Lower Hunter & Central Coast Regional Biodiversity Conservation Strategy

Technical Report 2003

Digital Aerial Photo Interpretation &
Updated Extant Vegetation Community Map

May 2003

LOWER HUNTER & CENTRAL COAST
REGIONAL ENVIRONMENTAL
MANAGEMENT STRATEGY

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1. Introduction

Previous vegetation mapping for the LHCCREMS study area undertaken by the NSW NPWS produced a map of extant vegetation communities from statistical models. The presence or absence of vegetation was determined by existing Aerial Photo Interpretation (API) supplied by a variety of sources including DLWC, NPWS, State Forests and Local Government (NSW NPWS, 2000). The data from these different sources was effectively 'merged' together to create a single vegetation map for the region. However, considerable variability in the methodology, age and quality of the datasets is evident, such that in places the presence or absence of vegetation has been mapped incorrectly or is of a very low precision (errors of several hundred metres have been identified).

Where possible the NPWS worked to overcome these errors through manually updating the existing API. To further improve the reliability of the extant vegetation map Eco Logical Australia (ELA) was engaged by LHCCREMS to produce a new extant vegetation map from digital aerial photos (orthophotos) flown between 2000 – 2001 (exact dates vary).

Using data supplied by partner organisations (NPWS & PlanningNSW), ELA digitised the presence or absence of vegetation within the Arcview GIS system at a scale of 1 : 10 000. Having fully rectified photos already within the GIS system, with Australian Map Grid Coordinates, removed a large degree of error caused by edge effects and warping associated with traditional stereoscope API methods.

Additional to the presence/absence of vegetation, ELA mapped the canopy cover (%density) of vegetation remnants. Remnants were mapped to a very fine scale – all remnants with a canopy cover > 20% and a size of at least 0.25 hectares were mapped. Where canopy cover was found to be between 10 and 20% all remnants greater than or equal to 0.5 hectares were mapped.

This compares favorably with the previous mapping that, in some cases, only mapped remnants larger than 10 hectares in size. Other features including wetlands, scrub and plantations were mapped.

The new presence absence map was combined with the pre1750 model to produce a new extant vegetation community map. Canopy cover was assessed in relation to vegetation communities to identify the likely condition of the canopy. For example an area mapped as forest in the pre1750 mapping but exhibiting a canopy cover of 10 – 20% is considered to have a substantially modified canopy structure.

The result is a consistent, up to date and highly accurate extant vegetation map for the Lower Hunter and central Coast region that far surpasses the accuracy and currency of the previous mapping, and includes additional information on canopy condition. The methodology implemented, examples of the improvements rendered by the mapping and recommendations for future work are contained within this report.

2. Methodology

The methodology was determined through analysis of the available digital orthophotos, consultation with the NPWS and LHCCREMS staff, and a review of relevant literature. Initially the project was to undertake a 'supervised isocluster numerical classification' of the available digital orthophotos (an automated image analysis technique). This technique has previously been successfully used by ELA for mapping vegetation in the Eden RFA area. However, trials of this technique in the REMS area yielded poor results, due largely to high moisture levels that resulted in poor discrimination of greenness values.

Consequently a manual approach was employed. Aerial photo interpreters identified the location of remnant vegetation 'on-screen'. All remnants were then classified according to the type of feature and in the case of vegetation, the canopy cover. Canopy cover codes were assigned according to structural categories identified by Walker and Hopkins. The following categories were used:

Table 1: Canopy Cover Codes

Code	Cover	Description
CF	100%	Closed Forest
OF	50 - <100%	Mid Dense (Open Forest)
WO	20 - <50%	Sparse (Woodland)
OW	10 - <20%	Very Sparse (Open Woodland)
W	NA	Wetland
MF	NA	Mangrove Forest
R	NA	Rock
S	NA	Scrub
P	NA	Plantation
B	NA	Bushland – Extensive areas of native vegetation, may include Woodland, Open Woodland, Closed Forest etc.

2.1 Mapping Rules

A number of rules were applied when mapping vegetation. Specifically they were:

- Mapped at 1:10 000 scale
- Roads or linear clearing greater than 10m width mapped as cleared
- Remnants mapped if:
  - 0.5 ha and >10% crown cover
  - 0.25ha and > 20% crown cover
  - All other categories mapped if > 0.25ha
  - Include wetlands identified by SEPP14 mapping provided by PlanningNSW

Individual photos were mapped and then edge matched with neighboring photos. Edge matching included ensuring that both linework and attributes were consistent

between photos. Each photo was then 'clipped' to an outline grid and all photos were then merged into a single arcview shapefile.

2.2 Data Validation

No on-site validation of data has been undertaken as part of this project. However, approximately 10 person days has been spent assessing individual photos and ensuring consistency between photos. This extensive validation period, combined with the high-resolution mapping ensures a high level of quality control.

2.3 Producing an Updated Vegetation Community Map

The final mapped product was then combined with the existing pre1750 map to produce an extant vegetation community map. Initial attempts to undertake this though a union process in the Arcview GIS system failed due to the complexity of the data. Subsequent attempts in Arcinfo resulted in altered linework and some coding discrepancies. The final method used was to clip the pre1750 vegetation map to each of the individual API categories and then merge this data back into a single coverage. The resultant layer contained polygons that exactly matched the original data and contained codes for both the vegetation community and the canopy cover within each polygon.

2.4 Deriving Canopy Condition

A matrix (of community by condition) was used to determine the likely condition of the canopy at a site (see appendix 1), by comparing the predicted canopy cover to the mapped canopy cover. This matrix took into consideration the natural canopy cover expected and discrepancies that may be caused through interpretation errors (for example rainforest and scrub can look similar when viewed in 2 dimensions). It must be highlighted that only canopy cover was mapped, no understorey or growth-stage information is available. Hence the resultant map is best described as a surrogate for condition.

The rationale with the canopy condition coding being that if the canopy cover was lower than what is expected for that community it is an indication of disturbance. For example if an area expected to contain a forest community (canopy cover 50 - 100%) has been mapped as woodland (canopy cover 20 – 50%) it is likely that the canopy has been thinned. This approach assumes a high degree of accuracy with the pre1750 map. In many cases there were anomalies such as woodland being mapped as a forest (i.e. a higher canopy cover than expected). Such polygons were tagged 'AN' for anomaly, although their final condition value was assigned the highest level – substantially unmodified.

The following condition codes were assigned:

     SU –   Substantially unmodified vegetation
     M –   Modified
     SM –   Substantially modified vegetation
     MF –   Mangrove Forest
     P -   Plantation
     R –   Rock
     W -   Wetland
     AN -   Anomaly

These codes were further grouped for the conservation component into the following categories:

     A –   SU, MF, R, AN, W
     B –   M
     C –   SM, P
     W –   W

The following communities mapped as W, received a score of A:

Table 2: Wetland Communities of Condition Category A

Community Name	Mapunit
Heath	26a
Coastal Sand Wallum Woodland – Heath	34
Heath	34a
Kurri Sand Swamp Woodland	35
Tomago Sand Swamp Woodland	36
Heath	36a
Swamp Mahogany - Paperbark Forest	37
Swamp Oak Rushland Forest	40
Rushland	40a
Swamp Oak Sedge Forest	41
Riparian Melaleuca Swamp Woodland	42
Melaleuca Scrub	42a
Wyong Paperbark Swamp Forest	43
Melaleuca Scrub	43a
Coastal Wet Sand Cyperoid Heath	44
Lepironia Swamp	45
Freshwater Wetland Complex	46
Mangrove-Estuarine Complex	47
Saltmarsh	47a
Coastal Clay Heath	48
Nora Head Endangered Heath-Woodland	48a
Coastal Sand Scrub	50
Closed Heath / Scrub (Ti-tree) (Payne 1999)	Qa13
Seagrass	Seagrass
Water	Water

3. Results

The final mapped product has been captured at a scale of 1:10 000 from digital aerial photos that were flown during 2000 – 2001. Exact dates of the photos vary and are not currently available. To remain consistent with the NPWS vegetation community mapping, it is recommended that the data is suitable for publication at a minimum scale of 1: 25 000. The new LHCCREMS map is a substantial improvement on the previous vegetation map produced in 2000 by:

- Overcoming a number of inconsistencies resulting from the variety of API sources only available at that time
- Utilising the most recently available digital aerial photos
- The inclusion of canopy cover
- The inclusion wetlands, scrub and plantations mapping
- Increased linework precision.

Information has been provided to LHCCREMS in digital form. An ANZLIC compliant metadata statement has been produced to accompany the data and is included as Appendix 2 to this report.

An example of the differences between the old extant mapping and the new mapping is contained below.

Figure1. Comparison of mapping

Old Extant Vegetation Map   New Extant Vegetation Map
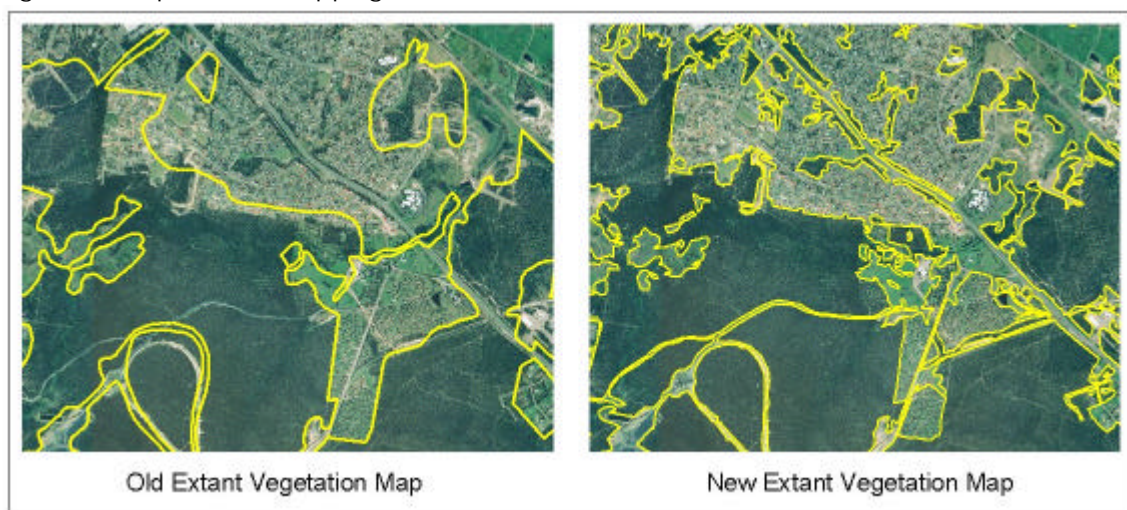
The above diagrams highlight that the new mapping has both removed and added areas of bushland. In particular boundary errors have been corrected, recent clearing has been included and smaller remnants missed by earlier mapping identified. Analysis of the variation in mapping has identified that thousands of hectares of mapping has been adjusted, as indicated by the following table:

Table 3. Comparison of mapped areas

New Mapping	Land previously mapped as Bushland	Land previously mapped as Cleared
Cleared	**22502**	155711
Bushland (SU)	337849	**37824**
Bushland (M)	2898	5520
Bushland (SM)	3181	4601
Water Mapped as terrestrial Vegetation in pre1750 mapping	557	1608

Bold indicates direct discrepancies between old and new mapping
SU = substantially unmodified, M = modified, SM = substantially modified bushland

This table indicates the relationship between the new mapping classes and the old mapping classes. In particular it identifies the discrepancies between the two maps. Of note 22502 hectares of land previously mapped as containing bushland have now been mapped as cleared. A further 37 824 hectares of substantially unmodified bushland previously mapped as cleared is included in the new mapping.

As a result of the updated mapping it is necessary to review the extant levels of vegetation communities and the proportion of their pre1750 distribution. This information is contained in the following table.

Table 4. Vegetation areas

Map Unit	Vegetation Community	Pre1750 Hectares	Old Extant Ha	New All Condition Ha	New 'A' Condition Ha
1	Coastal Wet Gully Forest	16556	12028	14600	14418
1a	Coastal Warm Temperate-Subtropical Rainforest	2929	3175	2897	2890
2	Sandstone Ranges Warm Temperate Rainforest	404	404	402	402
3	Hunter Valley Dry Rainforest	2996	1326	1175	1041
4	Littoral Rainforest	206	185	193	189
5	Alluvial Tall Moist Forest	25274	4565	6453	4702
6	Coastal Narrabeen Moist Forest	36502	28432	31167	30856
7	Sheltered Rough Barked Apple Forest	5328	4898	4796	4610
8	Sheltered Blue Gum Forest	12650	11713	11940	11787
9	Coastal Ranges Open Forest	21167	18528	19868	19714
10	Sandstone Grey Myrtle Sheltered Forest	7362	7084	7222	7180
11	Coastal Sheltered Apple - Peppermint Forest	1167	102	326	304

12	Hunter Valley Moist Forest	7356	4906	5439	4984
13	Central Hunter Riparian Forest	1863	1186	936	869
14	Wollombi Redgum - River Oak Forest	4518	622	1574	1371
15	Coastal Foothills Spotted Gum - Ironbark Forest	32175	16939	21094	19998
16	Seaham Spotted Gum Iron Bark Forest	14822	6975	7677	6677
17	Lower Hunter Spotted Gum - Ironbark Forest	64587	26917	31286	26518
18	Central Hunter Ironbark - Spotted Gum - Grey Box Forest	437	44	130	102
19	Hunter Lowland Redgum Forest	18305	4856	7047	5171
20	Dharug Roughbarked Apple Forest	4362	4007	4169	4138
21	Hunter Range Grey Gum Forest	47342	38950	45914	45638
22	Coastal Narabeen Shrub Forest	7615	7461	6645	6459
23	Broken Back Grey Gum - StringybarkForest	3282	3150	3182	3175
24	McDonald Exposed Ironbark Woodland	3693	3672	3667	3667
25	Sheltered Dry Hawkesbury Woodland	18478	18639	18170	18128
26	Exposed Hawkesbury Woodland	25518	16504	18503	18036
26a	Heath	2049	2052	1965	1965
27	Exposed Yellow Bloodwood Woodland	26420	26206	26237	26223
28	Scribbly Gum - Dwarf Apple Woodland	940	874	931	928
28a	Dwarf Apple Scrub	22	22	22	22
29	Hawkesbury Coastal Banksia Woodland	6340	5732	5446	5425
29a	Scrub	1858	1859	1573	1573
30	Coastal Plains Smooth-barked Apple Woodland	52663	32984	35959	35065
31	Coastal Plains Scribbly Gum Woodland	10751	4251	6059	5812
32	Nerong Smooth Barked Apple Forest	273	239	234	231
32a	Scrub	327	331	309	309
33	Coastal Sand Apple - Blackbutt orest	16891	9356	10907	9487
34	Coastal Sand Wallum Woodland - Heath	3964	1914	2349	2196
34a	Heath	891	893	693	693
35	Kurri Sand Swamp Woodland	4115	2195	2448	2246
36	Tomago Sand Swamp Woodland	1637	35	659	287
36a	Heath	1889	1889	1704	1704
37	Swamp Mahogany - Paperbark Forest	15055	4763	5264	4381
38	Redgum Rough Barked Apple Forest	1073	257	366	311

39	Apple - Palm Gully Forest	118	56	73	50
3a	Dry Rainforest Canopy Dominant	85	86	84	83
40	Swamp Oak Rushland Forest	7175	2449	2607	2406
40a	Rushland	121	981	99	96
41	Swamp Oak Sedge Forest	1361	596	593	543
42	Riparian Melaleuca Swamp Woodland	7681	2886	3935	3774
42a	Melaleuca Scrub	116	107	95	95
43	Wyong Paperbark Swamp Forest	5306	1921	2821	2259
43a	Melaleuca Scrub	27	27	27	27
44	Coastal Wet Sand Cyperoid Heath	1551	1383	1368	1368
45	Lepironia Swamp	47	37	40	40
46	Freshwater Wetland Complex	5231	3773	3900	3867
47	Mangrove-Estuarine Complex	9160	6111	6626	6608
47a	Saltmarsh	274	730	170	170
48	Coastal Clay Heath	564	351	388	388
48a	Nora Head Endangered Heath-Woodland	40	40	39	39
49	Nelson Bay Shrub Heath	53	54	49	49
50	Coastal Sand Scrub	1516	809	945	945
51	Coastal Headland Complex	149	126	121	121
52	Rocky Headland Scrub	74	14	19	19
53	Beach Spinifex	426		69	69
54	Sandstone Hanging Swamps	359	356	297	297
Beach Sands	Beach sands	2553	2549	104	92
Qa13	Closed Heath / Scrub (Ti-tree) (Payne 1999)	142	381	142	142
Rocky Coast	Rocky Coast	83	69	37	37
Sand	Sand	1		1	0
Seagrass	Seagrass	21	23	2	2
Water	Water	168	224	91	91

4. Conclusion

The project has produced a highly accurate, cost effective method of identifying the location of extant vegetation and canopy density. The availability of fully rectified digital orthophotos removes many of the tasks associated with importing traditional hardcopy API into a GIS system. This results in substantially lower data capture costs and removes many of the errors caused by scanning and digitising hardcopy data.

This methodology is readily repeatable and with appropriate training and quality control techniques can be undertaken by personnel with limited GIS or API

experience. Despite being a highly accurate and high quality product, improvements could be obtained by including a field validation stage, which LHCCREMS is now pursuing as part of its ongoing commitment to improved biodiversity conservation and management. Importantly this will improve the accuracy of the canopy condition coding and the reliability of some map units, particularly wetlands whose boundaries are often difficult to delineate in scrubby environments or cleared lands.

The condition mapping should only be considered as a surrogate for condition and used with caution. There is potential for error with the condition coding due to a high reliance placed on the pre1750 vegetation map and natural variability within vegetation communities. True vegetation condition is related to more than canopy cover, in particular the understorey and the age of vegetation. Traditional API using a stereoscope is much more effective at identifying these features.

Ideally an initial map product would be based on the use of full stereoscope mapping, with extant vegetation being updated periodically using the digital orthophoto technique implemented by this study. Full stereoscope mapping has the potential to identify many important features that cannot currently be mapped from digital orthophotos including:
- Canopy and forest structure
- Growth stage
- Some understorey characteristics
- Dominant canopy species
- Height

The capture of such information consistently across the region would substantially improve the reliability of vegetation communities and condition.

The mapping produced by this project has identified an additional 37824 Hectares of bushland not previously mapped. Much of this is small remnants that were below previous mapping thresholds or was identified through improving the accuracy of remnant boundaries. Conversely 22502 hectares of land previously mapped as bushland has since been identified as cleared. This is due to considerable clearing that has been undertaken since the original mapping and improvement in the accuracy of remnant boundaries.

Despite the changes in the mapping of vegetation and cleared lands the trends of clearing across the region are consistent with the previous mapping. That is, clearing has been biased towards the Hunter Valley and Coastal areas with the majority of vegetation occurring on steep slopes or low fertility sandstone plateau landscapes.

Appendix 1 – Condition Matrix

Column labels – CF - closed forest, B – bushland, OF – Open Forest, WO – woodland, OW – Open Woodland, S – Scrub, R – rock, W – wetland, MF – Mangrove Forest

Values: AN – Anomaly, SU – Substantially Unmodified, M – Modified, SM – Substantially Modified, R – Rock, P – Plantation, W – Woodland, MF – Mangrove Forest

Community Name	Mapunit	CF	B	OF	WO	OW	S	R	P	W	MF
Coastal Wet Gully Forest	1	SU	SU	SU	M	SM	SM	R	P	W	MF
Coastal Warm Temperate- Subtropical Rainforest	1a	SU	SU	SU	SM	SM	SU	R	P	W	MF
Sandstone Ranges Warm Temperate Rainforest	2	SU	SU	SU	SM	SM	SM	R	P	W	MF
Hunter Valley Dry Rainforest	3	SU	SU	SU	SM	SM	SM	R	P	W	MF
Dry Rainforest Canopy Dominant	3a	SU	SU	SU	SM	SM	SU	R	P	W	MF
Littoral Rainforest	4	SU	SU	SU	SM	SM	SU	R	P	W	MF
Alluvial Tall Moist Forest	5	AN	SU	SU	M	SM	SM	R	P	W	MF
Coastal Narrabeen Moist Forest	6	AN	SU	SU	M	SM	SM	R	P	W	MF
Sheltered Rough Barked Apple Forest	7	AN	SU	SU	M	SM	SM	R	P	W	MF
Sheltered Blue Gum Forest	8	AN	SU	SU	M	SM	SM	R	P	W	MF
Coastal Ranges Open Forest	9	AN	SU	SU	M	SM	SM	R	P	W	MF
Sandstone Grey Myrtle Sheltered Forest	10	SU	SU	SU	M	SM	SM	R	P	W	MF
Coastal Sheltered Apple - Peppermint Forest	11	AN	SU	SU	M	SM	SM	R	P	W	MF
Hunter Valley Moist Forest	12	AN	SU	SU	M	SM	SM	R	P	W	MF
Central Hunter Riparian Forest	13	AN	SU	SU	M	SM	SM	R	P	W	MF
Wollombi Redgum - River Oak Forest	14	AN	SU	SU	M	SM	SM	R	P	W	MF
Coastal Foothills Spotted Gum – Ironbark Forest	15	AN	SU	SU	M	SM	SM	R	P	W	MF
Seaham Spotted Gum Iron Bark Forest	16	AN	SU	SU	M	SM	SM	R	P	W	MF

Lower Hunter Spotted Gum - Ironbark Forest	17	AN	SU	SU	M	SM	SM	R	P	W	MF
Central Hunter Ironbark - Spotted Gum - Grey Box Forest	18	AN	SU	SU	M	SM	SM	R	P	W	MF
Hunter Lowland Redgum Forest	19	AN	SU	SU	M	SM	SM	R	P	W	MF
Dharug Roughbarked Apple Forest	20	AN	SU	SU	M	SM	SM	R	P	W	MF
Hunter Range Grey Gum Forest	21	AN	SU	SU	M	SM	SM	R	P	W	MF
Coastal Narrabeen Shrub Forest	22	AN	SU	SU	M	SM	SM	R	P	W	MF
Broken Back Grey Gum - Stringybark Forest	23	AN	SU	SU	M	SM	SM	R	P	W	MF
McDonald Exposed Ironbark Woodland	24	AN	SU	AN	SU	M	SM	R	P	W	MF
Sheltered Dry Hawkesbury Woodland	25	AN	SU	AN	SU	M	SM	R	P	W	MF
Exposed Hawkesbury Woodland	26	AN	SU	AN	SU	M	SM	R	P	W	MF
Heath	26a	SU	SU	SU	SU	SU	SU	R	P	W	MF
Exposed Yellow Bloodwood Woodland	27	AN	SU	AN	SU	M	SM	R	P	W	MF
Scribbly Gum - Dwarf Apple Woodland	28	AN	SU	AN	SU	M	SM	R	P	W	MF
Dwarf Apple Scrub	28a	SU	SU	SU	SU	SU	SU	R	P	W	MF
Hawkesbury Coastal Banksia Woodland	29	AN	SU	AN	SU	M	SU	R	P	W	MF
Scrub	29a	SU	SU	SU	SU	SU	SU	R	P	W	MF
Coastal Plains Smooth-barked Apple Woodland	30	AN	SU	AN	SU	M	SM	R	P	W	MF
Coastal Plains Scribbly Gum Woodland	31	AN	SU	AN	SU	M	SM	R	P	W	MF
Nerong Smooth Barked Apple Forest	32	AN	SU	SU	M	SM	SM	R	P	W	MF
Scrub	32a	SU	SU	SU	SU	SU	SU	R	P	W	MF
Coastal Sand Apple - Blackbutt Forest	33	AN	SU	SU	M	SM	SM	R	P	W	MF
Coastal Sand Wallum Woodland – Heath	34	SU	SU	SU	SU	SU	SU	R	P	W	MF
Heath	34a	SU	SU	SU	SU	SU	SU	R	P	W	MF
Kurri Sand Swamp Woodland	35	AN	SU	AN	SU	M	SM	R	P	W	MF
Tomago Sand Swamp Woodland	36	AN	SU	AN	SU	M	SM	R	P	W	MF

Name	Code										
Heath	36a	SU	SU	SU	SU	SU	SU	R	P	W	MF
Swamp Mahogany - Paperbark Forest	37	AN	SU	SU	M	SM	SM	R	P	W	MF
Redgum Rough Barked Apple Forest	38	AN	SU	SU	M	SM	SM	R	P	W	MF
Apple – Palm Gully Forest	39	AN	SU	SU	M	SM	SM	R	P	W	MF
Swamp Oak Rushland Forest	40	SU	SU	SU	M	SM	SU	R	P	W	MF
Rushland	40a	SU	SU	SU	M	SM	SU	R	P	W	MF
Swamp Oak Sedge Forest	41	AN	SU	SU	M	SM	SM	R	P	W	MF
Riparian Melaleuca Swamp Woodland	42	SU	SU	AN	SU	M	SU	R	P	W	MF
Melaleuca Scrub	42a	SU	SU	SU	SU	SU	SU	R	P	W	MF
Wyong Paperbark Swamp Forest	43	AN	SU	SU	M	SM	SM	R	P	W	MF
Melaleuca Scrub	43a	SU	SU	SU	SU	SU	SU	R	P	W	MF
Coastal Wet Sand Cyperoid Heath	44	SU	SU	SU	SU	SU	SU	R	P	W	MF
Lepironia Swamp	45	SU	SU	AN	M	SM	SU	R	P	W	MF
Freshwater Wetland Complex	46	SU	SU	AN	M	SM	SU	R	P	W	MF
Mangrove-Estuarine Complex	47	SU	SU	SU	M	SM	SU	R	P	W	MF
Saltmarsh	47a	SU	SU	AN	AN	AN	SU	R	P	W	MF
Coastal Clay Heath	48	SU	SU	SU	SU	SU	SU	R	P	W	MF
Nora Head Endangered Heath-Woodland	48a	SU	SU	SU	SU	SU	SU	R	P	W	MF
Nelson Bay Shrub Heath	49	SU	SU	SU	SU	SU	SU	R	P	W	MF
Coastal Sand Scrub	50	SU	SU	SU	SU	SU	SU	R	P	W	MF
Coastal Headland Complex	51	SU	SU	SU	SU	SU	SU	R	P	W	MF
Rocky Headland Scrub	52	SU	SU	SU	SU	SU	SU	R	P	W	MF
Beach Spinifex	53	SU	SU	SU	SU	SU	SU	R	P	W	MF
Sandstone Hanging Swamps	54	SU	SU	SU	SU	SU	SU	R	P	W	MF
Beach sands	Beach sands	AN	AN	AN	AN	AN	SU	R	P	W	MF
Closed Heath / Scrub (Ti-tree) (Payne 1999)	Qa13	SU	SU	SU	SU	SU	SU	R	P	W	MF

Rocky Coast	Rocky Coast	AN	SU	SU	AN	AN	SU	R	P	W	MF
Sand	Sand	AN	AN	AN	AN	AN	AN	R	P	W	MF
Seagrass	Seagrass	AN	AN	AN	AN	AN	AN	R	P	SU	MF
Water	Water	AN	AN	AN	AN	AN	AN	R	P	W	MF

Appendix 2 – Metadata Statements

METADATA CATEGORY	CORE METADATA ELEMENT	DESCRIPTION
DATASET	Title	LHCCREMS Extant Vegetation
	Custodian	LHCCREMS
	Jurisdiction	New South Wales
CONTACT ADDRESS		
	Contact Organisations	Lower Hunter and Central Coast Regional Environmental Management Strategy
	Contact Position	Regional Biodiversity Coordinator
	Mail Address 1	PO Box 189
	Mail Address 2	** None Entered **
	Suburb/Place/Locality	Hunter Region Mail Centre
	State/Locality 2	NSW
	Country	Australia
	Postcode	2310
	Telephone	02 4962 0916
	Facsimile	02 4962 0966
	Electronic Mail Address	Biomapping@hroc.org.au
DESCRIPTION		
	Abstract	Mapping of vegetation cover from digital orthophotos. Scale of 1:25 000. Projection: AMG 66 zone 56
	Search Words	VEGETATION; Classification ; Mapping ; Models
	Geographical Extents Name(s)	Lower Hunter and Central Coast
	Geographical Extents Polygon(s)	X min: 294481.74 X max: 424765.00 Y min: 6283898.18 Y max: 6394412.50
	Type of Feature	Polygon

Attribute/Field List	Shape
	ID
	Area
	Perimeter
	Hectares
	Mu_name
	Canopy_lab
	Map_unit
	Canopy
	Condition
	Lumped_cond

	Attribute/Field Description	Shape: The shape of the GIS data, in this case polygons ID: Unique polygon identifier Area: The are in square metres of each polygon Perimeter: The perimeter of each polygon in metres Hectares: The are of each polygon in hectares Mu_name: Vegetation community name from pre1750 mapping (NSW NPWS) Canopy_lab: Dominant canopy species from pre1750 mapping (NSW NPWS) Map Unit: Unique numeric code for each vegetation community Canopy: The code for the type of canopy mapped CF 100% canopy cover Closed Forest OF 50 - <100% Mid Dense (Open Forest) WO 20 - <50% Sparse (Woodland) OW 10 - <20% Very Sparse (Open Woodland) W Wetland MF Mangrove Forest R Rock S Scrub P Plantation B Bushland – Extensive areas of native vegetation, may include Woodland, Open Woodland, Closed Forest etc Condition: The canopy condition of each polygon, derived by assessing the canopy_cod in relation to the vegetation community SU – Substantially unmodified vegetation M – Modified SM – Substantially modified veg MF – Mangrove Forest P – Plantation R – Rock W – Wetland AN –Anomaly Lumped_cond: Grouping on condition codes in 4 super codes A – SU, MF, R, AN, W (where pre1750 mapped as a wetland community) B – M C – SM, P W – terrestrial communities mapped as wetlands
	Scale/Resolution	1: 25,000

DATASET CURRENCY		
	Beginning Date	01Jul2002
	Ending Date	"Current"
DATASET STATUS		
	Progress	Complete
	Maintenance and Update frequency	Not Known
DATASET ENVIRONMENT		
	Software	ArcView 3.1
	Computer Operating System	Microsoft WindowsXP
	Dataset Size	44mb
ACCESS		
	Stored Data Format	DIGITAL ArcView
	Available Format Types	Arcview Shapefile
	Access Constraints	Licensed to LHCCREMS
DATA QUALITY		
	Lineage	Original linework digitised from 1 : 5000 digital orthophotos supplied by LPI. Photos flown between 2000 – 2001 to produce extant vegetation map. This mapped than combined with existing pre1750 vegetation community mapping undertaken by NSW NPWS to produce an extant vegetation community map
	Positional Accuracy	API accuracy is excellent – 1: 10 000. Delineation of vegetation communities is variable. Appropriate scale of use 1 : 25,000
	Attribute Accuracy	Data has been validated although potential for incorrect entries does exist. Further field validation and regular updates would improve data
	Logical Consistency	Extant vegetation data mapped from aerial photos, combined with a pre1750 model of vegetation communities to produce an extant vegetation community map
	Completeness	The western most portion of the study area (6 photos) did not have photos available. Hence extant mapping was taken from existing data collated by the NSW NPWS
NOTES		

	Notes	** None Entered **
METADATA DATE		
	Metadata Date	26May2003
METADATA COMPLETED BY		
	Metadata Sheet Completed by	Kathy Godfrey – Eco Logical Australia
FURTHER INFORMATION		
	Further Information	See report " *Digital aerial photo interpretation and updating of extant vegetation map*".