.

The field surveys should be designed as an efficient traverse of a limited number of pre-selected sites.

Representative site data is collected with the specific purpose of describing a larger area located in the dominant landform element/pattern and delineated on imagery. Aerial photographs should be used (in the office) to select assessment sites based on geology, landform, soils, and vegetation patterns. Care should be taken to sample structural variation that may occur within an area and to use this variation in the assessment of remnant status. This is usually done in relation to historic imagery i.e. historic aerial photography.

Sheet C – vegetation structure site

The information needed to complete Sheet C records:

- Data/observations on the vegetation structure (growth form, height, and cover) of each vegetation layer to verify the remnant status of the vegetation.

An example of a filled-out sheet C is given Example 4, page 13.

Determination of remnant status

Many vegetation communities in Queensland are arranged vertically into different layers.

The Queensland Herbarium method applies a maximum of 7 **layers** or **strata** at any one site (see Appendix 2). The predominant canopy or ecologically dominant layer (EDL) is defined as the stratum of the vegetation which contains the most above ground biomass. The EDL is defined in terms of growth form, height, cover, density, and species. In most cases, the EDL is equivalent to the upper stratum of Walker and Hopkins (1990).

<u>Case 1: where existing vegetation occurs clearly in layers (strata)</u>

For existing vegetation to be remnant, the EDL of the existing vegetation is to:

(a) cover more than 50% of the normal EDL; and

(b) average more than 70% of the mean height of the normal EDL; and

(c) be made up of species characteristic of the normal EDL.

Case 2: where existing vegetation does not clearly exhibit layering

Where it is difficult to determine the strata of existing vegetation (e.g. because of natural disturbance such as a cyclone) then, **if** the cover of plant species taller than 70% of the minimum height of the normal / reference EDL is greater than 50% of the cover of the normal / reference EDL, it is assessed as remnant.

The normal height and cover measurements are determined by comparing the assessed vegetation to a reference site.

Crown cover is measured as the percentage of a site within the vertical projection of the crowns taken as opaque. It can be measured (as **%**) using a tape or estimated (see below).

The mean height of the ecologically dominant layer should always be measured while heights of other strata may be estimates. Where the height of the disturbed vegetation is close to the threshold of "70% of the vegetation's normal / reference height", all heights along the transect will need to be measured.

Crown cover estimate

For remnant/non-remnant changes where crown cover is not a determining attribute, Sheet C lists the information needed on the floristics and structure, in particular the height of vegetation, without requirement to measure crown cover. This is appropriate in the scenario where, for example, regrowth is clearly denser than the normal canopy, but may not yet have attained 70% of the vegetation's normal height.

The crown cover is estimated into one of four broad classes from Neldner et al. (2022),

Table 1: Broad crown cover classes as per Neldner et.al. (2022).

Cover Class	Dense	Mid-dense	Sparse	Very Sparse
Crown Cover	80-100%	50-80%	20-50%	<20%
Crown separation	closed or dense	mid-dense	sparse	very sparse
Field criteria	touching-overlap	touching - slight separation	clearly separated	well separated
Crown separation Ratio	<0	0-0.25	0.25-1	1-20

See Appendix 1 for tables detailing structural formation classes and determining strata.

Crown cover measured

Where crown cover is used to determine remnant status (remnant vs. non-remnant), Sheet C details the structure and floristic and height information and crown cover measurements required.

The data recorded in this part of Sheet C for a disturbed site can be compared to that recorded on the Reference site/transect form (Sheet E) to determine remnant status.

The transect intercept (line intercept) method (Neldner et al. 2022, Appendix 2) is the most efficient and accurate way to measure crown cover as follows:

Step 1) a 100m tape is laid down in a straight line and the vertical projection onto the tape of the start and finish of each crown is recorded, a clinometer or vertical sighting tube may be used to ensure that the crown intercepts are vertically projected.

Step 2) the intercept measured in metres for the first 50m along the tape is recorded.

Step 3) the intercept measured in metres for the second 50m along the tape is recorded.

Step 4) the measurements in Step 2 and Step 3 are compared. Where these measures are similar (e.g. within 5%) go to Step 7, otherwise go to Step 5.

Step 5) continue the transect for a further 50m and record the intercept in metres.

Step 6) compare the measurements in Step 2 and Step 3 and Step 5; if appropriate go to Step 7, otherwise repeat Step 5 until a consistent measure of crown cover is attained.

Step 7) total length of crown is divided by the total length of the tape and multiplied by 100 to give a measure of crown cover percent.

Do not position transect so that it crosses regional ecosystem boundaries. For small assessment areas a shorter transect may be utilised e.g. 50m.

Sheet D – regional ecosystem type assessment site

Sheet D details the information required for an assessment of the regional ecosystem type for an area. The information required will generally include bioregion, geology and landform and other information required to determine the land zone, and dominant vegetation species by strata.

An example of a filled-out sheet D is given in Example 5, page 14.

Relative dominance is numerical dominance (measured as % of the overall cover, stem density or basal area, or combination of these measurements) and should be recorded by strata as follows:

D - dominant species (= predominant species). A species that contributes most to the overall above-ground biomass of a particular stratum.

C - co-dominant species. Where two or more species contribute approximately equally to form the dominant above-ground biomass of a particular stratum.

S - subdominant species. A species that contributes less biomass than the dominant species but occurs as more than an isolated individual. A general rule is the species must individually contribute more than 10% of the total biomass of the stratum in which it occurs.

A - associated species. Any species is present in a stratum but does not contribute more than 10% of the total biomass of the stratum in which it occurs.

All pre-clearing and remnant vegetation is assigned to a regional ecosystem from the current Regional Ecosystem Description Database (REDD) (Queensland Herbarium 2023). Where vegetation does not match the REDD database exactly, it is assigned to the regional ecosystem within the same land zone that most closely describes the attributes of the vegetation.

Sheet E – reference site/transect

Sheet E is to be completed for reference sites. These are used when a quantitative comparison of species, height, and cover of an assessment area to the normal height and

cover of the vegetation is required. A reference site is one chosen to illustrate the normal canopy height and cover of the vegetation for a particular regional ecosystem at a particular assessment area.

Variation in structure and species occurs within a regional ecosystem across its distribution. As such, care should be taken to ensure that an appropriate reference site is compared to an equivalent vegetation structure site, with a similar landscape position. This can usually be determined from historic aerial photography.

The information on this form is a combination of the site structure (sheet C) and regional ecosystem (sheet D) information. This allows the regional ecosystem to be confirmed and provides data to compare with the data of a disturbed site on Sheet C and/or Sheet D to determine remnant status.

Checklist

- contact details for the assessor and the landholder, as appropriate
- lot and plan property descriptions for the land involved
- a map or aerial image clearly showing areas for assessment, carefully delineated and labelled with supporting documentation and links to the detailed information collected
- a summary of the assessment, together with a comparative description of any differences between the assessment and the existing regional ecosystem mapping
- Additional information including site information and how it supports the assessment.

ASSESSMENT SHEET WORKED EXAMPLES

Example 1: Sheet A – assessment area summary

Insert yes "y" or no "n"in each of the boxes

REMNANT/NON-REMNANT	y	height	y	cover	y	species	n
REGIONAL ECOSYSTEM	n	land zone	-	species	-		

- Desktop assessment only **y**
- Field traverse and desktop assessment **n**
- Past compliance issues over lot/plan(s) **n**

Request details

Sender/agency:	**John Baldwin**	**Client: Name**	**see below**
location	**DoR Roma**	**Postal address**	
Date:	**25/10/2003**		
Lot/Plan:	**2 LX103**	**'Phone no.**	
		Owner: Name	**Roy Simmons**
		Postal address	**'Ruthvale'**
			MS 212 Mitchell QLD 4510
		'Phone no.	**07 5621 0120**
		Email	**-**

Mapsheet Name.	**Mitchell**
Mapsheet No.	**8445**
Local Govt. Area	**Bungil**

Note: *An aerial photograph or satellite image showing: the parcel(s) of land involved AND the area(s) of interest clearly delineated* ***must*** *accompany this request.*

Aerial photography

Map sheet Name/Number	Film No.	Date	Run	Frame	Scale	Colour
Mitchell/8445	**QPc5543**	**7/8/1995**	**6**	**079**	**1:40000**	**y**

Satellite images

91		**95**		**97**		**99**		**00**		**01**		**03**		**other**					

Notes

Summary of changes:
Landholder reported vegetation in Area 1 and Area 2 cleared by bulldozer in the early 1990s.
Refer attached aerial photograph.

Example 2: Sheet B – assessment method summary

Date and description of treatment. To be classified as non-remnant an area must show evidence of previous clearing.

AREA A: shows clearing between 1965 and 1975 on aerial photography
AREA B: shows thinning of crowns between 1965 and 1975 aerial photography

Note:
For obvious remnant/non-remnant assessments which do not require field assessment, ***Sheet A,*** *the annotated photograph/image, and "date and description of treatment" is sufficient. The "date and description of treatment" for each area is to be included in the Notes section on* ***Sheet A****.*

Where field assessment is required to determine remnant status or regional ecosystem:

- Provide aerial photograph or other imagery showing the field traverse and the location of sites and linked to survey method described here,
- indicate the purpose for which each site was selected,
- detail relevant observations made while traversing the property in the field. Correlate these with locations on the annotated photograph or satellite image; provide on-ground photographs with a GPS location and direction/ bearing of photograph and,
- include locations/links to more detailed site information (forms C-F).

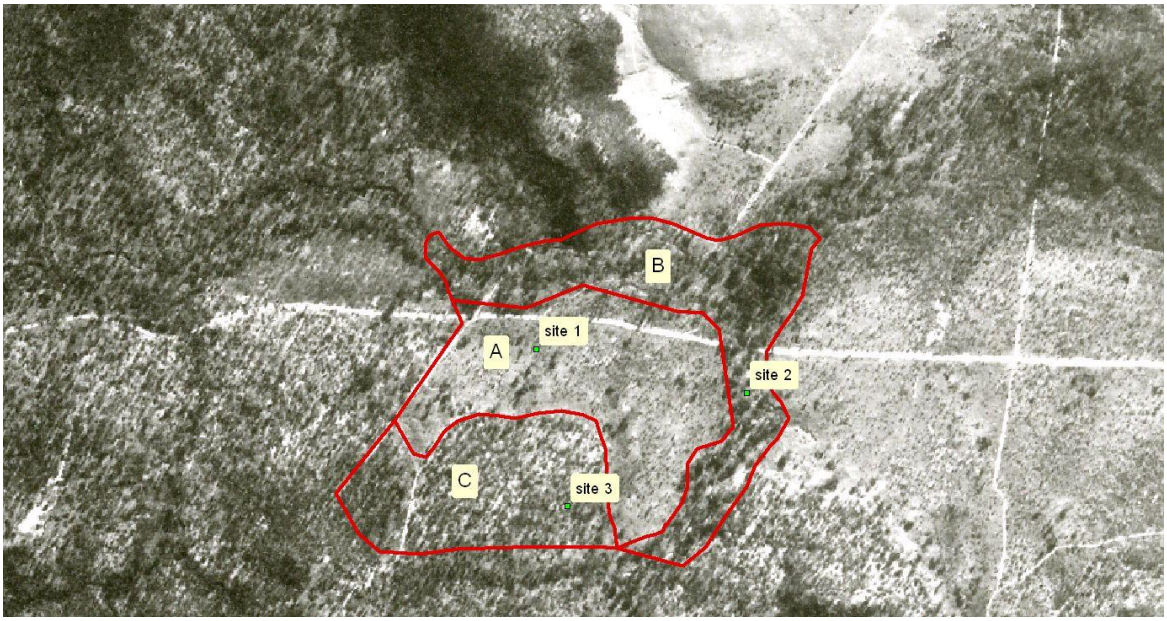
Survey method/details

In the case of an area with 3 distinct photo/image patterns (see aerial photograph below), the survey method may read as follows:

Three sites have been selected to record the structural/floristic diversity within the area:
-site 1 is indicative of the cleared area (Area A of air photo).
-site 2 represents darker riparian vegetation (Area B of air photo); and
-site 3 is characteristic of the thinned area (Area C of air photo).

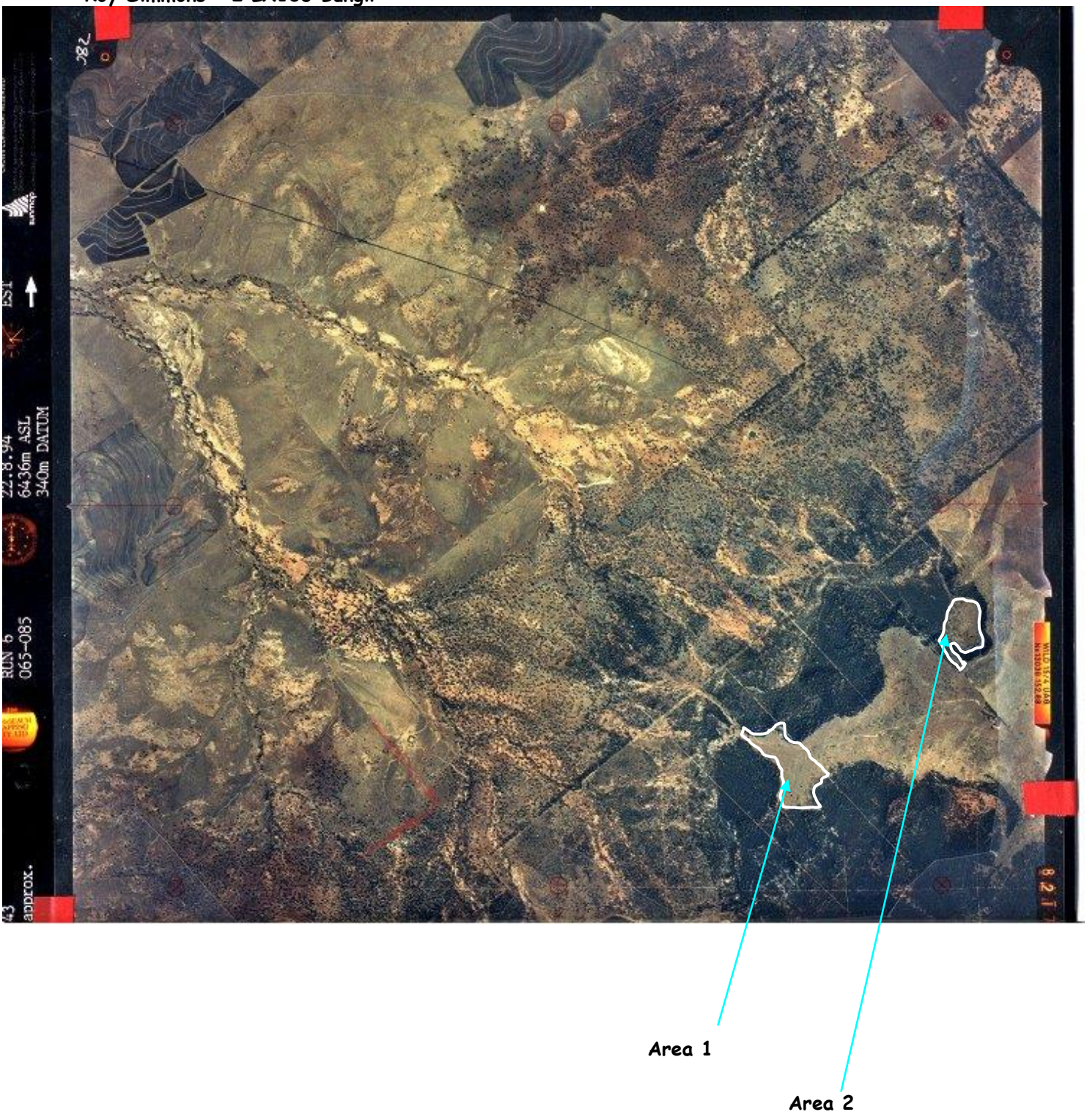
In the case of a simple verification of a regional ecosystem the survey method may read as follows:

The area in question is relatively homogeneous with respect to geology, landform, soils and vegetation community as evidenced on the aerial photo cited. The site description is representative of the polygon (the area of vegetation) as a whole. Traverse notes and supporting data (provided) confirm the requested change.



Example 3: remnant status is obvious on aerial imagery

Roy Simmons – 2 LX103 Bungil



Example 4: Sheet C – vegetation structure site/transect

Location

Site No. 1 Recorder: Peter Jackson Day/Date: Thursday 19/5/2005

Purpose Representative site for Area A (Map 1)

Locality: (inc. distance/direction to nearest town) 5kms N of Chinchilla, Durong Rd

Vegetation structure

Record relative (numerical) dominance for each stratum;

Stratum	Mean height	Height interval	Est. cover density (D,M,S,V)
E	-	-	-
T1	19.1m	18m-22m	S
T2	10.2m	8m-12m	V
T3	-	-	-
S1	3m	1m-4m	isolated
S2	-	-	-
G	✓	<1m	-

Structural formation: (including height)
woodland

Ecologically dominant layer: T1

Plant species

d – dominant; ***c*** – codominant; ***s*** – subdominant; ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	*Eucalyptus populnea*
T1	a	*Eucalyptus tereticornis*
T1	a	*Corymbia clarksoniana*
T2	d	*Eucalyptus populnea*

Transect - crown cover measured *(transect intercept method)*

GPS coordinates: Datum: WGS84 Transect length: 100m

Start point	Zone 56	E 0240937	N 7414864
End point	Zone 56	E 0240937	N 7414764

Interval (metres)	Intercept	Str./height
3.2m-6.7m	3.5m	T1/20
6.9m-7.1m	0.2m	T1/18
14.8m-17.2m	2.4m	T2/11
28.0m-40.1m	12.1m	T1/23/21
60.9m-64.8m	3.9m	T1/20
75.3m-75.9m	0.6m	T1/21
89.1m-91.2m	2.1m	T1/20
92.7m-99.1m	6.4m	T2/15
96.4m-100.0m	3.6m	T1/18
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	10 m
Intercept of EDL 0 - 50m:	15.8m
Intercept of EDL 50 -100m:	10.2m
Measured crown cover % of EDL 0 -100m:	26%

Conclusions/notes:

two canopies

Example 5: Sheet D – regional ecosystem assessment site

Location

Site No. 2 **Recorder:** Peter Jackson **Day/Date:** Thursday 19/5/2005

Purpose Representative site for Area B (Map 1)

Locality: (inc. distance/direction to nearest town) 7kms NNW of Gympie, Mill Rd

GPS coordinates: Zone 56 E 0249387 N 7414652 **Datum:** WGS84

Vegetation structure

Record relative (numerical) dominance for each stratum;

Stratum	Mean height	Height interval	Est. cover density (D,M,S,V)
E	-	-	-
T1	26.2m	22m-29m	M
T2	17m	14m-20m	V
T3	-	-	-
S1	4m	2m-6m	V to I
S2		-	
G	✓	<1m	-

Structural formation: (including height) open forest

Ecologically dominant layer: T1

Plant species

d – dominant; ***c*** – codominant; ***s*** – subdominant; ***a*** – associated.

Str.	Rel. dom.	Scientific Name
T1	d	*Eucalyptus tereticornis*
T1	s	*Corymbia intermedia*
T1	s	*Angophora leiocarpa*
T1	s	*Corymbia tessellaris*
T2	d	*Lophostemon suaveolens*
S1	d	*Acacia* spp.

Geology, landform, soils

Geology map/scale/year: Gympie Special 1:100000 First Edition 1999

Geology code and rock types: TQa – high level alluvial deposits …

Land system: -

Landform: gently undulating plain

Soils: -

Field observation and notes: ancient terrace of Mary River valley, well above Quaternary terraces

Landzone: 5

RE code assessment

Existing RE code: 12.3.3

Proposed RE code: 12.5.2

FURTHER INFORMATION

The Queensland Herbarium mapping methodology details the definition and mapping method used to compile the regional ecosystem mapping and should be read in conjunction with these notes.

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F., Addicott, E.P. and Appelman, C.N. (2022). Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. Version 6.0. Updated April 2022. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane. 143 pp.

This publication can be consulted on-line at:
Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities - Regional ecosystems descriptions - Publications | Queensland Government
As amendments to the methodology do occur from time to time it is essential that this site is referred to for up-to-date information.

Wilson, P.R. and Taylor, P.M. (2012) *Land Zones of Queensland.* Queensland Herbarium, Queensland Department of Science, Information Technology, Innovation and the Arts, Brisbane. 79 pp.

This publication can be consulted on-line at:
Land zone definitions | Environment, land and water | Queensland Government (www.qld.gov.au)

The regional ecosystem framework is dynamic.

Up-to-date regional ecosystem information including the latest version of the Regional Ecosystem Description Database is available on the Queensland Government website https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/download/

Up-to-date hardcopy regional ecosystem maps are available at:
https://environment.ehp.qld.gov.au/map-request/re-broad-veg-group/

Up-to-date digital mapping data is available for download from:
https://www.data.qld.gov.au/ and search for the term **Biodiversity Status of pre-clearing**.

or the Queensland Spatial Catalogue (Qspatial) - use the search term of **pre-clearing and regional ecosystems**
http://qldspatial.information.qld.gov.au/catalogue/custom/search.page

or the data can be viewed on the Queensland Globe:
https://qldglobe.information.qld.gov.au/

A digital geological data is available on Queensland Globe or from the Queensland Spatial Catalogue (Qspatial) - use the search term of **detailed surface geology**
http://qldspatial.information.qld.gov.au/catalogue/custom/search.page

Historical aerial photography can be obtained from:
https://qimagery.information.qld.gov.au/

REFERENCES

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Walker, J. and Hopkins, M.S. (1990). Vegetation. In R.C. McDonald, R.F. Isbell, J.G. Speight, J. Walker and M.S. Hopkins (eds), Australian Soil and Land Survey Field Handbook. Second edition. Inkata Press, Melbourne, pp. 58-86.

Wilson, P.R. and Taylor, P.M. (2012) *Land Zones of Queensland.* Queensland Herbarium, Queensland Department of Science, Information Technology, Innovation and the Arts, Brisbane. 79 pp.

APPENDIX 1: VEGETATION STRUCTURE

Table 1: Herbarium method for determining layers/strata in vegetation (source Neldner et al. 2022)

Stratum	Growth form	Height range	Notes
E - emergent	tree	≤ ½ mean ht. of E	
T1 - canopy	tree	≤ ½ mean ht. of T1	
T2 - sub-canopy	tree	≤ ½ mean ht. of T2	
T3 - low tree layer	tree	from 2m to the bottom of the T2	
S1 - tallest shrub layer	shrub (low trees)	≤ 5m	
S2 - lower shrub layer	shrub	≤ 5m	infrequently recognised
G - ground layer	graminoids/ forbs/ sprawling vines …	0m ≤ G ≤ 2m; usually <1m	height measured to top of mai leaf biomass. flowering racemes may be taller

- a maximum of 7 strata is allowable
- the height ranges for strata should not overlap
- there is no minimum requirement for cover or abundance to determine a layer, a single tree or widely scattered trees could form a layer
- *tree* – woody plant more than 2m tall with a single stem or branches well above the base
- *tree mallee* – woody perennial plant usually *Eucalyptus*; multi-stemmed with fewer than 5 trunks with at least three greater than 100mm DBH; usually 8m or more tall
- *shrub* – woody plant multi-stemmed at the base (or within 200mm from ground level), or, if single-stemmed, less than 2m tall.

Table 2: Structural formation classes (Source Neldner *et al.* 2022, Table 28)

Projective Foliage Cover	> 70%	> 30-70%	10-30%	<10%
Crown Class	Dense/Closed	Mid-dense	Sparse	Very sparse
Crown cover %[1]	> 80%	> 50-80%	20-50%	<20%
GROWTH FORM[2] ↓	Structural Formation Classes (qualified by height)			
Trees > 30m	tall closed forest TCF	tall open forest TOF	tall woodland TW	tall open woodland TOW
Trees 10 – 30m	closed forest CF	open forest OF	woodland W	open woodland OW
Trees 2-10m	low closed forest LCF	low open forest LOF	low woodland LW	low open woodland LOW
Shrubs 2 – 8m	closed scrub CSC	open scrub OSC	tall shrubland TS	tall open shrubland TOS
Shrubs 1 – 2m	closed heath CHT	open heath OHT	shrubland S	open shrubland OS
Shrubs <1m	dwarf closed heath DCHT	dwarf open heath DOHT	dwarf shrubland DS	dwarf open shrubland DOS
Succulent shrub	closed succulent scrub CSSC	succulent scrub SSC	succulent shrubland SS	open succulent shrubland OSS
Hummock grasses	closed hummock grassland CHG	hummock grassland HG	open hummock grassland OHG	sparse hummock grassland SHG
Tussock grasses	closed tussock grassland CTG	tussock grassland TG	open-tussock grassland OTG	sparse-tussock grassland STG
Herbs[3]	closed herbland CH	herbland H	open herbland OH	sparse herbland SH
Forbs	closed forbland CFB	forbland FB	open forbland OFB	sparse forbland SFB
Rush	closed rushland CR	rushland R	open rushland OR	sparse rushland SR
Vines	closed vineland CVI	vineland VI	open vineland OVI	sparse vineland SVI
Ferns	closed fernland CFN	fernland FN	open fernland OFN	sparse fernland SFN
Sedges	closed-sedgeland CV	sedgeland V	open-sedgeland OV	sparse-sedgeland SV

[1] In this table the crown cover classes listed are used to allocate the modified Specht (1970) structural formation labels (after Walker and Hopkins 1998, page 68). These approximate the Specht (1970) projective foliage cover (pfc) classes and derivation by converting crown cover to pfc using crown density types.

[2] Growth form of the predominant layer (the ecologically dominant layer). See table 28 for definition of growth forms.

[3] Herbland refers to associations in which species composition and abundance is dependent on seasonal conditions and at any one time grasses or forbs may predominate.

Source: after Specht (1970), Neldner (1984), and Walker and Hopkins (1998).

APPENDIX 2: ASSESSMENT SHEETS

SHEET A – ASSESSMENT AREA SUMMARY

Insert yes "y" or no "n" in each of the boxes

Remnant/non-remnant		Based on height		Based on cover		Based on species	
Regional ecosystem		Based on land zone		Based on species		Based on other	

- Desktop assessment only
- Field traverse and desktop assessment

Request details

Assessor/agency/location/email	**Client:**	
	Postal	
Date:	**'Phone no.**	
Lot/Plan:	**Owner:**	
	Postal	
	'Phone no.	
	Email	

Mapsheet Name. (1:100 000)	
Mapsheet No.	
Local Govt. Area	

Aerial photography

Mapsheet Name/Number	Film No.	Date	Run	Frame	Scale	Colour

Satellite images (indicate the series of images used, for example: *1988, 1991, 2003*)

Notes (include a summary of conclusions which are linked to image)

SHEET B – ASSESSMENT METHOD SUMMARY

Date and description of treatment. To be classified as non-remnant an area must show evidence of previous clearing.

Note:
For obvious remnant/non-remnant assessments which do not require field assessment, ***Sheet A,*** *the annotated photograph/image, and "date and description of treatment" is sufficient. The "date and description of treatment" for each area is to be included in the Notes section on* ***Sheet A****.*

Where field assessment is required to determine remnant status or regional ecosystem:

- Provide aerial photograph or other imagery showing the field traverse and the location of sites and linked to survey method described here
- indicate the purpose for which each site was selected
- detail relevant observations made while traversing the property in the field. Correlate these with locations on the annotated photograph or satellite image; and
- include locations/links to more detailed site information (forms D-E).

Survey method/details

SHEET C – VEGETATION STRUCTURE SITE/TRANSECT

Location

Site No. ____ **Recorder:** ____ **Day/Date:** ____

Purpose ____

Locality: (inc. distance/direction to nearest town) ____

Vegetation structure

Mean height of EDL is to be measured
Cover density is to be estimated

Stratum	Mean height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1		-	
T2		-	
T3		-	
S1		-	
S2		-	
G		-	

Structural formation including height: (estimated)

Ecologically dominant layer: ____

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s -** subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name

Transect - crown cover measured *(transect intercept method)*

GPS coordinates: **Datum:** ____ **Transect length:** ____

Start point

End point

Interval (metres)	Intercept	Str.	Height
-	m		
-	m		
-	m		
-	m		
-	m		
-	m		
-	m		
-	m		
-	m		
-	m		
-	m		

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes:

Notes:

SHEET D – REGIONAL ECOSYSTEM TYPE ASSESSMENT SITE

Location

Site No. ..... **Recorder:** ..... **Day/Date:** .....

Purpose .....

Locality: (inc. distance/direction to nearest town) .....

GPS: ☐☐ ☐☐☐☐☐☐☐ ☐☐☐☐☐☐☐ **D** .....

Vegetation structure

Mean height of the EDL is to be measured

Stratum	Mean height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1		-	
T2		-	
T3		-	
S1		-	
S2		-	
G		-	

Structural formation: (including height)

Ecologically dominant layer: .....

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s -** subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name

Geology, landform, soils

Geology map/scale/year: .....

Geology code and rock types: .....

Land system: .....

Landform: .....

Soils: .....

Field observation and notes: .....

Landzone: .....

RE code changes

Existing RE code: .....

Proposed RE code: .....

SHEET E – REFERENCE SITE/TRANSECT

Location

Site No. ____ **Recorder:** ____ **Day/Date:** ____

Regional ecosystem: ____

Locality: (inc. distance/direction to nearest town) ____

Vegetation structure

Mean height of the EDL is to be measured
Cover density is to be estimated

Stratum	Mean height	Height interval	Est. cover density (D,M,S,V)
E		-	
T1		-	
T2		-	
T3		-	
S1		-	
S2		-	
G		-	

Structural formation: (including height)

Ecologically dominant layer:

Notes:

Plant species

Record relative (numerical) dominance for each stratum;
d – dominant; ***c*** – co-dominant; **s -** subdominant, ***a*** – associated.

Str.	Rel. dom.	Scientific Name

Geology, landform, soils

Geology map/scale/year: ____

Geology code and rock types: ____

Land system: ____

Landform: ____

Soils: ____

Field observation and notes: ____

Landzone: ____

Transect - crown cover measured *(transect intercept method)*

GPS coordinates: **Datum:** ..... **Transect length:** .....

Start point	Zone	5	E	0	N
End point	Zone	5	E	0	N

All heights in the "Str./height" column are to be measured

Interval (metres)	Intercept	Str./height
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	
-	m	

Summary:

Minimum height of plants included in the transect table:	m
Intercept of EDL 0 - 50m:	m
Intercept of EDL 50 -100m:	m
Measured crown cover % of EDL 0 -100m:	%
Structural formation	

Conclusions/notes: