Title	Old Growth Forest Ecosystems BOGMP Grid for CRA Lower North East. VIS_ID 5060
Alternative title(s)	FE_OldGrowth_BOGMP_LNE_E_5060
Abstract	Map of the distribution of old-growth forest ecosystems across extant forest in the Lower North East CRA region. Three separate classifications and mapping techniques were used to derive the ecosystems in three distinct biogeographic regions and these classifications and maps were then expertly integrated and merged to create a full coverage across the region. The ecosystems were mapped for application in the Comprehensive Regional Assessment process. They were then clipped to candidate old growth, component of the BOGMP successional forest growth stage mapping. The 100m modelled grid data is to be used in a regional context and not for fine scale interpretation. For areas without detailed vegetation mapping (western portions of the UNE and LNE regions, and the southern portion of the LNE region) the modelled distributions were used to predict the proportion of a modelled ecosystem only. As a result, the exact spatial representation of the data is not designed to be accurate. VIS_ID 5060

Resource locator

Data Quality Statement	Name: Data Quality Statement Protocol: WWW:DOWNLOAD-1.0-http--download Description: Data quality statement for Forest Ecosystem Grid for CRA Lower North East. VIS_ID 3883 Function: download
Download package	Name: Download package Protocol: WWW:DOWNLOAD-1.0-http--download Description: Raster Data (Esri Grid & TIFF) Function: download

Unique resource identifier

Code	ed3c1e6c-c7ee-445c-99bf-54d57c1f31f5

Presentation form	mapDigital
Edition	unknown
Dataset language	eng

Metadata standard

Name	ANZLIC Metadata Profile: An Australian/New Zealand Profile of AS/NZS ISO 19115:2005, Geographic information - Metadata
Version	1.1

Dataset URI	https://datasets.seed.nsw.gov.au/dataset/ed3c1e6c-c7ee-445c-99bf-54d57c1f31f5
Purpose	The old growth forest ecosystems were mapped for application in the Comprehensive Regional Assessment process.

Status	completed
Spatial representation type	grid

Spatial reference system

Authority code	GDA94 / MGAZone 56
Code identifying the spatial reference system	28356

Spatial resolution	100 m
Additional information source	NPWS (1999). Forest Ecosystem Classification & Mapping for the Upper & Lower North East CRA Regions. Project number NA35/Eh.; DEC (2004). Field Key to Forest Ecosystems. Coffs Harbour. Old-growth Forest Related Projects - UNE / LNE Regions A project undertaken as part of the NSW Comprehensive Regional Assessments February (1999)

Topic category

Keyword set

keyword value	VEGETATION
	FLORA

Originating controlled vocabulary

Title	ANZLIC Search Words
Reference date	2008-05-16

Geographic location

West bounding longitude	150.9233
East bounding longitude	153.4562
North bounding latitude	-33.0544
South bounding latitude	-30.2235

Vertical extent information

Minimum value	-100
Maximum value	2228

Coordinate reference system

Authority code	urn:ogc:def:cs:EPSG::
Code identifying the coordinate reference system	5711

Temporal extent

Begin position	1998-08-01
End position	N/A

Dataset reference date

Date type	publication
Effective date	2011-07-11
Date type	revision
Effective date	2019-05-30

Resource maintenance

Maintenance and update frequency	None

Contact info

Organisation name	NSW Department of Climate Change, Energy, the Environment and Water
Full postal address	NSW Australia data.broker@environment.nsw.gov.au
Telephone number	131555
Email address	data.broker@environment.nsw.gov.au
Responsible party role	pointOfContact

Lineage

Eastern Portion of the CRA Region - north of the Hunter River to the northern boundary of the Lower North East region and west to the New England Highway; ; Data Collecton Method:; 1. Fine Scale Vegetation Mapping from Aerial Photograph Interpretation; 2. Field survey; 3. Mapping of ecosystems across areas covered by existing fine scale mapping; 4. Modelling of ecosystems across unmapped forest and cleared land; ; Data Set Source:; 1. The following fine scale vegetation mapping from aerial photograph interpretation was utilised:; * SFNSW Forest Typing; * Natural Resources Audit Council Multi-attribute Mapping; * Coffs Harbour Council Vegetation Mapping; * Henry James Tweed Vegetation Mapping; * Department of Land and Water Conservation Nambucca Vegetation Mapping; * National Parks and Wildlife Service Coastal Vegetation Mapping; 2. Information from the following field surveys was utilised:; * Flora survey of Ben Halls Gap State Forest; * Flora Survey of Broadwater National Park; * Flora survey of Bundjalung National Park; * Flora Survey of the Coffs Harbour Local Government Area; * CRA Systematic Flora Survey; * Flora Survey of Demon Nature Reserve; * Vegetation Survey of the National Parks of Dorrigo District; * Eucalyptus dunnii survey; * John Hunter Granite Surveys; * Mount Neville Vegetation Survey; * Vegetation Survey of Myall Lakes National Park; * North East Forests Biodiversity Study Flora Sites; * Natural Resources Audit Council Flora Survey; * Joint Old Growth Project Flora data; * Hunter Valley Remnant Surveys; * Royal Botanic Garden Vegetation Data for the Guyra Mapsheet; * State Forest Environmental Impact Study flora data; * Tomaree National Park Vegetation Survey; * Tweed Coast Vegetation Survey; * Yuraygir National Park Flora Survey Sites; * Rainforest Floristic Traverses - Alex Floyd, Sally King and Woko National Park; 3. The following environmental layers were utlised to conduct analysis and modelling:; * Solar Radiation Index; * Minimum Temperature of the Coldest Month; * Mean Temperature; * Annual Rainfall; * Wetness Index; * Rainfall in the Driest Quarter; * Moisture Index; * Geological Classes; * Soil Fertility; * Soil Depth; * Topographic Position; * Ruggedness Indices; * Topographic Indices; * Slope; * Easting; * Northing; 4. Other datasets utilised were:; * Broad Old Growth Mapping Project (BOGMP); * Eastern Bushlands Broad Vegetation layer; * Historical Portion Plan Data for a sample of Parishes across the region; * Vegetation Units from the Interim Assessment Process; ; Source Material Input Scale:; 1. All finescale vegetation mapping was conducted at a scale of 1:25000 or finer; 2. The Topographic Indices, Ruggedness Indices, Solar Radiation Index, Mean Temperature, Minimum Temperature of the Coldest Month, Slope, Wetness Index and Annual Rainfall layers were all derived at a 25m resolution and utilised a 25m Digital Elevation Model; 3. The Moisture Index, Rainfall in the Driest Quarter, Soil Fertility and Soil Depth layers were all derived at 200m resolution; 4. The Geological classes were captured at 1:250,000 scale; 5. The Eastern Bushlands broad vegetation layer was captured from landsat at a scale of 1:100,000; ; Additional Processing Steps:; 1. All finescale vegetation mapping was imported into ARCVIEW as shape files and the vegetation type attribution of each mapping project was expertly converted to an analagous SFNSW RN17 forest type classification; 2. The imported shapefiles were converted to ARCVIEW grids at a 50m resolution and merged into a single layer; 3. All survey data was imported into an ACCESS 97 flora database specifically designed for storage of the data and was subject to a sequence of manual and automatic checking procedures as outlined in attached metadata statements for each survey.; 4. A

data matrix of sites by species by cover abundance was derived from the survey data for use in the analysis.; 5. All environmental layers were imported as ARCVIEW grids and resampled at 50m.; 6. Analyses were undertaken of existing RN17 forest types with sufficient floristic sites using the full floristic survey data to assess the floristic variation and the environmental data to map that variation. The analysis utilised an analytical technique known as Analysis of Similarities (ANOSIM). The analytical methodology was applied using software developed specifically for this purpose by the NPWS GIS Research and Development Unit. The software was implemented as an extension within the ArcView GIS package, and coded using the Avenue scripting language with calls to external C++ functions, where necessary, to perform intensive mathematical processing.; 7. Forest ecosystems derived from the analysis were mapped within existing (albeit converted) mapped forest type polygons by iterative application of binary divisions of environmental variables at a 50m resolution. These applications were derived from the analysis process as a decision tree for each forest type which indicated the sequence of binary environmental splits and final merges required to produce the derived forest ecosystems.; 8. All derived ecosystem grids were merged to create a final ecosystem layer within the mapped extent.; 9. The pre-1750 distribution of each derived eucalypt ecosystems was modelled in relation to abiotic environmental variables using data extracted from areas covered by existing fine scale mapping. Non eucalypt ecosystems were not able to have models fitted because the coarseness of the classification for these ecosystems precluded the development of statistical relationships with environmental predictors. ; 10. For each eucalypt forest ecosystem a random sample of 1ha grid cells was drawn from all cells mapped as containing that ecosystem and a second sample of cells was drawn from all cells mapped as not containing the ecosystem. Samples were selected in a manner which minimized problems of spatial autocorrelation and model overfitting. A logistic regression model relating the probability of presence of each forest ecosystem to abiotic environmental and geographical variables was then fitted using generalised additive modelling (Yee and Mitchell 1991), a technique already applied extensively by NPWS in forest assessment work in NSW. Generalized additive models (GAMs) use a nonparametric smooth function relating the response variable to the predictor.; 11. These fitted models were then used to extrapolate the distribution of forest ecosystems across all unmapped forest and cleared areas. ; 12. The modelling was conducted via a modelling module (produced by Watson, 1996) which fitted regression models under S-PLUS statistical software (StatSci, 1995) and conducted extrapolation using ARCVIEW Spatial Analyst (ESRI, 1996).; 13. The modelling resulted in a probability surface (extrapolated distribution) for each forest ecosystem at 100m resolution. A single layer depicting the pre-1750 distribution of each forest ecosystem was derived from the overlay of all the forest ecosystem probability surfaces by randomly proportionally assigning each gridcell to a forest ecosystem according to the relative probabilities of each ecosystem at that gridcell.; 14. In the zone of overlap between the mapping schemes from the western and eastern portions of the CRA region, western ecosystems overrode the mapped distribution of eastern ecosystems for those ecosystems for which the western ecosystem models were deemed (via expert opinion) more robust then the eastern ecosystem models. ; 15. An extensive analysis of data from historical portion plans was used to inform the pre-1750 distribution of eucalypt forest vegetation (versus other native vegetation types). Each data point from historical portion plans was assigned to open eucalypt forest or non eucalypt vegetation based predominantly on the corner tree type recorded by the surveyors and secondarily on the description provided by the surveyors. From this information, the proportion of open eucalypt forest to non eucalypt vegetation was calculated for each vegetation unit derived during the Interim Assessment Process (NPWS 1996). Vegetation units for which no historical portion plan data was collected, were assigned the proportions of their nearest neighbour in the dendrogram for which data was available. This then provided a full coverage of the likely proportion of pre-1750 eucalypt forest on a vegetation unit by vegetation unit basis. Gridcells were then randomly proportionally allocated to eucalypt forest or not according to the vegetation unit value. The non-eucalypt gridcells were then cut out from the pre-1750 ecosystem layer within cleared land and did not contribute to the derivation of pre-1750 area values for eucalypt ecosystems.; 16. The distribution of mapped ecosystems was then merged over the pre-1750 layer derived from modelled distributions.; 17. For extant forest without fine scale mapping, rainforest was derived from the combination of the Eastern Bushlands database rainforest category and digitised transects from rainforest floristic traverses from the survey database. For extant forest with fine scale mapping, rainforest was derived from the combination of Broad Old Growth Mapping Project rainforest categories B and C and SFNSW RN17 mapped rainforest. Rainforest so derived was merged with the pre-1750 ecosystem layer.; 18. The area of non-forest vegetation within the extant forest domain was estimated by using a proportional allocation procedure for the Coastal Complex and Plateau Sclerophyll Complex categories from the Eastern Bushlands database. The proportion of non-forest within each of these units in unmapped areas was estimated by reporting the area of non-forest from fine scale mapping in mapped areas against each category and then applying that proportional allocation to forest/non-forest in the Coastal Complex and Plateau Sclerophyll Complex categories over unmapped extant forest.; 19. The extant forest ecosystem layer was derived by masking the pre-1750 ecosystem layer with the extant forest layer from the Eastern Bushlands database.; ; Western Portion of the CRA Region - west of the New England Highway; ; Data Collecton Method:; 1. Field survey; 2. Analysis and Modelling; 3. Integration with existing fine scale vegetation mapping; ; Data Set Source:; 1. Information from the following field surveys was utilised:; * Eastlink Flora Survey; * Torrington State Recreation Area Vegetation Survey; * State Forest Environmental Impact Study flora data; * CRA Systematic Flora Survey; * John Hunter Granite Surveys; * Royal

Botanic Garden Vegetation Data for the Guyra Mapsheet; 2. The following environmental layers were utlised to conduct modelling:; * Mean temperature; * Mean annual rainfall; * Soil fertility; 3. The following fine scale vegetation mapping was utilised:; * Vegetation mapping of Torrington State Recreation Area; 4. Other datasets utilised were:; * Eastern Bushlands broad vegetation layer; ; Source Material Input Scale:; * The Eastern Bushlands broad vegetation layer was captured from landsat at a scale of 1:100,000; * The vegetation mapping of Torrington State Recreation Area was conducted at a scale of 1:50,000; * The temperature and rainfall variables were derived at 250m grid cell resolution and the soil fertility was derived at a 200m grid cell resolution.; ; Additional Processing Steps; 1. All survey data was imported into an ACCESS 97 flora database specifically designed for storage of the data and was subject to a sequence of manual and automatic checking procedures as outlined in attached metadata statements for each survey.; 2. A data matrix of sites by species by cover abundance was derived from the survey data for use in the analysis.; 3. The pre-1750 distribution of each derived eucalypt ecosystems was modelled in relation to abiotic environmental variables based on the presence/absence of each ecosystem at each survey site.; 4. A logistic regression model relating the probability of presence of each forest ecosystem to abiotic environmental and geographical variables was then fitted using generalised additive modelling (Yee and Mitchell 1991), a technique already applied extensively by NPWS in forest assessment work in NSW. Generalized additive models (GAMs) use a nonparametric smooth function relating the response variable to the predictor.; 5. These fitted models were then used to extrapolate the distribution of forest ecosystems across all unmapped forest and cleared areas. ; 6. The modelling was conducted via a modelling module (produced by Watson, 1996) which fitted regression models under S-PLUS statistical software (StatSci, 1995) and conducted extrapolation using ARCVIEW Spatial Analyst (ESRI, 1996).; 7. The modelling resulted in a probability surface (extrapolated distribution) for each forest ecosystem at 100m resolution. A single layer depicting the pre-1750 distribution of each forest ecosystem was derived from the overlay of all the forest ecosystem probability surfaces by randomly proportionally assigning each gridcell to a forest ecosystem according to the relative probabilities of each ecosystem at that gridcell.; 8. In the zone of overlap between the mapping schemes from the western and eastern portions of the CRA region, western ecosystems overrode the mapped distribution of eastern ecosystems for those ecosystems for which the western ecosystem models were deemed (via expert opinion) more robust then the eastern ecosystem models. ; 9. An extensive analysis of data from historical portion plans was used to inform the pre-1750 distribution of eucalypt forest vegetation (versus other native vegetation types). Each data point from historical portion plans was assigned to open eucalypt forest or non eucalypt vegetation based predominantly on the corner tree type recorded by the surveyors and secondarily on the description provided by the surveyors. From this information, the proportion of open eucalypt forest to non eucalypt vegetation was calculated for each vegetation unit derived during the Interim Assessment Process (NPWS 1996). Vegetation units for which no historical portion plan data was collected, were assigned the proportions of their nearest neighbour in the dendrogram for which data was available. This then provided a full coverage of the likely proportion of pre-1750 eucalypt forest on a vegetation unit by vegetation unit basis. Gridcells were then randomly proportionally allocated to eucalypt forest or not according to the vegetation unit value. The non-eucalypt gridcells were then cut out from the pre-1750 ecosystem layer within cleared land and did not contribute to the derivation of pre-1750 area values for eucalypt ecosystems.; 10. Torrington vegetation mapping was imported as a shapefile into ARCVIEW and attributes were converted to the derived ecosystem classification. The layer was then converted to a grid at 100m resolution and merged over the pre-1750 ecosystem layer.; 11. The extant forest ecosystem layer was derived by masking the pre-1750 ecosystem layer with the extant forest layer from the Eastern Bushlands database.; ; Southern portion of the CRA region - south of the Hunter valley to the southern border of the region; ; Data Collecton Method:; 1. Field survey; 2. Analysis and Modelling; ; Data Set Source:; 1. Information from the following field surveys was utilised:; * State Forest Environmental Impact Study flora data; * Wollemi Flora Survey; * Hunter Valley Remnant Surveys; 2. The following environmental layers were utlised to conduct modelling:; * Mean temperature; * Mean annual rainfall; * Soil fertility; ; Additional Processing Steps; 1. The predicted pre-1750 distribution of forest ecosystems was modelled using decision tree analysis. The decision rules related the occurrence of each ecosystem to one or more unique envelopes of environmental space defined by GIS coverages. Coverages included terrain, climate and vegetation attributes. Several alternative rule sets were evaluated cartographically be assigning grid cells to vegetation types, re-substituting samples and cross-tabulating predicted versus observed vegetation types. Rules were refined iteratively byseeking alternative rules on branches of the decision tree which did not fit well with the data.; 2. The extant forest ecosystem layer was derived by masking the pre-1750 ecosystem layer with the extant forest layer from the Eastern Bushlands database.; ; Attributes:; Value = unique ecosystem identification field, Count = area of ecosystem in hectares, Ecosystem = ecosystem name, Feat_ID = unique entity identification field for use in C-plan; ; Limitations: ; For areas without fine scale vegetation mapping (western portions of the UNE and LNE regions, and the southern portion of the LNE region) the modelled distributions were used to predict the proportion of a modelled ecosystem only. As a result, the exact spatial representation of the data is not designed to be accurate.; ; Completeness: ; Complete although further refinement/improvement over the years has been planned. The table is updated with target achievement statistics annually - these are based on original JANIS criteria and measure the representativeness of the CAR reserve system.; ; LNE - The spatial dataset coverage is complete for the entire extant forest in the Lower North East region as

delineated by the Eastern Bushlands Database. Areas of forest less than 5ha are not included in the extant forest layer. Since the forest ecosystem layer is derived from mapped forest types where available, small areas less than 2ha in size or 50m in width are not represented. Rainforest mapped by the BOGMP project will not be represented below a 25ha minimum and mapped by the Eastern Bushlands project will not be represented below a 50ha minimum.

Limitations on public access

Scope: dataset

Responsible party

Contact position	Data Broker
Organisation name	NSW Department of Climate Change, Energy, the Environment and Water
Full postal address	NSW Australia data.broker@environment.nsw.gov.au
Telephone number	131555
Email address	data.broker@environment.nsw.gov.au
Web address	https://www.nsw.gov.au/departments-and-agencies/dcceew
Responsible party role	pointOfContact

Metadata point of contact

Contact position	Data Broker
Organisation name	NSW Department of Climate Change, Energy, the Environment and Water
Full postal address	NSW Australia data.broker@environment.nsw.gov.au
Telephone number	131555
Email address	data.broker@environment.nsw.gov.au
Responsible party role	distributor

Metadata date

1999-01-01

Metadata language

eng