

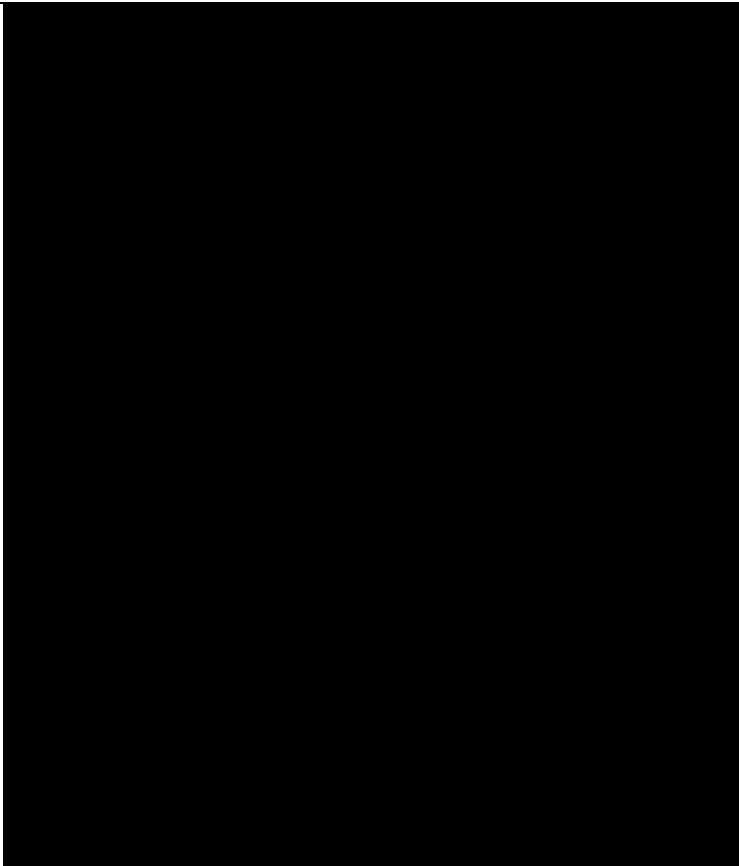


Collection of Vegetation Data from Historical Portion Plan Surveys

Upper North East and Lower North East CRA Regions

A project undertaken as part of the NSW Comprehensive Regional Assessments

May 1999



COLLECTION OF VEGETATION DATA FROM HISTORICAL PORTION PLANS SURVEYS

**UPPER NORTH EAST AND LOWER
NORTH EAST CRA REGIONS**

State Forests of NSW

A project undertaken for
the Joint Commonwealth NSW Regional Forest Agreement Steering Committee
as part of the
NSW Comprehensive Regional Assessments
project number NA 34/EH

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The project has been overseen and the methodology has been developed through the Environment and Heritage Technical Committee which includes representatives from the New South Wales and Commonwealth Governments and stakeholder groups.

State Forests of NSW employed the services of two consultant historians, Brett Stubbs (UNE) and Pauline Curby (LNE), to collect data for this report and assist in report preparation.

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PROJECT SUMMARY

This report describes a project undertaken as part of the comprehensive regional assessments of forests in New South Wales. The comprehensive regional assessments (CRAs) provide the scientific basis on which the State and Commonwealth Governments will sign regional forest agreements (RFAs) for major forest areas of New South Wales. These agreements will determine the future of these forests, providing a balance between conservation and ecologically sustainable use of forest resources.

Project objective/s

This project was undertaken to collect historical information on vegetation cover from a representative sample of original portion plans within parishes in the upper north east (UNE) and lower north east (LNE) CRA regions.

Methods

Locations (in terms of easting and northing) of tree types from each corner of each portion were collected and entered into an excel spreadsheet. In addition to this information, the date the survey was carried out and general vegetation information was also recorded.

Key results and products

The project produced a database consisting of vegetation data from 2,001 portions within a representative sample of 202 parishes across the UNE and LNE regions of NSW. The data was supplied to National Parks and Wildlife Service for use in the modelling phase of the pre-1750 extent of vegetation types/forest ecosystems.

1. INTRODUCTION

1.1 OBJECTIVES

The specific objectives of this project were to:

- (i) collect historical information on vegetation cover from a sample of original portion plans within parishes in the upper north east (UNE) and lower north east (LNE) comprehensive regional assessment (CRA) regions;
- (ii) relate this information to grid references so that other projects can apply the data spatially; and
- (iii) produce a report documenting methods, results and limitations.

1.2 BACKGROUND

Given that forest ecosystem biodiversity is reflected primarily in its vegetation complexity, the pre-1750 vegetation data layer is an important base data layer for the design of forest ecosystem reserves.. For the purposes of vegetation reservation and other dependent layers such as fauna habitat, it is critical that this layer be as accurate as possible and the accuracy of the data be known.

For the NSW CRAs the pre-1750 distribution of forest types in north east New South Wales will be using a combination of existing forest type mapping and predictive modelling of forest types across unmapped forests and cleared land. Data extracted from existing forest type mapping will be used to derive models relating to the distribution of forest types to physical environmental variables. These models will then be used to extrapolate forest type distribution across unmapped areas.

The potential to use historical data to refine the pre-1750 vegetation map was investigated. A case study was conducted by two consultant historians, M. Ryan and B. J. Stubbs, for the NPWS over an area comprising seven parishes in the County of Richmond (see final report Ryan and Stubbs 1996). An historical overview of the sequence of land use in this area, and a discussion of the effects of various land uses on the original vegetation of the area were presented. A detailed examination of two parishes (Bungawalbin and Tatham) within the case study area was made. Based on the reasoned premise that vegetation disturbance prior to free selection was relatively insignificant, maps showing the original distribution of vegetation in these two parishes were compiled from portion plans prepared in connection with the conditional purchase of land under the *Crown Lands Alienation Act 1861*.

This study concluded that “where the destruction of the vegetation has been complete, the historical record, and in particular the conditional purchase plans, is indispensable in reconstructing the pre-settlement pattern of vegetation. Even in less severely modified areas, where existing thinned vegetation or minimally disturbed remnants of the original forest can be used to infer the original pattern across a wider area, the historical record is a valuable reference.”

Another study was done by D. N. Jeans of the Sydney University Geography Department, over the Big Scrub area of the Richmond River valley (Jeans 1991). Using portion plans and mapping the vegetation formations systematically across the various parishes, a map of the pre-alienation vegetation of the Big

Scrub was reconstructed. Jeans found that surveyors, operating at different times and at intervals of some years, showed formation boundaries with few discrepancies from portion to portion, suggesting that the work was done conscientiously. He concluded that the surveying archives of the New South Wales Department of Land and Water Conservation (DLWC) can provide the basis for the mapping of pre-alienation vegetation, although the information is limited botanically to a description of formation, as relatively few species are named.

Due largely to time and practicality constraints, the results of these studies were not utilised in the IFA. The Environment and Heritage Technical Committee (EHTC) believes that historical studies would aid in deriving and refining the pre-1750 vegetation layer. NPWS has confirmed, on the basis of the Ryan and Stubbs report, that historical studies will be a useful tool to derive the pre-1750 vegetation layer, in combination with modelling techniques (S. Ferrier, pers comm).

1.3 SCOPE OF THE PROJECT

NPWS, in its estimation of the pre-1750 vegetation, concluded that the approach adopted by Ryan and Stubbs had merit and should be considered for use in future conservation planning work. However, NPWS recommended that any such application of these techniques, such as for the proposed CRAs, be preceded by further testing and refinement. This project provides information that will improve the prediction of pre-1750 vegetation distribution in the UNE and LNE CRA regions.

It is not feasible in the CRA timeframes or within the EHTC technical framework budget to gather historical information from the entire UNE & LNE CRA regions. There are at least 12 counties that each have 70 to 80 parishes and up to 300 portion plans per parish on an area basis. Historical data should be used in areas where the pre-1750 vegetation map has the lowest level of confidence, namely the cleared land on the coastal plain and tablelands.

This project is limited to data collation only. The data outputs are used by the CRA vegetation mapping project for interpretation and analysis.

1.4 PROJECT CO-ORDINATION

Based on the importance of delivering the data to the vegetation mapping project to assist in estimating the pre-1750 extent of vegetation, it was decided to run data collection for both UNE and LNE concurrently. For this reason two contractors were employed by State Forests of New South Wales (SFNSW) to collect data.

In order to facilitate meeting the data delivery dates, SFNSW personnel also assisted in data collection for both UNE and LNE.

The following section describes the methodology adopted for the project and the results.

2. METHODOLOGY AND RESULTS

2.1 METHODOLOGY

2.1.1 Sampling methodology

A subset of parishes were selected from all those occurring within the region, to provide a representative sample both geographically and environmentally (in terms of climate, terrain and soils).

The exact number of parishes to be selected, and the number of portions to be sampled within each parish, was determined in the initial planning phase of the project. Given the project's strong link with the vegetation mapping project, the sampling methodology was determined through a joint planning exercise between SFNSW and NPWS.

It was decided that ten portions should be selected randomly from each of 200 representative parishes across the UNE and LNE CRA regions.

Maps of existing vegetation cover across all tenures have been derived from Landsat information. These maps were used initially to determine which parishes may be suitable for detailed study on the basis of current vegetation coverage.

Parishes in the regions were listed from those with 0% vegetation over the entire parish to those with 100% vegetation and then the first 100 parishes in each region were mapped to determine how representative the selection was. NPWS and SFNSW decided that this sample was not representative enough and that the parishes should be reselected using every third parish. The selected parishes were remapped and agreement was reached between NPWS and SFNSW that the selection was representative both geographically and environmentally (in terms of climate, terrain, and soils), with preference given to those parishes in which a relatively large proportion of native vegetation has been cleared.

A random sample of portions were chosen from within each selected parish. Portion numbers for plans that were unavailable or plans that had inadequate vegetation detail were discarded. In UNE, within the 100 selected parishes, data for ten portion plans were collected. In LNE, data was collected from 102 parishes as some parishes did not have ten portion plans available.

2.1.2 Data collection

The portion plans for each of the selected portions were used to extract and database (in a spreadsheet format) the general vegetation type and specific tree type associated with each surveyed corner of the portion. Australian Map Grid coordinates for each of these corner points (ie corner tree positions) was recorded from 1:25 000 topographic maps.

Information collected and recorded included:

- Parish name and county name;
- Portion number;

- Map sheet name/number for each corner (more than one topographic map sheet may cover a single portion);
- Map grid references (easting and northing) for each corner;
- The general vegetation type (for example brush, open forest, swamp) occurring at each portion corner. Such information is often not recorded on the portion plan, or cannot be ascertained for all corners. Other relevant information appearing on the portion plan is also recorded under this heading (e.g. ridge, hilly country, flat land);
- Tree type used to mark each corner (or note the absence of a tree if the corner is marked by a stake or post, as this may indicate naturally treeless areas or areas of sparse tree coverage);
- Plan number for each portion; and
- The date of survey of each portion (or the estimated date of survey if the actual date is not recorded on the plan).

This procedure was followed until ten randomly selected portions had been described for each parish.

2.2 RESULTS

The results of this project were entered into an excel spreadsheet for the UNE and LNE CRA regions. This data has been supplied to RACD as a supplementary report.

2.2.1 UNE

For the UNE CRA Region, data was collected from 1,000 portions within 100 parishes.

The subset of parishes selected in the UNE were as follows:

- Thirty seven parishes within the Armidale Land Board District; and
- Sixty three parishes within the Grafton Land Board District.

Of the parishes within the Grafton Land Board District, 47 parishes were sampled, by the contractor at the DLWC regional office, and 16 were sampled by SFNSW at DLWC Sydney (Bridge St) office. SFNSW sampled the 37 parishes within the Armidale Land Board District at DLWC Sydney (Bridge St) office.

The results (refer to supplementary report) were compiled in a database using Microsoft Excel. The 100 parishes sampled are listed below in Table 2a and shown in Figure 2a. Table 2a lists the corresponding parish identification number (refer Figure 2a), percentage of vegetation, and the County name for each parish. A metadata statement for the UNE database is provided in the supplementary report to this document.

2.2.2 LNE

A total of 102 parishes were sampled in the LNE CRA Region. From these parishes, data was recorded from a total of 992 portion plans.

Ninety seven of these parishes were collected by the contractor at the offices of DLWC in Taree, Armidale and Maitland. Data for the remaining five parishes were collected by SFNSW employees at DLWC Bridge Street Sydney office.

The results (refer to supplementary report) were compiled in a database, using Microsoft Excel. The 102 parishes sampled are listed below in Table 2b and are shown in Figure 2b. Table 2b lists the corresponding parish identification number (refer Figure 2b), percentage of vegetation, and the County name for each parish. A metadata statement for the LNE database is provided in the supplementary report to this document.

TABLE2a: List of Parishes Sampled in UNE CRA Region

Upper North East selected parishes			
No.	% Veg.	Name	County
1	0	Falconer	Sandon
2	0	Tygalgah	Rous
3	1	Harwood	Clarence
4	3	Coraki	Rous
5	3	North Codrington	Rous
6	3	Stratheden	Rous
7	4	Clerkness	Hardinge
8	4	Stonehenge	Gough
9	5	Fletcher	Gough
10	5	South Lismore	Rous
11	6	Elderbury	Hardinge
12	6	Taloumbi	Clarence
13	7	Everett	Hardinge
14	8	Southhampton	Clarence
15	9	Ben Lomond	Gough
16	9	Lismore	Rous
17	9	Tomki	Rous
18	10	Waterloo	Gough
19	11	East Gundurimba	Rous
20	11	North Lismore	Rous
21	11	Ward	Clarke
22	12	Geneva	Rous
23	12	Rusden	Gough
24	13	Lewis	Clive
25	13	Warner	Clarke
26	14	Moredun	Hardinge
27	14	Wyndham	Rous
28	16	Lawrence	Clarence
29	17	Sandilands	Drake
30	18	Cudgen	Rous
31	18	Terranora	Rous
32	19	Parkes	Gough
33	20	Bungawalbin	Richmond
34	21	Gulmarrad	Clarence
35	22	Blair Hill	Gough
36	22	Lavadia	Clarence
37	23	Meerschaum	Rous
38	24	Aberfoyle	Clarke
39	24	Woodford	Clarence
40	25	Condong	Rous
41	25	Mackenzie	Hardinge
42	26	Coventry	Clarke
43	26	Pikapene	Drake
44	28	Addison	Clive
45	28	Tabulum	Drake
46	29	Bonalbo	Buller
47	31	Bonville	Raleigh
48	33	Angoperran	Clive
49	35	Blaxland	Fitzroy
50	35	Fairy Mount	Rous
51	36	Lawson	Clive
52	37	Capeen	Buller
53	37	Mayo	Hardinge
54	38	Acacia	Buller
55	38	Murwillumbah	Rous
56	39	Chauvel	Drake
57	40	Mingoola	Clive
58	40	Pulganbar	Drake
59	40	Undercliffe	Buller
60	41	Gordon	Gough
61	42	Dunbible	Rous
62	44	Rampsbeck	Clarke
63	45	Mummulgum	Rous

Upper North East selected parishes			
No.	% Veg.	Name	County
64	46	Gore	Buller
65	46	Tyalgum	Rous
66	47	Loadstone	Rous
67	48	Mullumbimby	Rous
68	49	Stuart	Clarence
69	50	Marsh	Buller
70	51	Shannon	Richmond
71	52	Donaldson	Clive
72	52	Tyndale	Clarence
73	53	Braylesford	Gresham
74	53	Frazer	Clive
75	54	Coombadjha	Drake
76	56	Boorabee	Rous
77	56	Copmanhurst	Clarence
78	57	Alice	Drake
79	58	Garrett	Clive
80	59	Wellington	Gough
81	60	Hamilton	Drake
82	61	Robertson	Buller
83	63	Coongbar	Drake
84	63	Orara	Fitzroy
85	64	Churchill	Drake
86	64	Hyland	Fitzroy
87	64	Toothill	Fitzroy
88	65	Strathspey	Buller
89	67	Grange	Gresham
90	68	Ashby	Clarence
91	68	Dunbar	Drake
92	69	Burgess	Buller
93	69	Wyandah	Richmond
94	70	Hogarth	Richmond
95	70	Reid	Buller
96	71	Wunglebong	Clive
97	73	Antimony	Buller
98	74	Maryvale	Clarence
99	77	Coldstream	Clarence
100	49	Picarbin	Drake

Note: % Veg. Indicates the percentage of vegetation currently found within the parish.

TABLE2b: List of Parishes sampled in LNE CRA Region

Lower North East selected parishes			
No.	% Veg.	Name	County
1	0	Apsley	Vernon
2	0	Strathearn	Brisbane
3	1	Cooroobongatti	Dudley
4	1	Howick	Durham
5	1	Wynn	Durham
6	2	Myrabluan	Brisbane
7	2	Sandon	Sandon
8	3	Damaresq	Sandon
9	4	Darlington	Durham
10	4	Liddell	Durham
11	4	Vaux**	Durham
12	5	Clybucca	Dudley
13	5	Gordon	Dudley
14	6	Althorpe	Durham
15	6	Brougham	Durham
16	6	Ravensworth	Durham
17	6	Whittingham	Northumberland
18	7	Fletcher	Vernon
19	7	Tuncurry	Gloucester
20	8	Macqueen	Brisbane
21	8	Uralla	Sandon
22	9	Barlow	Hardinge
23	9	Ingleba	Vernon
24	9	Stockton**	Gloucester
25	10	Emu	Vernon
26	10	Hillgrove	Sandon
27	10	Wollombi	Northumberland
28	12	Alnwick**	Northumberland
29	12	Kentucky	Sandon
30	13	Arding	Sandon
31	13	St Clair	Vernon
32	13	Wollom	Gloucester
33	14	Eastlake	Sandon
34	14	Hexham**	Northumberland
35	15	Dungog	Durham
36	16	Fingal	Durham
37	16	Lemington	Hunter
38	16	Springmount	Sandon
39	16	Walcha	Vernon
40	17	Mimi	Gloucester
41	17	Tomaree	Gloucester
42	19	Avondale	Clarke
43	19	Herschell	Durham
44	19	Rowan	Durham
45	20	Doon	Durham
46	21	Killawarra	Macquarie
47	21	Sobraon	Sandon
48	23	Nuandle	Hardinge
49	24	Cherson	Brisbane
50	24	Tudor	Durham
51	25	Butterwick	Durham
52	25	Halscot	Brisbane
53	26	Marlee	Macquarie
54	26	Tyraman**	Durham
55	27	Stonybatter	Hardinge
56	28	Albert	Macquarie
57	28	Howell	Clarke
58	28	Redbank	Macquarie
59	30	Marwood	Durham

Lower North East selected parishes			
No.	% Veg.	Name	County
60	30	Wybong	Brisbane
61	31	Terell	Brisbane
62	32	Houghton	Durham
63	32	Stewart	Macquarie
64	34	Horton**	Gloucester
65	35	Camden Haven	Macquarie
66	35	Yarravel	Dudley
67	36	Heddon	Northumberland
68	37	Campbell	Brisbane
69	38	Awaba	Northumberland
70	39	Allandale	Northumberland
71	40	Enmore	Sandon
72	41	Fenwick	Vernon
73	41	Moonan	Durham
74	42	Barford	Durham
75	43	Carrow	Durham
76	43	Parkes	Hawes
77	45	Manbus	Brisbane
78	46	Enfield	Vernon
79	46	Yarrabandini	Dudley
80	47	Pappinbarra	Macquarie
81	48	Schofield**	Hawes
82	51	Thornton	Gloucester
83	52	Omadale	Durham
84	53	Uralgurra	Dudley
85	56	Yarratt	Macquarie
86	59	Warbro	Dudley
87	61	Kangaroo Flat	Vernon
88	64	Yarraman	Brisbane
89	66	Parrabel	Dudley
90	72	Oldcastle	Durham
91	73	Burrawan	Macquarie
92	74	Burragong	Dudley
93	79	Knorrit	Macquarie
94	81	Debenham**	Macquarie
95	84	Kokomerican	Macquarie
96	85	Tollagong	Hunter
97	83	Macleay*/**	Vernon
98	16	Macleay*	Dudley
99	25	Russell*	Durham
100	59	Russell*	Hardinge
101	49	Tiara*	Vernon
102	50	Tiara*/**	Clarke

Note: *The parishes of Macleay, Russell and Tiara appear twice as they appear in two different Counties.

** These parishes have been included but do not have ten portions per parish. % Veg. Indicates the percentage of vegetation currently found within the parish.

It should be noted that parishes with less than 10 portion plans held in the Region were recorded as complete when all local data was checked and listed. Those for which 10 portion plans were not recorded have been indicated in Table 2b.

The data was delivered to NPWS within the project timelines.

3. LIMITATIONS

3.1 LIMITATIONS

The plans used for this study were prepared over a period of about ninety years (from the 1850s until the 1940s), and by numerous different surveyors, working in varying vegetation types. The terminology and graphical symbols used to describe and indicate the vegetation varied somewhat from surveyor to surveyor and from plan to plan. Some of the limitations of using such a non-uniform set of records to reconstruct pre-settlement vegetation patterns have been described generally in Ryan and Stubbs (1996).

Aspects of early surveying which should be noted are:

- surveys before 1855 record a low level of detail;
- corner tree data was rarely recorded before 1860;
- there are few vegetation notes in very early surveys; and
- ringbarking was widespread by 1870 resulting in reduced timber in agricultural land.

Some particular aspects of the methodology as applicable to the present study are described hereunder.

Missing plans

As stated previously, the portion plan records at the regional offices of DLWC are incomplete. In general, it is the older plans that are missing (or those which are sometimes available only as poor quality, often illegible, photostat copies of the originals held in the Sydney office). This may have the tendency to bias the sample towards more recently surveyed portions, and therefore towards the less 'desirable' lands within each parish. The more desirable lands for closer settlement were generally those relatively level areas close to a river or creek. These would have supported a particular vegetation type (often brush in the present study region) which may be under-represented in a parish from which many older portions are not sampled. In the present case, it is considered that such bias, if present, is not significant. This was generally not the case for the parishes where the data were collected in the Sydney office. Originals were of high quality with an insignificant number missing.

Map grid references for corners

Map grid references are given for each corner to the nearest 50 metres (2mm at a map scale 1:25,000). This is considered to be the best result obtainable given the inherent level of accuracy of the topographic maps, and the slight misalignment of the topographic base and the cadastral layer.

Tree type

The corner tree descriptions used by surveyors range from the highly specific (e.g. spotted gum, cedar, bean) to the very general (e.g. 'brush', for rainforest species, or even simply 'tree' or 'sapling'). In the former case, these descriptions can readily be translated into botanical names (e.g. *Corymbia maculata*, *Toona ciliata*, *Castanospermum australe* for the three examples given). Less specific descriptions (e.g. stringybark, gum, ash, apple) may refer to more than one, perhaps several different species. Other descriptions (e.g. berry

tree, peppermint) may be impossible to interpret, or may only be interpreted sensibly with the aid of good local botanical knowledge.

Vegetation type

Descriptions of vegetation type (and of topographical information) within a portion vary from the highly detailed to the non-existent. Portions were not excluded from the sample because of the absence of such information if corner tree details were provided. In most cases, however, such information was provided by the surveyor and this is a valuable aid in the interpretation of the corner tree details, as well as providing good descriptions of the vegetation cover across the portion.

Vegetation descriptions are of two main types: first, they are notations or stylistic indications of particular vegetation units within the portion (brush land and swamp is generally clearly demarcated and distinguished from open forest, for example); secondly, they are general comments which apply to the vegetation across the whole portion (used more often on more recent plans).

In addition to vegetation information, information about landform provided by the surveyor has often been recorded where it is believed that this may be useful in interpreting the vegetation cover. In the particular case of a corner which is adjacent to a creek or river, this fact is noted (with the word creek or river etc. appearing in the database in inverted commas). For example, a corner tree described as 'brush' may occur, apparently anomalously, within an area described generally as 'apple and gum flat', but this is clarified by the knowledge that the corner is within a narrow zone of riparian vegetation, not specifically indicated on the plan.

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