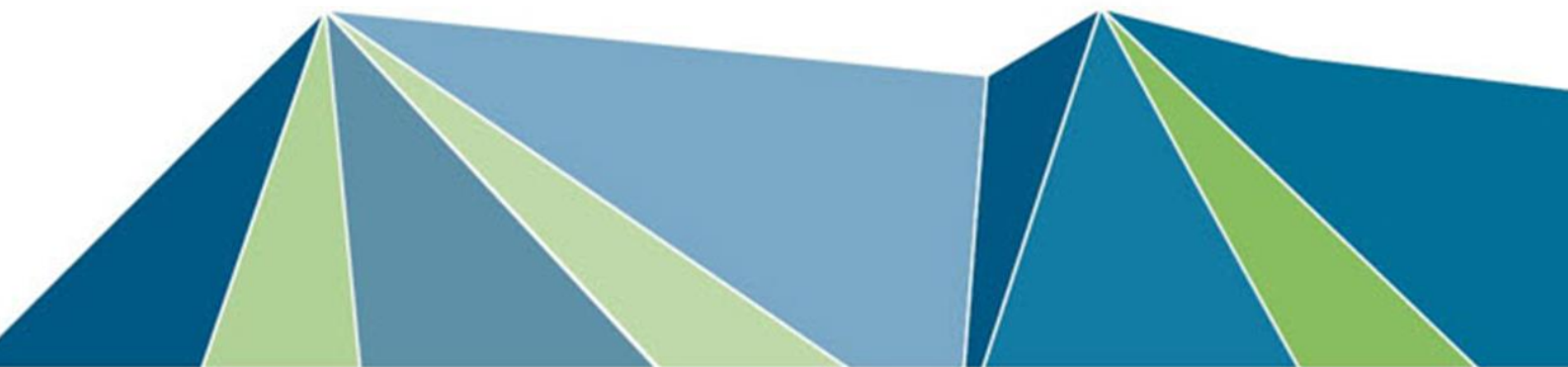# Ballina Shire Council Integration of Certain Deferred Matters

Methodology Report

October 2021

The information in this report is based on the documentation provided by Ascent Ecology Pty Ltd in their report titled *Identification of Proposed E2 and E3 Zones – Ballina Shire Council Integration of Certain Deferred Matters (2021).*

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Glossary and List of Abbreviations

Term	Definition
API	Aerial photo interpretation
BAM	*Biodiversity Assessment Method 2020*
BC Act	*Biodiversity Conservation Act 2016*
BLEP	Ballina Local Environmental Plan
BSC	Ballina Shire Council
CM	Coastal management
CM SEPP	*State Environmental Planning Policy (Coastal Management) 2018*
DM	Deferred Matters
DPIE	Department of Planning Industry and Environment (formerly known as Department of Planning and Environment)
E zones	A land use zone identified in the Standard Instrument Local Environmental Plan that is designed to protect land that is of important environmental value
E2 Zone	E2 Environmental Conservation zone
E3 Zone	E3 Environmental Management zone
EEC	Endangered Ecological Community
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Exotic	An exotic plant species is an organism that is not indigenous or native to New South Wales
FNC	Far North Coast
JANIS	Joint *ANZEC/MCFFA National Forest Policy Statement Implementation sub-committee*
LEP	Local Environmental Plan
LGA	Local Government Area
LLS Act	*Local Land Services Act 2013*
Native	A native plant species is indigenous to New South Wales
NCEZR report	Northern Councils E Zone Review Final Recommendations Report
NRAR	Natural Resources Access Regulator
NVR Map	Native Vegetation Regulatory Map
PCT	Plant Community Type
PKH	Potential Koala Habitat
PLU	Primary Land Use
RAMSAR	Convention on Wetlands of International Importance
SILEP	Standard Instrument Local Environmental Plan
SEPP	State Environmental Planning Policy
Strahler	Strahler Stream Order
Stratum	A stratum is a distinct height class in the vegetation.
TEC	Threatened Ecological Community
TSC Act	*Threatened Species Conservation Act 1995*

1 Introduction

Ballina Shire Council (Council) is undertaking a project to facilitate the integration of certain land previously deferred from inclusion into the *Ballina Local Environmental Plan 2012* (BLEP 2012), by applying appropriate zones available under the Standard Instrument Local Environmental Plan (SILEP).

In order to facilitate this integration, Ascent Ecology Pty Ltd (Ascent Ecology) was engaged to identify and verify proposed E2 Environmental Conservation and E3 Environmental Management zones under the BLEP 2012. Any proposal for an E2 or E3 zone, must be undertaken in line with the criteria set out by the former Department of Planning and Environment, now Department of Planning, Industry and Environment (the Department), in the Northern Councils E Zone Review Final Recommendations report (DPE 2015; henceforth 'NCEZR report').

This document sets out the criteria, process, hierarchy, assumptions, and rationale that was applied to generate the spatial data to identify proposed E2 and E3 zones for deferred matter areas (DM areas) under the *Ballina Local Environmental Plan 1987* (BLEP 1987) and associated spatial data layers and attribute tables. It excludes those DM areas identified as an existing environmental protection zone (i.e. a '7' zone) under the BLEP 1987 as per the NCEZR report.

2 Context

2.1 NCEZR Report and E Zones

The NCEZR report details the criteria and final recommendations for the application of E zones in Local Environmental Plans (LEPs) for Councils on the Far North Coast (FNC) (DPE 2015). Based on a review announced in 2012, the Northern Councils E Zone Review Interim Report, and submissions in response to public exhibition of that report, the NCEZR report provides guidance on the application of E2 Environmental Conservation and E3 Environmental Management zones.

In consideration of the proposed E2 and E3 zoning in this report, the NCEZR report notes the following in relation to permissibility of agriculture in E2/E3 zones:

- E2 Environmental Conservation: extensive agriculture should be permitted <u>with consent</u>; and
- E3 Environmental Management: extensive agriculture should be permitted <u>without consent</u>.

2.2 Deferred Matter Areas

Other than those DM areas currently zoned as 7 (Environmental Protection), DM areas currently subject to a BLEP 1987 zone will be transitioned into the BLEP 2012 in accordance with NCEZR report recommendations and process outlined in this document (DPE 2015). An overview of the DM areas assessed is shown in **Figure 1**.

Table 1 summarises the current BLEP 1987 zones within the DM areas and whether or not they will be transitioned into BLEP 2012.

Table 1 DM Area Zones and Integration into BLEP 2012

Zone	Description	Transition into BLEP 2012
1(a1)	Rural (Plateau Lands Agriculture)	Yes
1(a2)	Rural (Coastal Lands Agriculture)	Yes
1(b)	Rural (Secondary Agricultural Land)	Yes
1(d)	Rural (Urban Investigation)	Yes
1(e)	Rural (Extractive and mineral Resources)	Yes
2(a)	Living Area	Yes
2(b)	Village Area	Yes
4	Industrial Zone	Yes
6(a)	Open Space Zone	Yes
8(a)	National Parks and Nature Reserves	Yes
9(a)	Roads (Main Roads Proposed)	Yes
9(b)	Roads (Local Roads Proposed)	Yes
UZ	Unzoned Land	Yes
7(a)	Environmental Protection (Wetlands)	No – not assessed
7(c)	Environmental Protection (Water Catchment)	No – not assessed
7(d)	Environmental Protection (Scenic/Escarpment)	No – not assessed
7(d1)	Environmental Protection (Newrybar Scenic/Escarpment)	No – not assessed
7(f)	Environmental Protection (Coastal Lands)	No – not assessed
7(i)	Environmental Protection (Urban Buffer)	No – not assessed
7(l)	Environmental Protection (Habitat)	No – not assessed

A summary of DM areas by current BLEP 1987 zoning is provided in
Table 2. Almost 80% of the DM areas assessed for transition are currently zoned as 1(b) Rural (Secondary Agricultural Land).

Table 2 Summary of DM Areas and Previous Zoning

Zone	No. Discrete Polygons[1]	Area (ha)
1(a1): Rural (Plateau Lands Agriculture)	24	124.1
1(a2): Rural (Coastal Lands Agriculture)	100	85.2
1(b): Rural (Secondary Agricultural Land)	211	2,798.2
1(d): Rural (Urban Investigation)	44	142.2
1(e): Rural (Extractive and Mineral Resources)	10	85.0
2(a): Residential (Living Area)	60	46.8

2(b): Residential (Village Area)	11	21.7
4: Industrial	1	6.3
6(a): Open Space	30	72.8
8(a): National Parks and Nature Reserves	17	9.1
9(a): Road - Main Road Proposed	3	27.8
9(b): Road - Local Road Proposed	4	10.2
UZ: Unzoned Land	27	83.4
Total	**542**	**3,512.8**

[1] A discrete polygon is a distinct two-dimensional mapped area. A discrete polygon may extend over one or more cadastral boundaries, and may share a boundary with another polygon, but it is identified by a single set of distinct attributes

2.3 E2 and E3 criteria

The NCEZR report sets out the criteria to be applied to proposed E2 and E3 (DPE 2015). In summary, the criteria are:

E2 Environmental Conservation
- Mapped Coastal Wetlands and Littoral Rainforest
- Endangered or Threatened Ecological Communities
- Key Threatened Species Habitat
- Over-cleared landscapes
- Over-cleared vegetation communities
- Culturally significant lands

E3 Environmental Management
- Riparian and Estuarine Vegetation and Wetlands
- Rare, Endangered and Vulnerable Forest Ecosystems
- Native Vegetation on Coastal Foreshores

The full descriptions of the criteria, rules, considerations, data sources and examples are provided in **Appendix A**.

These criteria were refined and converted into a ruleset for application and were applied in a sequential hierarchy, described in Section 6. This rule-based hierarchical approach ensured an efficient methodology that assisted in meeting the project constraints and optimising the approach to verification.
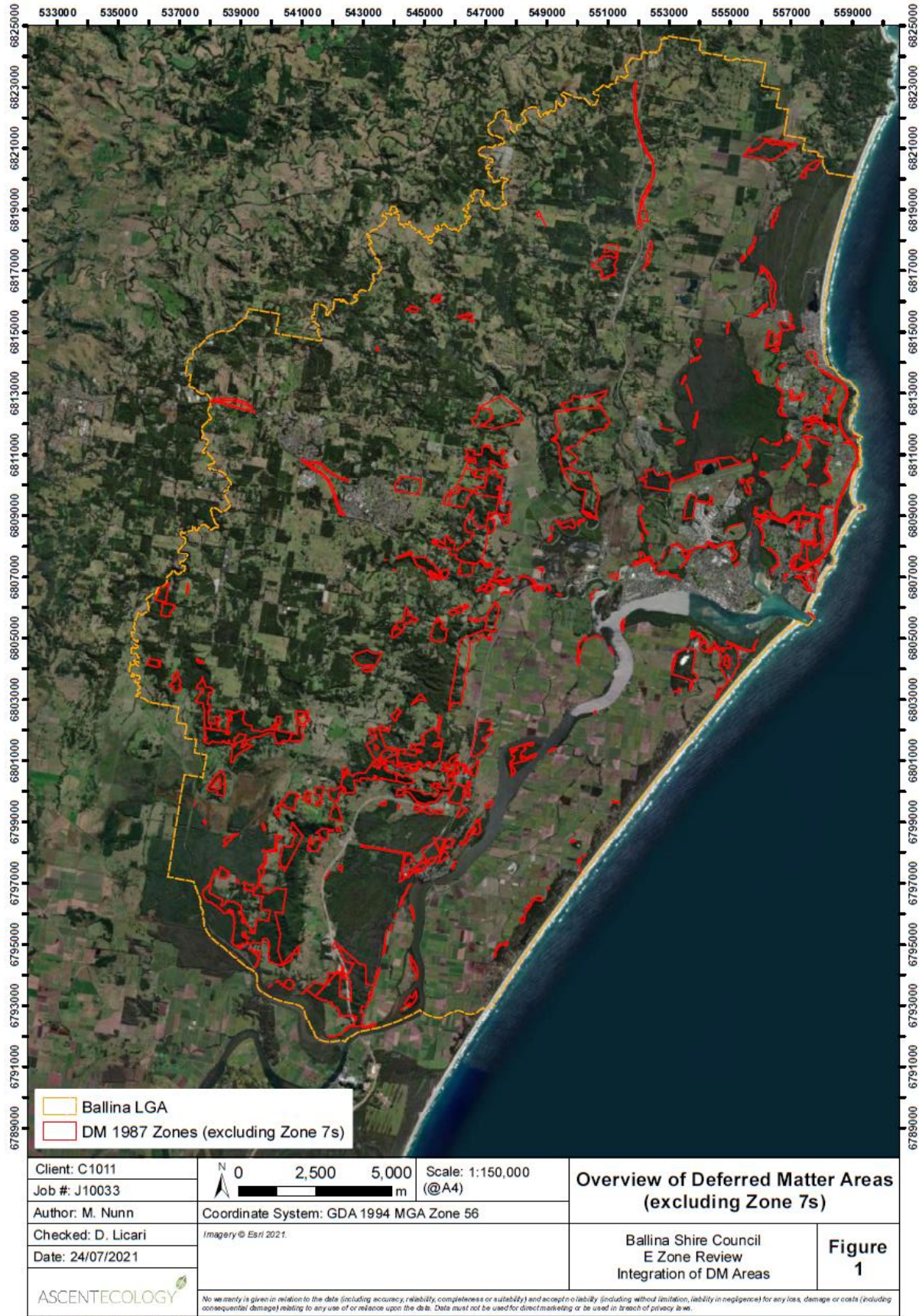
Figure 1 Deferred Matter Areas in Ballina Local Government Area (LGA)

3 Approach

3.1 Overarching Approach

Application of the E zone criteria aligns with the recommendations and criteria of the NCEZR report. Care was taken to ensure:

- The appropriate application of criteria;
- That proposed zoning is evidence-based;
- That any uncertainty is transparent within the data and documented process; and
- Where any deviation or modification to the NCEZR report recommendations was made, rationale was provided.

The following sections outlines the approach relating to key points raised as part of the submissions to the Interim Report that were specifically addressed in the NCEZR report.

The importance of public submissions for the draft LEP of a planning proposal in suitable and sustainable planning is acknowledged. As such, the spatial data was developed with comprehensive attribution that demonstrates how the criteria outlined in the NCEZR report were applied and to support transparency in decision-making.

3.2 Application of E2 and E3 zones

In line with the NCEZR report and final recommendations, the general process for application of E2/E3 zones involved:

1. Application of E2 and E3 criteria;
2. Consideration of additional rules and output requirements;
3. Assessment of the Primary Land Use (PLU); and
4. Verification of E2 and E3 criteria and/or PLU as required.

The criteria and ruleset used was refined from the criteria outlined in the NCEZR report and is presented in more detail in Section 6 and Appendix A. Other considerations established in the NCEZR report are addressed in the following sub-sections.

3.3 Voluntarily revegetated land

According to the NCEZR report, "*Land which has been actively revegetated by the current landowner will not have an E2 or E3 zone applied to it without the landowner's agreement unless the revegetation was undertaken with grant funding which required ongoing protection of the vegetation.*"

While this is acknowledged, insufficient data was present to consider this and it is assumed that information about land which has been actively revegetated by current landholders will be considered through submissions to the forthcoming planning proposal.

3.4 Public and private land inconsistent with the criteria

In accordance with the NCEZR, E2 and E3 zones can only be applied if the PLU is considered to be environmental conservation or environmental management and the land has verified attributes which meet the criteria for an E2 or E3 zone. However, two circumstances exist where land has attributes which are inconsistent with the E2 or E3 zoning criteria (NCEZR p. 7).

The first circumstance arises wherethe PLU of public land is environmental conservation or environmental management . Where this occurs, public land may be zoned E2 or E3 even though the attributes of the land are inconsistent with E2 or E3 zone criteria (e.g. cleared public land that is designated as 'Community' or 'Operational' land under the *Local Government Act 1993* land that is managed or environmental conservation or environmental management under a Plan of Management).

The second circumstance arises whereprivate land has attributes which are inconsistent with E2 or E3 zone criteria. Where this occurs, land may be zoned E2 or E3 only if it is consistent with a negotiated development outcome (e.g. master plan, rezoning, development consent, designated offset areas) or at the landowners request.

For this project, E2 or E3 zones have only been applied if the PLU is considered to be environmental conservation or environmental management and the land has verified attributes which meet the criteria for an E2 or E3 zone. Additional assessment of both public and private potential land for E2 or E3 zoning where that land does not meet the criteria for an E2 or E3 zoning criteria has not been undertaken.

3.5 Split Zone and Minimum Area Considerations

The NCEZR report notes that more than one zone can be applied to properties where the characteristics of different areas of the land reflect the different PLUs, however, Councils should consider the suitability of alternative zones when considering more than one zone for a property. As a general rule, the use of multiple zones on a property should be minimised as far as possible.

The NCEZR report is silent on the minimum area for a proposed E2/E3 zone. However, with regard to both land use planning and environmental considerations a minimum area of 500 m^2 for any single proposed E2/E3 zone has been adopted.

From the perspective of land use planning, a minimum area of 500 m^2 is considered practical to apply at the scale of the Ballina LGA. From the perspective of environmental considerations, a substantial proportion of native vegetation in the Ballina LGA is considered to be over-cleared (i.e. >70% of their pre-1750 extent cleared). A large portion of the Ballina LGA is located on the over-cleared Clarence–Richmond alluvial plains Mitchell landscape which is 73% cleared (Mitchell 2002). Moreover, 9 vegetation communities that are recorded in the Ballina LGA are over-cleared (Rainforests, Wet sclerophyll forests (shrubby and grassy subformations), Dry sclerophyll forests (shrubby and shrub/grass subformations), Grassy woodlands,

Grasslands (Themeda australis sod tussock), Heathlands, Forested wetlands, Freshwater wetlands and Saline wetlands; DECCW 2010). Also note, there are no area-based thresholds for the *Biodiversity Conservation Act 2016* (BC Act) listed Endangered Ecological Communities (EECs) identified as an E2 zone criteria in the NCEZR. Consequently, the protection of relatively small areas of 500 m^2 of native vegetation are considered valuable and appropriate for a proposed E2/E3 zone.

While the proposed E2/E3 zoning is presented with a strict adherence to the application of criteria, connectivity and minimum threshold rules (Section 6.2), it is acknowledged that care should be taken to ensure that proposed E2/E3 zones do not introduce unnecessary split zoning to a given parcel of land.

For the purposes of this draft proposed E2/E3 zoning, a minimum area of 500 m^2 was selected for the initial purpose of excluding DM areas from assessment (see Additional Rules in section 6.2). These excluded areas are contained within a separate layer.

3.6 Vegetation Data and Equivalency

3.6.1 Eastern NSW Plant Community Type Mapping

Information about NSW vegetation communities is maintained within the BioNet Vegetation Classification. This standard classification hierarchy for vegetation in NSW incorporates a three-tiered hierarchical and nested classification. At the top of the hierarchy are the NSW Vegetation Formations (Keith 2004). Nested below each Vegetation Formation in the hierarchy are the NSW Vegetation Classes (Keith 2004). Finally, nested below each Vegetation Class Plant Community Types (PCTs) at the lowest level of the hierarchy.

One of the E2 criteria identified in the NCEZR is 'Over-cleared vegetation communities on the Far North Coast'. Note, all but one of these vegetation communities (i.e. Grasslands, Themeda australis sod tussock) equate to one of 10 NSW Vegetation Formations within the BioNet Vegetation Classification.

The methodology defined at the commencement of this project assumed the availability of the Eastern NSW PCT Mapping. At the time of publication of this report, the Department was updating the Eastern NSW PCT Mapping and these mapping data were not made available. As a result, VegeCom 2004 and VegeCom 2015 DRAFT datasets were used as the primary source of vegetation mapping.

The above datasets were either appropriately attributed at the level of NSW Vegetation Formation and/or Class or this data could be readily derived from the datasets. In either case, on the whole the data was sufficient to identify 'over-cleared vegetation communities on the Far North Coast' in accordance with the NCEZR.

3.6.2 VegeCom 2004 and VegeCom 2015 DRAFT

The primary source of data for vegetation mapping was the Ballina Shire Council VegeCom dataset, in two iterations:
- VegeCom 2004; and

- VegeCom 2015 DRAFT (VegeCom 2015).

VegeCom 2004 was used as the core vegetation mapping layer with field verification undertaken in 2010. The VegeCom 2015 dataset presented an array of updates to polygon boundaries and data attributes based on ground truthing that was undertaken by Council's environmental scientist. However, it was not clear from the data where all updates had been made. As such, a review of VegeCom 2015 against VegeCom 2004 was undertaken, where:

1. Updates to geometry or attribution in VegeCom 2015 were identified using a comparison of attributes and/or geometry;
2. Where a valid update was identified, VegeCom 2015 data was merged into the VegeCom 2004 data to replace superseded polygons.

Following this, a Vegetation Community was determined for each polygon using the equivalency matrix found in **Appendix B**.

Several key challenges and methods relating to limitations of the mapped data are discussed in the below sections.

3.6.2.1 Treatment of native and exotic vegetation

Determining whether mapped vegetation is considered to be native or exotic is important for multiple E2/E3 criteria. For the purpose of this report the meaning of 'native vegetation' is taken to be the same as definition in the *Local Land Services Act 2013* (LLS Act) s. 60B. This definition extends to a plant that is not native to NSW if the plant is situated on land that is shown on the native vegetation regulatory (NVR) map as Category 2 Vulnerable Regulated Land.

In numerous cases within the VegeCom dataset, there was uncertainty as to whether a given polygon should be considered to be native or non-native, for one of two main reasons:

1. Varying percentages of camphor laurel coverage noted; or
2. A lack of decisive attributes for NSW Vegetation Formation and/or Class attributes for a particular polygon.

In areas where the data was inconclusive, to initially determine whether mapped vegetation was considered native, a precautionary approach was used. Where data attributes noted that camphor laurel was present in any amount, or the attributes provided insufficient information to determine whether the polygon was native (e.g. 'mixed forest'), the vegetation polygon was assigned the attributes:

1. A native attribute of 'assumed native'; and
2. An initial vegetation verification priority of 'high'.

This initial verification priority was subject to further assessment, as described in Section 5.

3.6.2.2 Camphor laurel and native vegetation

Rainforest communities on the north coast are frequently degraded by the invasion of woody weeds such as camphor laurel or privet. VegeCom 2004 and VegeCom 2015

spatial data indicates the presence of camphor laurel as a dominant or sub-dominant upper stratum species within rainforest communities (e.g. 'Mixed Camphor', 'Camphor-dominant Rainforest', 'Rainforest (formerly exotic/mixed/camphor)').

Consequently, it was assumed that the presence of camphor laurel as a dominant or sub-dominant species within upper stratum of a degraded rainforest community does not affect its status as native vegetation or as an EEC for a range of reasons:

- Vegetation attributes that are not present in the spatial data contribute to vegetation condition. For instance, in rainforest communities where camphor laurel is dominant in the upper stratum, native plant species are likely to be present in the ground and middle strata and these vegetation attributes are not discernible from aerial imagery;
- Invasion and establishment of weed species that change rainforest community structure and floristic composition is a known threat to rainforest communities that are identified in the NSW Scientific Committee final determinations for rainforest EECs (NSW SC 2011c, d, e);
- This precautionary approach aligns with the approach to determining vegetation condition (i.e. Vegetation Integrity) under the *Biodiversity Assessment Method 2020* (BAM). Indeed, a range of biodiversity assessments supporting development applications in Ballina Shire that have employed the BAM method to survey indicate degraded rainforest indicate this;
- As indicated above, the meaning of 'native vegetation' is taken to be the same as defined in the LLS Act s. 60B which extends to plants that are not native to NSW if the plant is situated on land identified on the NVR map as Category 2 Vulnerable Regulated Land.

3.6.3 Treatment of unattributed vegetation mapping

The VegeCom 2004 mapped vegetation data included polygons with no Keith (2004) vegetation formation and class attributes.

The following approach was applied:

1. Where VegeCom 2015 contained new information, the assigned vegetation community was updated (as described in Section 3.6).
2. Vegetation communities that remained 'Undecided' or Unknown' were assigned:
   a. The attribute of 'assumed native'.
   b. An initial vegetation verification priority of 'high'.

The equivalency table for assigning native vegetation, EEC status, and over-cleared community attributes to each vegetation community is provided in Table 3, along with the assigned initial verification priorities. Note that highest initial priority for further verification is given to vegetation that was unable to be accurately identified that was assumed to be native as a precautionary.

3.6.4 Treatment of candidate EECs

In some instances, rainforest and coastal floodplain vegetation communities derived from the VegComm 2004 dataset (Appendix B), had vegetation features recorded in data attributes that aligned to one or more rainforest or coastal floodplain vegetation EECs.

Table 3 Vegetation E2/E3 criteria and initial verification lookup table for the VegeCom 2004/VegeCom 2015 dataset

Vegetation Community	Native	Endangered Ecological Community (EEC)	Over-cleared Community	Initial Verification Priority (Vegetation level)	Comments
Mixed Camphor	Assumed native	Yes	No	High	Preliminary attributes.
Undecided	Assumed native	Yes	Yes	High	Preliminary attributes.
Unknown	Assumed native	Yes	Yes	High	Preliminary attributes.
Unspecified Native	Assumed native	Yes	Yes	High	Preliminary attributes.
Windbreak	Assumed native	Yes	Yes	High	Preliminary attributes.
Camphor-dominant Rainforest	Assumed native	Yes	No	Moderate	Note the VegeCom 2015 updates converted some to rainforest.
Rainforest (formerly exotic/mixed/camphor)	Native	Yes	No	Moderate	Updates applied from VegeCom 2015.
Disturbed	Assumed exotic	No	No	Low	Only 19ha, 18ha of which falls in one zone (45-0).
Dry Sclerophyll Forests (shrubby and grassy subformations)	Native	Yes	Yes	Low	
Exotic	Exotic	No	No	Low	Unlikely to require further verification.
Forested Wetlands	Native	Yes	Yes	Low	
Freshwater Wetlands	Native	Yes	Yes	Low	
Heathlands	Native	No	Yes	Low	
Rainforest	Native	Yes	No	Low	
Saline Wetlands	Native	Yes	Yes	Low	
Wet Sclerophyll Forests	Native	No	Yes	Low	

From the perspective of applying the E2 criterion set out in the NCEZR that relates to EECs, it is sufficient to identify whether one of the EECs listed in the NCEZR is present, rather than determine which specific EEC is present. Where this occurred, regardless of which individual EEC a vegetation community could be assigned to, the vegetation community was either a rainforest of coastal floodplain vegetation EEC as follows:

- Rainforest EECs – Littoral Rainforest, Lowland Rainforest, Lowland Rainforest on Floodplains
- Coastal floodplain vegetation EECs – Subtropical Coastal Floodplain Forest, Swamp Oak Floodplain Forest, Swamp Sclerophyll Forest on Coastal Floodplains, Freshwater Wetlands in Coastal Floodplains.

Consequently, in these cases a true/false result was recorded for the E2 EEC criteria, not the type of EEC.

A subtractive approach was taken to applying E2/E3 criteria as described in Section 6.1. Where a given area of land/vegetation met a higher order E2/E3 criteria within the hierarchical ruleset, it was not subjected to further assessment of lower order criteria. The E2 EEC was placed lower in the hierarchy due to higher verification requirements, thus in some cases where a vegetation community is identified as an over-cleared community on the Far North Coast, whether that vegetation community may also meet the criteria for an EEC/TEC became a non-issue for the purposes of this assessment.

The only native vegetation community that could be a candidate EEC that was not also considered an over-cleared community on the FNC is rainforest, and all rainforest is associated with one of the EECs identified above.

4 Primary Land Use

The NCEZR report defines the PLU as the main use for which the land has been used for the last two years. In some situations, this may mean that land which is currently subject to a rural zoning under BLEP 1987 may have parts of that land which meet the E2/E3 criteria included in a mapped planning control.

While the NCEZR report defines the PLU on the last two years, this assessment utilised the May 2018 Ballina Shire Council aerial imagery set as the primary data source for the PLU assessment on advice from DPIE. Where uncertain, recent captures from the Nearmap aerial imagery service were also utilised if available.

The assessment of PLU was restricted to land in DM areas that met the application of E2/E3 criteria in order to meet the scope of the project (i.e. other land in DM areas that did not trigger E2/E3 criteria was not further assessed for PLU). Land proposed for E2 or E3 zoning were assigned a PLU in accordance with the categories set out in Table 4.

Table 4 PLU categories for the purpose of determining E Zones

PLU category	Attributes
Environmental[1]	• Existing 7(a) Environmental Protection (Wetlands) and 7(l) Environmental Protection (Habitat) zones under BLEP 1987 and existing E2 Environmental Conservation and E3 Environmental Management zones under the BLEP 2012[2] • Areas of native vegetation where natural ecological processes predominate[3] • Areas subject to active revegetation works, habitat remediation or assisted natural regeneration (not mapped) • Some areas of land that where there gap between patches of native vegetation that meet E2/E3 zone criteria identified in the NCEZR the is less than 100 metres and these patches contribute to habitat connectivity
Agriculture	• Areas where agricultural activities including cropping, horticulture, pasture management, grazing or other forms of agriculture predominate • Other cleared areas used on a rotational or occasional basis for cropping or grazing which are integral to the broader farm management
Other	• Areas of existing urban, commercial, industrial, infrastructure or special purpose development • Developed open space • Road and waterway reserves not covered above • Public land actively used for sewer and water infrastructure • May include cleared and undeveloped land identified for future urban development[4]

[1] Areas allocated to the environmental PLU category must also meet other criteria that are identified in the NCEZR before they can be proposed for an E Zone.
[2] Under the NCEZR, areas of land identified as existing environmental protection zones under the BLEP 1987 and BLEP 2012 are assumed to have a primary use of environmental conservation or management.
[3] The environmental PLU may include some agricultural uses such as grazing where these activities are of a secondary or ancillary nature. In general, forested areas are considered unlikely to support commercial agriculture as a PLU.
[4] Unless zoned for urban development these areas are typically included in the "Agriculture" category reflecting their current PLU.

After application of E2/E3 criteria, land that was initially proposed for E2/E3 zoning was assessed for PLU on a case-by-case basis. The approach was as follows:

1. Areas of proposed E2/E3 zoning that were included due to mapped planning provisions that relate to *State Environmental Planning Policy (Coastal Management) 2018* (CM SEPP) or *Ballina Shire Koala Management Strategy 2017* (KMS 2017) were considered to have a PLU of Environmental.
2. Remaining areas of proposed E2/E3 zoning were assessed using aerial photo interpretation (API) and the NSW Landuse v1.2 2017 dataset and assigned a PLU.
3. A verification attribute was assigned for each to determine whether further verification was required.

The verification attributes of PLU were then further considered in the next step.

5 Verification of E Zone criteria

5.1 Overall Process

Verification of E Zone criteria and PLU was undertaken through the following priority-driven process, as field verification of all proposed E2/E3 zones was not viable:

1. Initial verification priority of vegetation triggering an E2/E3 criteria was assigned based on the vegetation lookup table summarised in Table 3 and described in Section 3.6;
2. Vegetation verification priority was then modified by whether *State Environmental Planning Policy (Coastal Management) 2018* (CM SEPP) or *Ballina Shire Koala Management Strategy 2016* (KMS 2017) mapping was present in the DM area, as these were assumed to have a lower priority for verification than other vegetation related attributes due to being aligned with current NSW State and Council planning provisions, and superseded the need for other vegetation verification if co-existing;
3. Each proposed E2/E3 zone was assigned a PLU verification status of either 'Verified API' or 'Required', as described in the previous section;
4. A review of DM areas with high to moderate vegetation verification priority and a PLU verification status of 'Required' was undertaken to establish a list of sites requiring field verification as identified in Table 3.

5.2 Roads

Where roads were adjacent to a Zone '7' (except for 7(d) Scenic/Escarpment or 7(d1) Newrybar Scenic/Escarpment) polygon, all DM area polygons within the road, were assumed to be a candidate for an E2 zone if there was E2 criteria vegetation fringing into the road polygon. The entire road reserve (up to the extent that was adjacent to a Zone '7' was assigned an E2 and E3 flag of 'Yes', a PLU of 'EC', and an PLU_VERI of 'Road A7' (i.e. no further verification or investigation at this stage). The vegetation verification priority was updated to 'Low Road'.

5.3 Field Verification Method

Verification of applied criteria was undertaken using a rapid assessment method in order to maximise the amount of vegetation that could be verified within project schedule constraints. This generally meant limiting verification sites to areas that were:

- Assigned a verification priority of high in accordance with Table 3;
- Able to be observed from a public area or roadside by the naked eye or binoculars.

The objective of field verification was to determine or confirm the vegetation community and to record the primary land use where possible. Field observation, the three most abundant plant species observable in the upper stratum and (where possible) the middle and ground strata. These data were analysed to assign a vegetation community.

Three types of observations were collected, depending on accessibility of the vegetation. Each type was also assigned a field confidence value.
- Within (high confidence) – observation was made standing within the vegetation;
- Edge (moderate confidence) – observation was made from a position adjacent to, but not within, the vegetation;
- Remote (low confidence) – observation was made from a remote position.

Field data points were adjusted during processing of the data to locate observations within the target vegetation polygons to enable attribution of the observations. The vegetation community was updated based on this data, and the vegetation verification attribute was updated to 'Verified – Field'.

6 Process

6.1 Hierarchy of E2/E3 Criteria

It was identified that application of some criteria would require more verification or introduce a higher level of uncertainty in mapped data than others. The two main reasons for this were:

- Mapping based on legislated planning controls were more suitable for the purpose of applying planning decisions, and would require less verification of attributes, for instance:
  - Littoral Rainforests and Coastal Wetlands mapping under the CM SEPP;
  - Preferred Koala Habitat mapping under the KMS 2017[1].
- Criteria related to vegetation characteristics that could be established without detailed information about the vegetation community would require less verification, for example:
  - Native vegetation in over-cleared Mitchell landscapes would only require demonstrating that mapped vegetation is native and occurs within the Clarence-Richmond Alluvial Plains landscape.

Thus, in order to perform an efficient and robust assessment of the DM areas that optimised the need for field verification, a hierarchy was established to apply the 'most certainty' criteria first, and only require that a given area of land only needed to exceed the threshold for one E2 or E3 criteria to be considered as a potential E2 or E3 zone. While the criteria was initially applied across the entire extent of DM areas, further assessment and verification was constrained by this hierarchy.

For example, if a given patch of vegetation was found to be mapped as preferred koala habitat (E2 criteria for key threatened species habitat), then it was attributed as a potential E2 zone with a low priority for further verification.

The order and decision logic determining how the E2 and E3 criteria was applied is described in **Table 5** below. This should be read in conjunction with the full ruleset of E2/E3 criteria provided in Appendix A.

As a general note, application of E3 criteria was derived from E2 criteria as much as possible, noting that Council also has discretion to apply E3 zoning to any candidate E2 zones where considered suitable.

Given this approach, should the presence of a higher order E2/E3 criteria be questioned through a submission to the planning proposal and given that a lower order criteria were not recorded, it would be incumbent upon to Council to investigate if the

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[1] This strategy is taken to be an approved koala plan of management under State Environmental Planning Policy Koala Habitat Protection 2021 (Koala Habitat Protection SEPP). The development of the KMS was informed by a habitat and koala population assessment that was based on a comprehensive sample of 76 field sites across the local government area (Phillips and Chang 2013).

land/vegetation has attributes that meet any lower order criteria in accordance with this section and the hierarchy set out in Table 5.

Table 5 E2/E3 criteria application hierarchy

Sequence	E2/E3 Criteria	Rationale
1	E2 Coastal Wetlands and Littoral Rainforest	Mapping based on legislated planning control (CM SEPP) – no further verification was considered at this stage.
2	E2 Key Threatened Species Habitat	As per description in Appendix A, the only applied mapping for this criterion was KMS 2017 Preferred Koala Habitat mapping.

Mapping based on a legislated planning control (KMS 2017) – no further verification was considered at this stage. |
3	E2 Over-Cleared Landscapes	As application of this criteria only requires vegetation that occurs within the Clarence-Richmond Alluvial Plains landscape to be identified to the level of native or non-native, this criteria was applied before vegetation-related criteria that would require verification of more detailed information about the vegetation community.
4	E2 Over-Cleared Vegetation Communities	Identification of vegetation community as one of the over-cleared communities occurring within the Ballina LGA require slightly less certainty than identification as a EEC.
5	E2 Endangered or Threatened Ecological Communities	Identification of vegetation community as an EEC could be a subject to a higher level of uncertainty and was therefore placed lower in the hierarchy of E2 criteria.
6	E2 Culturally Significant Lands	As a legislated planning control, application of this criteria was not considered to require further verification.
7	E3 Rare, Endangered and Vulnerable Forest Ecosystems	With respect to rationale in Appendix A and discussion with DPIE, any mapped vegetation that was considered to meet any of the vegetation-related E2 criteria was assumed to meet this E3 criterion.

A given area of mapped vegetation proposed as an E2 zone due to application of the over-cleared community criteria would then also be proposed as an E3 zone based on the Rare, Endangered and Vulnerable Ecosystem criteria due to this equivalency.

No further assessment was undertaken across the DM areas outside these lands already considered for E2 zoning, as the application of the E2 criteria already captured and assessed vegetation within the LGA. |
| 8 | E3 Riparian And Estuarine Vegetation And Wetlands | Determined that all riparian, wetland and estuarine vegetation would also be captured within vegetation-related E2 criteria. Thus, a proposed E3 zone was put forward for all vegetation meeting any of the vegetation-related E2 criteria where it fell within:
• A mapped wetland;
• Mapped estuarine vegetation; or
• A riparian corridor, which were applied as the appropriate buffer widths as defined by the published guidelines for the *Water Management Act 2000* (Appendix A, Section 10.2.2). |
| 9 | E3 Native Vegetation On Coastal Foreshores | Applied regulated planning provisions from CM SEPP to automatically qualify E3 criteria without further verification. |

6.2 Additional Rulesets

A number of rules were developed in order to suitably propose E2/E3 zones in addition to the strict application of the criteria.

These rules are presented in **Table 6**. A summary of those rules relating to patch connectivity and size thresholds are presented below.

6.2.1 E2/E3 Zone Connectivity and Area Thresholds

Application of E2/E3 criteria based on mapped vegetation presented an initial spatial data layer that contained fragmented polygons that would mean excessive or complex split zoning of lots, which should be minimised in accordance with the NCEZR report recommendations.

For example, in Figure 2 mapped vegetation across a lot results in an initial proposed E2 zoning consisting of multiple discrete zones within a single lot. This includes very small fragments of vegetation.

Fragmented zoning and gaps were addressed, namely:

1. A method for assigning connectivity across gaps between mapped E2/E3 criteria.
2. The definition of a minimum area of 500 m^2 (as discussion in Section 3.5) for a contiguous E2/E3 zone;
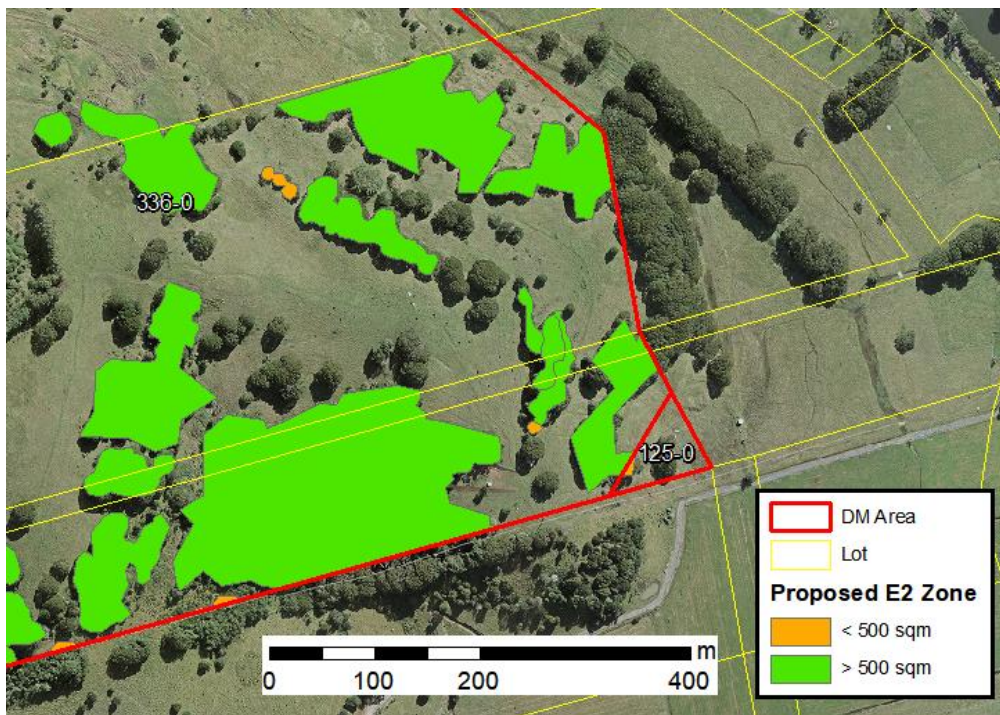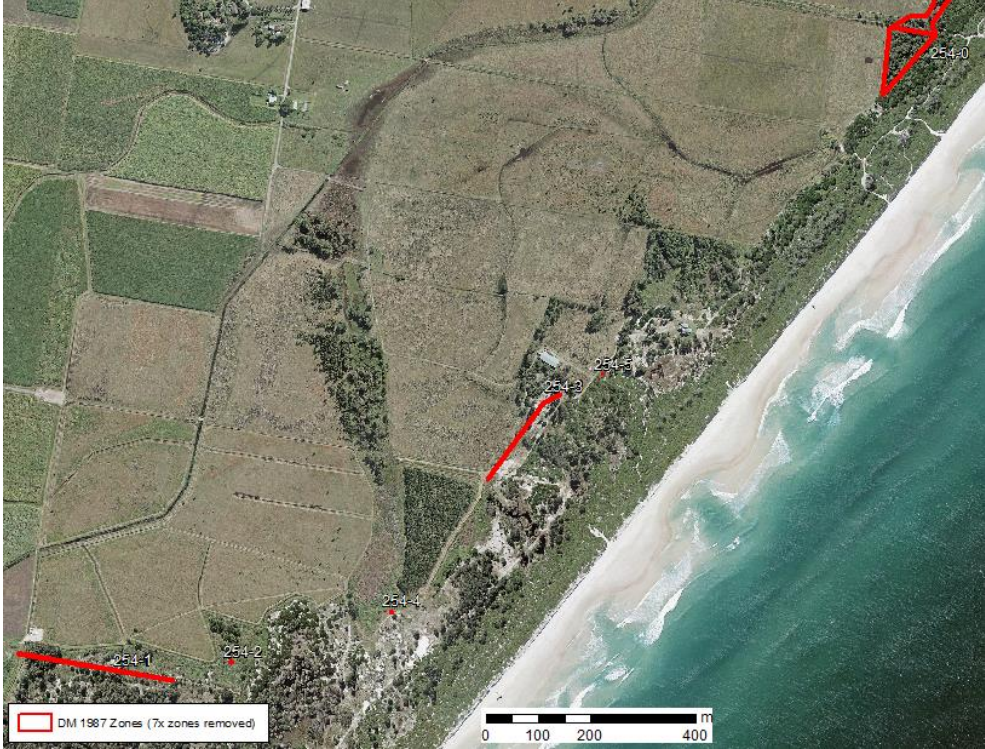
Figure 2 Example of complex/excessive split zoning and small areas of E2 criteria.

Connectivity rules and minimum area thresholds were applied as presented in **Table 6**. Note that the minimum area thresholds were then applied to patches, not individual polygons. Overall this enabled the preservation of small and/or discontinuous patches of over-cleared communities within the proposed zoning while minimising split zoning of lots. Polygons generated to fill gaps for the purpose of satisfying connectivity rules (gap-filling polygons) were attributed as such to differentiate them from proposed zone
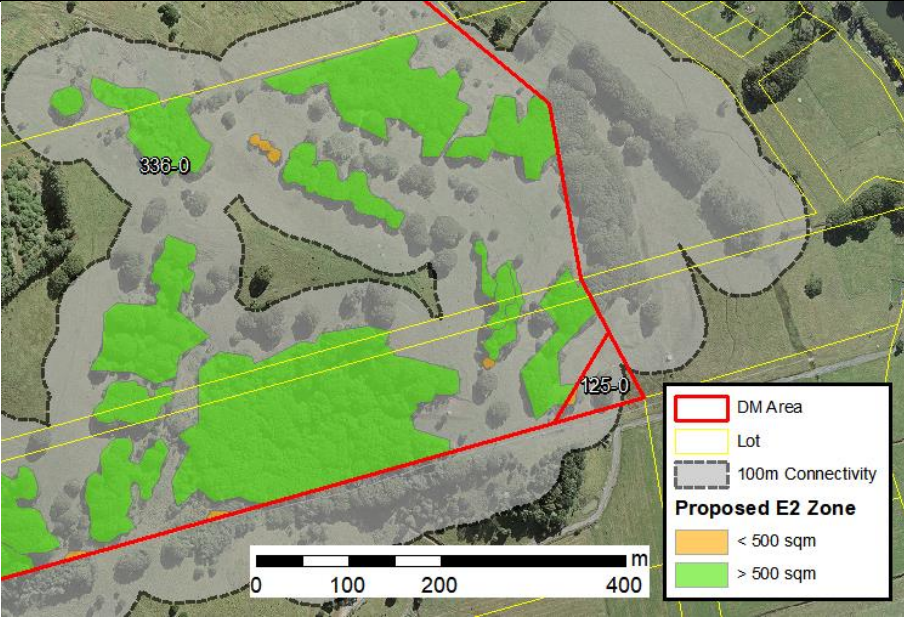
based on E2/E3 criteria, and provides the option of creating a separate environmental overlay rather than a zone.

Table 6 Additional rulesets

Rule	Rationale
DM areas assessed as single discrete polygons.	Initial DM areas consisted of multi-part features – that is, a single DM area with a single identifier could consist of multiple, non-contiguous polygons. These were split into single part features and assigned new unique identifiers derived from the parent ID. Example shown below. DM Area 254 consisted of multiple non-contiguous polygons. It was split into 6 individual polygons, each with their own attribute table record: 254-0, 254-1, 254-2, 254-3, 254-4 and 254-5.
Initial DM area must be ≥ 500 m^2	Any single DM area < 500 m^2 that was not: • Adjacent to a '7' zone (with the exception of 7(d) and 7(d1) zones; or

Rule	Rationale
	• Contiguous with another DM area through a shared edge which resulted in a combined area of < 500 m^2 was not considered to be effective for planning purposes (Section 3.5) and excluded from application of criteria. In the above example of DM Area 254 being split into 6 discrete polygons, all except 254-0 were assigned an EXCLUDE attribute of 'Exclude' and excluding from further analysis. These excluded lots were separated from the main dataset and into the Excluded DM Areas output layer.
Road reserves in Council mapping assigned proposed zoning of adjacent area.	In line with the NSW Department of Planning guidelines (DP 2010), mapped road reserves were assigned the zoning of the adjacent zones, and not assessed for E2/E3 zoning or verified separately.
E2/E3 polygons occurring <100 m apart are considered a single contiguous patch[2].	Defining contiguous patches is essential for zoning areas that may contain many isolated or small polygons of land meeting E2/E3 criteria. The example below shows the broad connectivity (patch) between proposed E2/E3 polygons less than <100 m apart. This was used to group connected polygons. Minimum bounding geometry process was used to generate the patch connectivity. The use of a simple processing tool rather than manual digitisation or complex landscape analysis was chosen to ensure a consistent and repeatable approach to the patch generation across the DM areas.. The areas of patch connectivity were given the E2 and E3 attributes of 'Patch', and the PLU attribute assigned from the NSW Landuse 2017 v1.2 dataset. This enables them to be proposed as E2 or E3 zones initially, with the option of proposing them as an environmental overlay as well.

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[2] The 100 m threshold is based on the *Biodiversity Assessment Method 2020* (BAM) threshold and method for calculating the patch size of native vegetation. These were selected because of its scientific validity with respect to the connectivity of native vegetation. Moreover, this is the accepted method in the BAM for determining if discrete tracts of treed native vegetation are part of the same patch. As such this is not considered a buffer to vegetation attributes that meet the E zone criteria as described in the NCEZR.

Rule	Rationale
Vegetated gaps (holes) within an E2/E3 polygon that are: • <100 m wide; OR • Wholly vegetated and encompassed within the E2/E3 polygon; are considered a single contiguous patch[2].	Allows unattributed/unmapped vegetation to be included within the patch. Does not include cropping/agriculture.
Unvegetated gaps (holes) within an E2/E3 polygon that is <100 m wide are considered a single contiguous patch[2].	Allows cleared areas to be included within the patch generation. Includes cropping/agriculture.
E2/E3 patches <500 m^2 are excluded from proposed zoning.	In accordance with Section 3.5 an adopted minimum area threshold of 500 m^2 was applied. Any patches fitting this rule and excluded would not be proposed for E2/E3 zoning, however the granular information behind the applied criteria is still preserved in other layers. Exception: where a patch adjoins an existing '7' environmental zone, patch size does not apply when it is an increase in the extent of a contiguous 7 zone.

6.3 E Zone Post-Processing

After dissolving the criteria into contiguous E2/E3 zones, the following steps were taken to post-process the areas in order to:

1. Minimise split zoning of lots; and
2. Reduce the occurrence of residual fragments from the processing.

Once the resultant layer from applying the E2 and E3 criteria was generated, it was dissolved into contiguous E2 and E3 zones. Both layers were then intersected with the cadastre to evaluate zone fragmentation within parcels. The following post-processing was then applied:

- Any E2 or E3 area < 50 m^2 was absorbed into the adjacent non-E2/E3 area, with the attribute of 'non-E fill' for traceability; and
- Any non-E2/E3 area < 50 m^2 was absorbed into the adjacent E2/E3 area as 'E2 fill' or 'E3 fill' for traceability.

50 m^2 was chosen as an area small enough to be considered a fragment that could be automatically removed without significant consequence for zoning intentions whilst reducing split zoning.

6.4 Areas unsuitable for E2/E3 zoning

Where land in DM areas did not meet the criteria for E2 or E3 zoning, a proposed transition of BLEP 1987 zones to BLEP 2012 zones was applied. This involved two broad steps:

1. Apply a proposed BLEP 2012 zone based on the BLEP 1987 zone as per the lookup table in **Table 7.**
2. Where BLEP 1987 zone was 1(d) Rural (Urban Investigation), 9(a) Roads (Main Roads Proposed), 9(b) Roads (Local Roads Proposed), or unzoned land, a proposed BLEP 2012 zone was proposed based on adjacent zoning.

Table 7 Transition of BLEP 1987 to BLEP 2012 zones

BLEP 1987 Zone (DM Area)	Proposed BLEP 2012 Zone
1(a1) Rural (Plateau Lands Agriculture) 1(a2) Rural (Coastal Lands Agriculture) 1(e) Rural (Extractive and Mineral Resources)	RU1 Primary Production
1(b) Rural (Secondary Agricultural Land)	RU2 Rural Landscape
1(d) Rural (Urban Investigation)	Based on adjacent zoning
2(a) Living Area 2(b) Village Area	R2 Low Density Residential or R3 Medium Density Residential
4 Industrial	IN1 General Industrial
6(a) Open Space	RE1 Public Recreation or RE2 Private Recreation
8(a) National Parks and Nature Reserves	E1 National Parks and Nature Reserves
9(a) Roads (Main Roads Proposed) 9(b) Roads (Local Roads Proposed) UZ Unzoned Land	Based on adjacent zoning

In the case of BLEP 1987 zones 2(a) Living Area and 2(b) Village Area, the transition table allows for BLEP 2012 zones R2 Low Density Residential or R3 Medium Density

Residential. These areas were proposed as 'R2 or R3' based on adjacent residential density.

In the case of BLEP 1987 zone 6(a) Open Space, the transition table allows for either RE1 Public Recreation or RE2 Private Recreation depending on the use rationale. All BLEP 1987 6(a) Open space zones were proposed as RE1 Public Recreation.

To be consistent with the approach previously taken by Council in transitioning of land to a rural zone (RU1 or RU2) at the time the BLEP 2012 was adopted, the following additional criteria was applied to areas unsuitable for E2/E3 zoning for land currently 1(a1), 1(a2), 1(b), 1(d) or 1(e). If the land met the following two criteria, an RU1 zone was proposed:

- Land is identified as State or Regionally Significant Farmland under the Northern Rivers Farmland Protection Project; and
- Land is identified as an agricultural class of 1, 2, 3 or 4 by the NSW DPI agricultural land class mapping.

For land zoned 1(b) that did not meet both these criteria, the RU2 zone was applied.

6.5 Identification of Environmental Overlays

In accordance with the NCEZR, land that has been verified to meet E2/E3 zone criteria and where the PLU is not environmental conservation or environmental management may be included in a mapped planning control (i.e. environmental overlay).

It is not proposed to introduce mapped planning controls (environmental overlays) within this planning proposal.

7 Output Layers

This section describes the output GIS data created by this assessment, including a description and possible values of the attributes within each layer. The output layers consist of:

- Proposed E2/E3 Zoning (E2_E3_Zoning)
- E2/E3 Criteria and Verification (E2_Criteria_Verification; E3_Criteria_Verification)
- Areas Unsuitable for E2/3 Zoning (Non_EZone_Areas)
- Excluded DM Areas (DM_Areas_Excluded)
- Environmental Overlays (DM_Area_Env_Overlays), which includes:
  - Updated VegeComm 2004 and VegeComm 2015 in land intersecting DM Areas, updated with the methodology outlined above
  - Gapfill (patch connectivity rules)

Descriptions and metadata for each of the layers are provided in Appendix C.

8 Recommendations

The spatial data accompanying this report presents recommended E2 and E3 zoning for DM areas, BLEP 2012 zones for areas unsuitable for E2/E3 zoning, and environmental overlays. A set of output examples to accompany the data is provided in Appendix D, highlighting notable areas or exceptions.

9 References

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NSW Scientific Committee 2010b, NSW Threatened Species Scientific Committee Final Determinations - *Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions - Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act.* DECC, Sydney NSW.

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NSW Scientific Committee 2011f, NSW Threatened Species Scientific Committee Final Determinations - *Subtropical Coastal Floodplain Forest of the NSW North Coast bioregion - Determination to make minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act.* DECC, Sydney NSW.

10 Appendix A E2/E3 Criteria

10.1 E2 Criteria

10.1.1   Mapped Coastal Wetlands and Littoral Rainforest

Description

Land mapped as littoral rainforest or coastal wetlands in accordance with the CM SEPP.

The NCEZR report refers to the repealed SEPP 26 Littoral Rainforests and repealed SEPP 14 Coastal Wetlands as two separate criteria. However, the CM SEPP has superseded SEPP 26 and SEPP 14 since the report was released. For this assessment, the above-mentioned mapping in accordance with the CM SEPP were used instead.

Rules

- All mapped coastal wetlands and littoral rainforest (CM SEPP) qualify automatically.
- Where appropriate, polygons were clipped where obvious structures like roads, houses etc. are observed to intersect the polygon, but polygons were not clipped when mapping intersected non-built structures (like gardens, areas of agriculture etc.) in order to align with the NCEZR report recommendation that the use of multiple zones on a single lot should be minimised.

Data sources

- CM SEPP: Coastal wetland and Littoral rainforest only.

Considerations

- Any communities identified as a coastal wetland or littoral rainforest outside of the CM SEPP gazetted areas within DM areas are assumed to be captured under the E2 criteria layer for a EEC.
- As the CM SEPP mapping is a regulated planning provision, land that triggered this criterion were not further assessed for PLU or verification of criteria.

Exceptions

None.

Data Attributes

- E2_CM_Act:
    - Values: Coastal Wetlands/ Littoral Rainforest/No

Examples

- E2 Mapped Coastal Wetlands and Littoral Rainforests across a number of DM areas (Figure 3)
    - DM Areas with full/major coverage not subject to further verification or PLU assessment at this stage as this mapping is an existing legislated planning control (e.g. 148-0).
    - DM Areas with partial coverage (e.g. 280-0) of this criterion were subjected to further assessment of vegetated areas not intersected by CM SEPP layers.
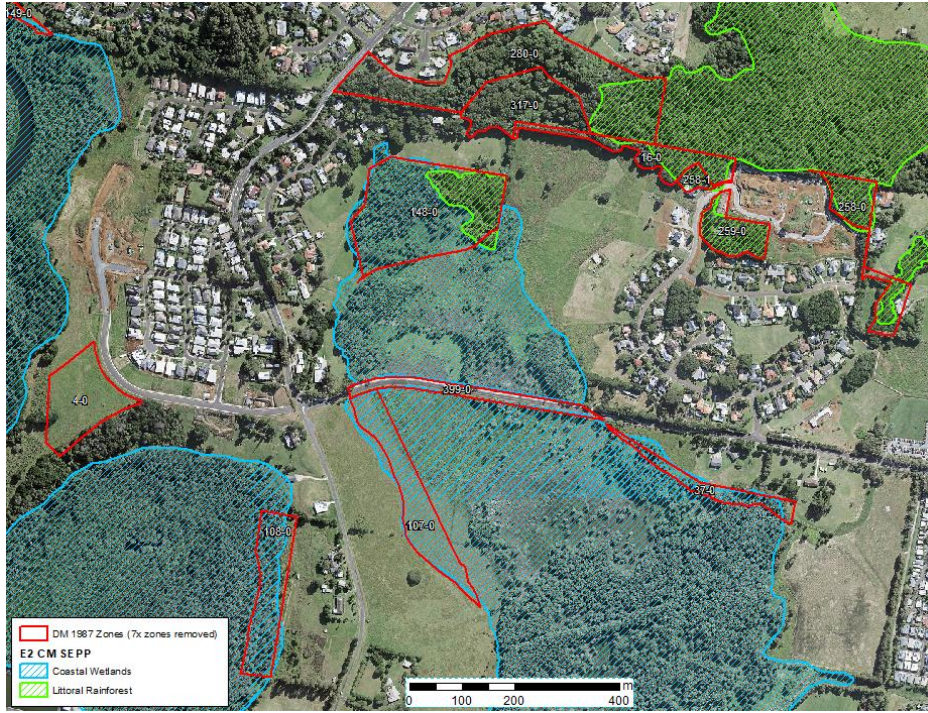
Figure 3 Example of E2 Mapped Coastal Wetlands and Littoral Rainforests

10.1.2   Endangered or Threatened Ecological Communities

Description

Land containing vegetation communities listed as Endangered Ecological Communities under the BC Act and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC).

The NCEZR report refers to Endangered Ecological Communities (EECs) listed under the repealed *Threatened Species Conservation Act 1995* (TSC Act) and/or the *Environment Protection and Biodiversity Conservation Act 1999*. The TSC Act has been replaced by the *Biodiversity Conservation Act 2016* (BC Act).

The following BC Act EECs are associated with vegetation communities throughout Ballina Shire Council LGA:

- Coastal Cypress Pine Forest
- Coastal Saltmarsh
- Freshwater Wetlands on coastal floodplains
- Littoral Rainforest
- Lowland rainforestLowland Rainforest on floodplain
- Subtropical coastal floodplain forest
- Swamp oak floodplain forest
- Swamp Sclerophyll Forest on Coastal Floodplains
- Themeda grassland on seacliffs and coastal headlands

Rules

- Most up to date determinations and listings were used.

- While the NCEZR report includes both EECs under the BC Act and TECs under the EPBC Act, in the methodology described in this report the focus was constrained to EEC listings under the BC Act as large overlap exists between the two. Furthermore, the threshold criteria involved in determining TECs that are set out in EPBC Act related documents for individual TECs under the EPBC Act (e.g. Listing Advice, Conservation Advice) involve a much higher level of on-ground verification. Thus, EECs are considered to capture a broader selection of mapped vegetation under this criterion. Since the focus of this assessment is to determine whether lands have an EEC for the purposes of E2 zoning and not to identify which specific EEC, it was considered that attempting to identify specific TECs did not add value to the outcome.

- Council sought advice from the DPIE Biodiversity Conservation Division regarding the determination of EECs. The following hierarchy was adopted (most important to least) to determine how existing vegetation communities could be aligned with EEC final determinations.

  1. Associated region
  2. Readily observable floristics
  3. Landform, edaphic and geological conditions

- Most determinations explicitly state that these communities can occur in a range of conditions. It was not proposed that any EECs were ruled 'out' based on patch size or degradation where they are part of a contiguous vegetation community as these considerations are not thresholds that form part of the NSW Scientific Committee's determinations.

- Vegetation communities derived from VegeCom 2004 and 2015 were assigned an EEC/TEC where appropriate as per the vegetation equivalency matrix (**Appendix B**).

Data sources

- Vegetation mapping (VegeComm 2004 and 2015)
- Guidance for identification of EECs (DECC 2007a, b; DECC 2008a, b, c; DECC 2009)
- NSW Scientific Committee Final Determinations (NSW Scientific Committee 2010a-d; NSW Scientific Committee 2011a-f)

Considerations

- NSW Eastern PCT mapping was not available as originally expected to dove tail broad vegetation descriptions and assist in aligning Council's VegeComm layers (see Section 3.6.1).

- In all cases except rainforests, identified native vegetation communities met the E2 Over-cleared Vegetation Communities on the FNC. Thus, by taking the hierarchical approach outlined in this document, identification of EECs was significantly less important factor in determining the application of E2 criteria.

Exceptions
None.

Examples
- E2 Endangered Ecological Communities across several of DM areas (Figure 4)
  - Note that broad areas of DM Areas 306-0 and 263-0 have significant coverage of Preferred Koala Habitat mapping, and in line with the hierarchy detailed in Section 6.1 these areas are not subject to further verification or PLU assessment at this stage as this mapping is an existing legislated planning control.
  - In land not covered by the Preferred Koala Habitat, mapped areas of rainforest and an unknown vegetation community are identified as EECs.
  - While the orange patch of vegetation represents an unknown type that was unable to be verified, the precautionary approach described in Section 3.6.3 is applied.
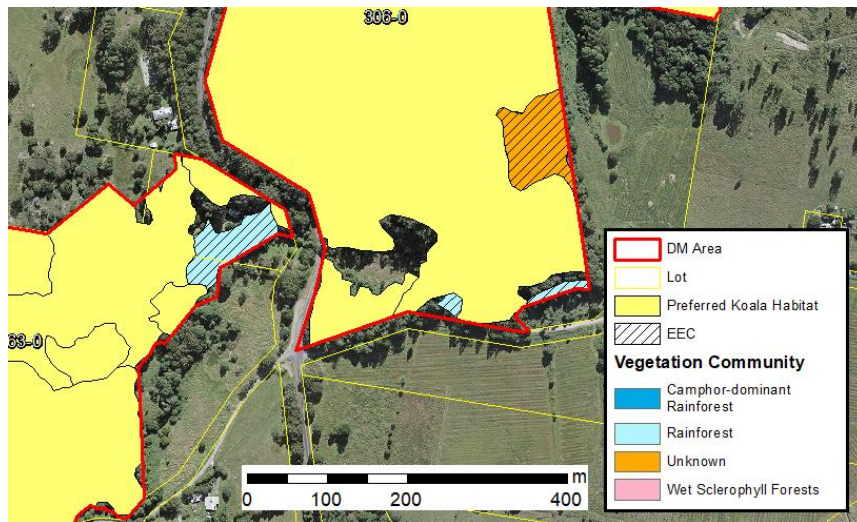
Figure 4 Example of E2 Endangered Ecological Communities

10.1.3   Key Threatened Species Habitat

Description

Key Threatened Species Habitat.

- old-growth forests where the overstorey or canopy trees are in the late mature stage of growth
- areas of predicted high conservation value for forest fauna assemblages, refugia, endemic forest fauna or endemic invertebrates

Habitats for threatened species or endangered populations that cannot withstand further loss where the threatened species or endangered population is present.

Rules

- It was determined that the datasets relating to old-growth forests as described in the NCEZR was outdated and not a reliable resource, and that correctly and accurately applying the full criteria would involve an in-depth modelling project to generate accurate and usable results. As such, and based on discussions with Council, the application of this criterion was constrained to the below.
- Preferred Koala Habitat mapping (KMS 2017) was the only data source determined to be reliable and applicable within the scope of this assessment.
- After the application of Preferred Koala Habitat, it was considered that most, if not all, remaining vegetation in DM Areas that may be considered Key Threatened Species Habitat would already be captured under the E2 criteria for over-cleared communities on the FNC, over-cleared landscapes, or EECs.

Data sources

- KMS 2017 Preferred Koala Habitat (Primary and Secondary)

Considerations

- As the KMS 2017 mapping is a legislated planning control, lands that triggered this criterion were not further assessed for PLU or verification of criteria.

Exceptions

None.

Examples

- E2 Key Threatened Species Habitat across several of DM areas (Figure 5)
  - Note that broad areas of DM Areas 306-0 and 263-0 have significant coverage of Preferred Koala Habitat mapping, and in line with the hierarchy detailed in Section 6.1 these areas are not subject to further verification or PLU assessment at this stage as this mapping is an existing legislated planning control.
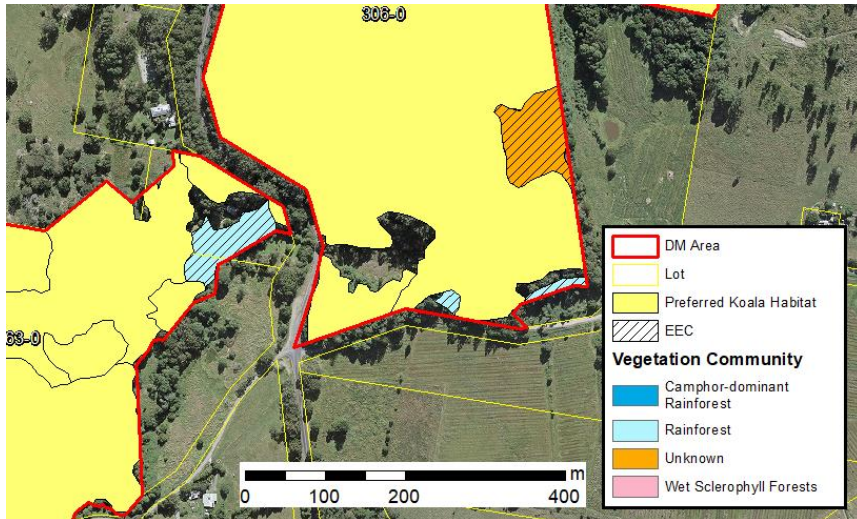
Figure 5 Example of E2 Key Threatened Species Habitat

10.1.4   Over-cleared landscapes

The E2 criteria defined as 'Over-cleared vegetation communities' in the NCEZR report has been split into two separate criteria due to the distinctive processes involved in identifying the two main components:

- Over-cleared Mitchell landscapes (Mitchell 2002)
- Over-cleared vegetation communities (DECCW 2010)

This section addresses over-cleared Mitchell landscapes (Mitchell 2002).

Description

Native vegetation in over-cleared Mitchell landscapes (Mitchell 2002). The *Far North Coast Regional Conservation Plan* (DECCW 2010) lists the following as examples of Over-cleared Mitchell landscapes: Byron–Tweed Alluvial Plains, Byron–Tweed Coastal Barriers, Clarence–Richmond Alluvial Plains and Upper Clarence Channels and Floodplains.

The Clarence-Richmond Alluvial Plains Mitchell Landscape occurs within the Ballina LGA.

Rules

- Any vegetation that was attributed as native AND intersects the Clarence–Richmond Alluvial Plains Mitchell landscape was attributed as a proposed E2 zone.

Data sources

- Vegetation mapping (VegeComm 2004 and 2015)
- Mitchell 2002

Considerations

- As the Mitchell Landscape mapping is a State-published boundary, this element of the criterion was considered to not require verification.
- As vegetation occurring within the over-cleared landscape only needed to be identified as native to trigger this E2 criterion, in general verification of lands within DM Areas was considered to require a lower level of verification.

Exceptions

None.

Examples

- E2 Over-cleared landscapes across several of DM areas (Figure 6)
  - Areas of native vegetation communities occurring within an over-cleared Mitchell Landscape (Clarence – Richmond Alluvial Plains).
  - While the orange patch of vegetation represents an unknown type that was unable to be verified, the precautionary approach described in Section 3.6.3 is applied and the vegetation is assumed to be native, thus triggering this criterion.
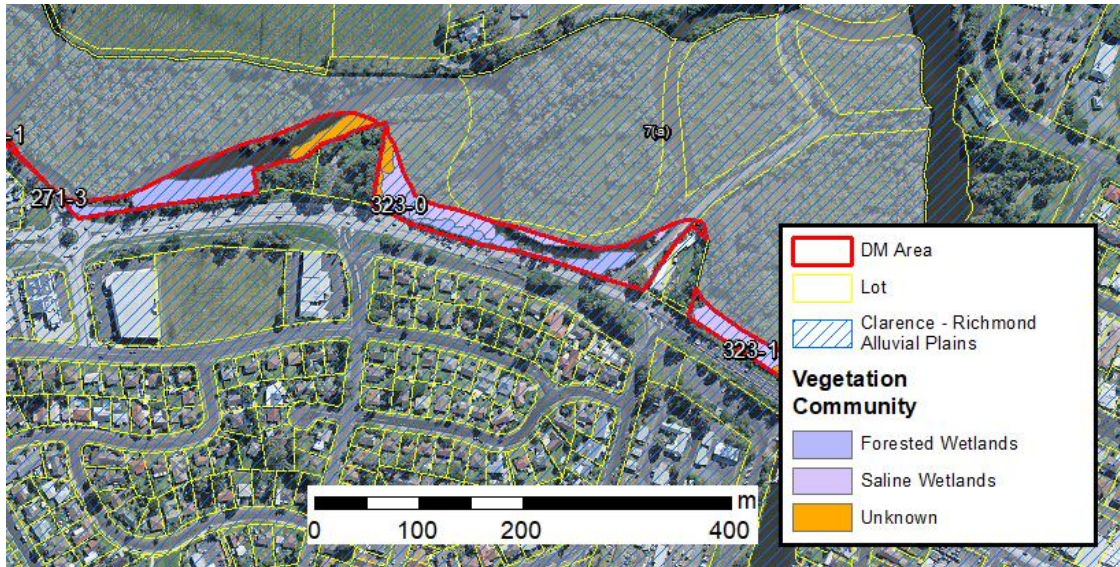
Figure 6 Example of E2 Over-cleared Landscapes.

10.1.5   Over-cleared vegetation communities

The E2 criteria defined as 'Over-cleared vegetation communities' in the NCEZR report has been split into two separate criteria due to the distinctive processes involved in identifying the two main components:

- Over-cleared Mitchell landscapes (Mitchell 2002)
- Over-cleared vegetation communities (DECCW 2010)

This section addresses over-cleared vegetation communities (DECCW 2010).

Description

Over-cleared vegetation communities where more than 70% of the original (pre-1750) extent of the native vegetation type has been cleared. The *Far North Coast Regional Conservation Plan* (DECCW 2010) lists the following over-cleared vegetation communities on the Far North Coast (FNC):

- Rainforests, Wet sclerophyll forests (shrubby and grassy subformations), Dry sclerophyll forests (shrubby and shrub/grass subformations), Grassy woodlands, Grasslands (Themeda australis sod tussock), Heathlands, Forested wetlands, Freshwater wetlands, Saline wetlands.

Rules

- Vegetation communities were identified as one of the above listed over-cleared vegetation communities on the FNC as per the vegetation equivalency matrix in Appendix B. These communities were considered to trigger this E2 criterion.

Data sources

- Vegetation mapping (VegeComm 2004 and 2015)
- DECCW 2010

Considerations
None.

Exceptions
None.

Examples
- E2 Over-cleared Vegetation Communities across several of DM areas (Figure 7)
  - o Areas of over-cleared vegetation communities occurring within an over-cleared Mitchell Landscape (Clarence – Richmond Alluvial Plains).
  - o While the orange patch of vegetation represents an unknown type that was unable to be verified, the precautionary approach described in Section 3.6.3 is applied and the vegetation is assumed to be a vegetation community that would trigger this criterion.
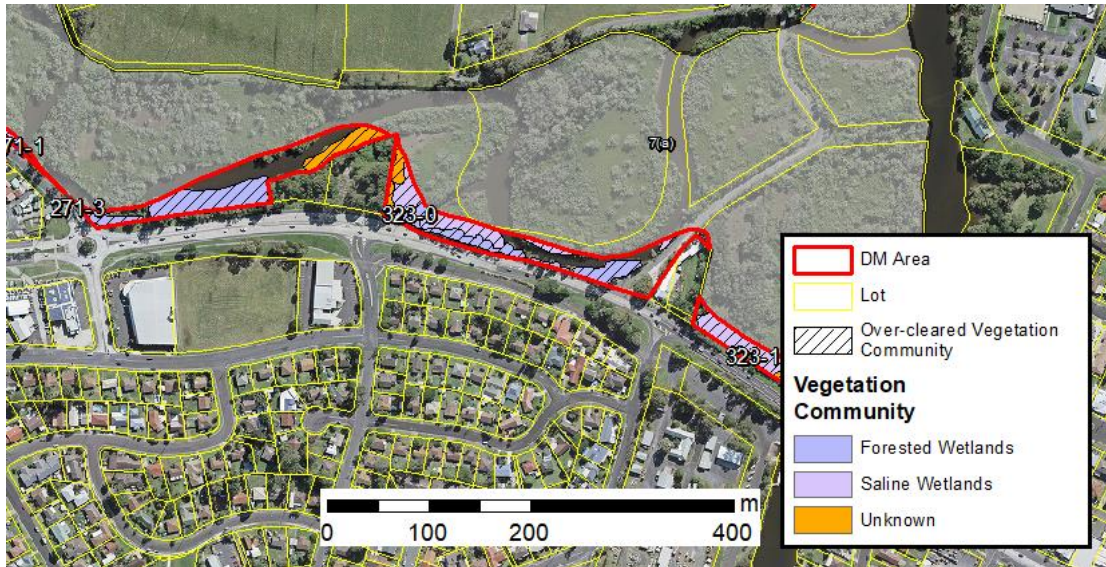
Figure 7 Example of E2 Over-cleared Vegetation Communities.

10.1.6   Culturally Significant Lands

Description
Areas of culturally significant lands such as Aboriginal object sites, Aboriginal places of heritage significance, and other significant objects identified by the local Aboriginal community.

Rules
Any Aboriginal object site, places and other significant items contained in Schedule 1 of the BLEP 1987 will included as land to be transitioned to E2.

Data sources
- BLEP 1987 Heritage Item layer (BSC_2012_1987_LEP_HER_149)
- List of cadastral lots aligning with Aboriginal Cultural Heritage items (as provided by Council)

Considerations
- Information used in the application of this criteria may change subject to consultation with Jali Local Aboriginal Land Council (not within the scope of this work).

Exceptions
n/a

Examples
- E2 Culturally Significant Lands across several of DM areas (Figure 6)
  - DM Areas 132-0 and 132-1 are within the coverage of a mapped Aboriginal Cultural Heritage item.
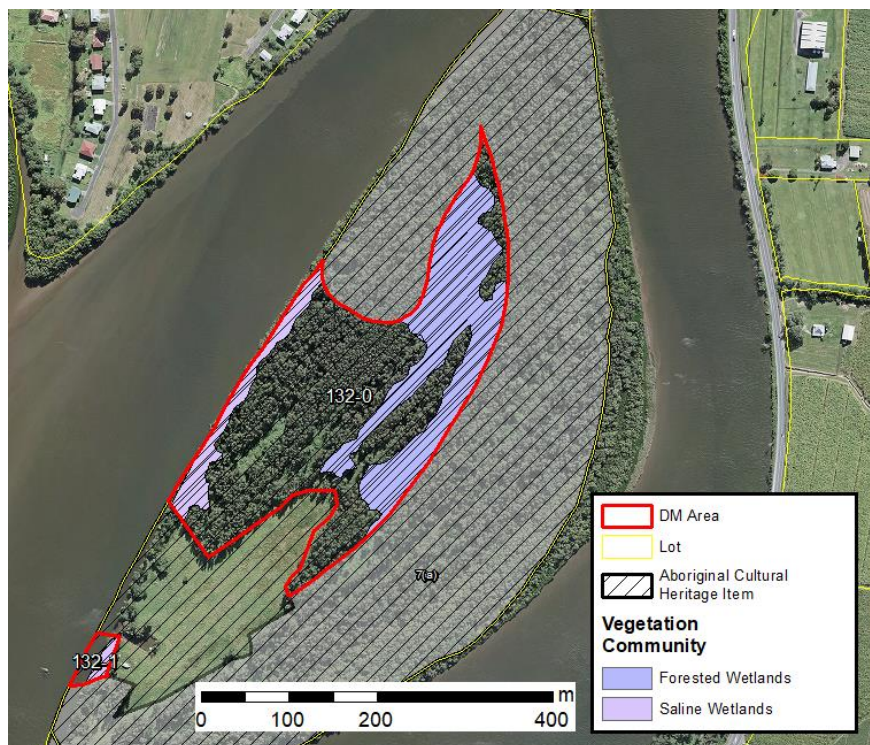 - All land within these two DM Areas will be proposed as E2 zones.

Figure 8 Example of E2 Culturally Significant Lands

10.2 E3 Criteria

10.2.1 Rare, Endangered and Vulnerable Forest Ecosystems

Description

- Land comprising areas of rare, endangered and vulnerable forest ecosystems as defined by the Joint *ANZEC/MCFFA National Forest Policy Statement Implementation sub-committee* (JANIS) (Commonwealth of Australia 1997).
- Vegetation Communities listed as rare, endangered and vulnerable forest ecosystems are also captured under the report titled "*Regional Forest Agreement for North East New South Wales (Upper North East and Lower North East Regions*)"

Rules

- Significant challenges were identified in classifying vegetation under the above-mentioned JANIS classes, with insufficient information available to perform this in a satisfactory way.
- Based on discussions with Council and correspondence with the Department (Dimitri Young, Biodiversity and Conservation Division of DPIE; 13 May 2021), and a modified approach was taken to apply this criterion.
- It is noted that the application of the E2 criteria for vegetation (i.e. all criteria other than 'culturally significant lands') means that almost all native vegetation mapped within the LGA is proposed for E2 zoning where the PLU is determined to be 'environmental'.
- Council has discretion to apply an E3 zone to any proposed E2 zone where the PLU is determined to be suitable. As a proxy for this E3 criterion, any mapped vegetation within DM areas that had triggered any of the E2 criteria related to vegetation (EECs, key threatened species habitat, over-cleared communities, over-cleared landscapes) was considered to have triggered this E3 criteria as well (Dimitri Young, Biodiversity and Conservation Division of DPIE; 13 May 2021).

Data sources

- Vegetation mapping (VegeComm 2004 and 2015)

Considerations

- Given the comprehensive assessment of vegetation against E2 criteria, the approach described in the rules above was assumed to fully satisfy this criterion without further assessment of any mapped vegetation outside of this.

Exceptions
None.

10.2.2   Riparian and Estuarine Vegetation and Wetlands

Description

- Land comprising riparian and estuarine vegetation on waterfront land, defined under the NSW Water Management Act 2000,
- Wetland areas other than those mapped under the CM SEPP.
- Waterfront land is defined under the NSW Water Management Act 2000 as the bed of any river, lake or estuary and any land within 40 metres of the river banks, lake shore or estuary mean high water mark.

Rules

The *Guidelines for riparian corridors on waterfront land* (DPI 2012) lists buffer widths for Vegetated Riparian Zones (VRZ):

Strahler Stream Order	Vegetated Riparian Zone width(VRZ, m)	Total RC width
1st	10	20 m + channel width
2nd	20	40 m + channel width
3rd	30	60 m + channel width
4th and above[1]	40	80 m + channel width

[1] Each side of watercourse
[2] Including estuaries, wetlands and any parts of rivers influence by tidal waters.

Based on the definition of waterfront land and the table above, the following rules for application of E3 criteria for riparian corridor widths were defined:
- Buffered corridors to Strahler ordered drainage lines with the following widths (each side of watercourse):
  - 1st order – 10 m
  - 2nd order – 20 m
  - 3rd order and above – 40 m
- Buffers to wetlands and estuaries with the following width (each side of feature):
  - 40 m

The available Strahler-ordered drainage dataset was limited to a maximum stream order of 3. As a precautionary approach, and given the definition of waterfront land, all watercourses with the maximum stream order 3 were assigned a buffer width of 40 m rather than 30 m.

In addition, the intersections of mapped wetlands (NSW Wetlands) and mapped estuary habitat (Northern Rivers Estuary Habitat Mapping 2000) was applied as part of this E3 criterion.

Native vegetation intersecting these wetlands, estuary and riparian corridors were identified. However, it is noted that once E2 criteria related to vegetation are applied to the DM areas, and above-mentioned adjusted rules for applying the E3 Rare, Endangered and Vulnerable Forest Ecosystems is also applied, that all native vegetation within the DM areas is already attributed to both E2 and E3 flags, subject to the assessment of PLU.

Thus, while the riparian corridor, wetland and estuary layers were retained for the purpose of future assessment, this criterion was considered fully satisfied without further assessment.

Data sources

- Ordered drainage (StreamOrderExtract.shp)
- DPI 2012
- NSW Wetlands (OEH 2010)
- Northern Rivers Estuary Habitat Mapping 2000 (EstuaryHabitat_2000)

Considerations

- There were no RAMSAR Wetlands or Important Wetlands in the DM areas.

Exceptions

- Man-made drainage lines (represented by streams with an order of -99 in the available dataset) were not buffered or considered for riparian corridors.

10.2.3 Native Vegetation on Coastal Foreshores

Description
Native vegetation on land with frontage, or adjoining or adjacent to a beach, estuary, coastal lake, headland, cliff or rock platform.
This includes:

- Land affected by the CM SEPP:
  - Coastal Use Area;
  - Coastal Environment Area.
- Land affected by the *Water Management Act 2000*
- Land affected by the Cape Byron Marine Park

Rules
- Native vegetation intersecting the CM SEPP Coastal Use Area and Coastal Environment Area were identified.
- However, it is noted that once E2 criteria related to vegetation is applied to the DM areas, and above-mentioned adjusted rules for applying the E3 Rare, Endangered and Vulnerable Forest Ecosystems is also applied, that all native vegetation within the DM areas is already attributed to both E2 and E3 flags, subject to assessment of PLU.
- Thus, while the CM SEPP layers were retained for the purpose of future assessment, this criterion was considered fully satisfied without further assessment.

Data sources
- CM SEPP (Coastal Use Area & Coastal Environment Area)
- Vegetation mapping (VegeComm 2004 and 2015)
- DPI 2012

Considerations
- As the CM SEPP mapping is a regulated planning provision, land that triggered this criterion (Coastal Use Area and Coastal Environment Area) were not further assessed for PLU or verification of criteria.

Exceptions
None.

11 Appendix B Vegetation Equivalency Matrix

Assigned Vegetation Community	Rules	EEC	Over-cleared Vegetation Community on Far North Coast
Dry Sclerophyll Forests (shrubby and grassy subformations)	Where *SubFormation* or *Formation* (VegeCom 2004) contains the following term(s): • Dry Sclerophyll **OR** Where *Keith Class 2004* (VegeCom 2015) contains the following term(s): • Dry Sclerophyll Forests	Yes (Coastal Cypress Pine Forest in the NSW North Coast Bioregion) where *Community* OR *Common_Name* contains one or more of the following term(s): • Coastal Cypress Pine • *Callitris columellaris* • Derivatives of the above (e.g. *C. columellaris*)	Yes
Forested Wetlands	Where *SubFormation* or *Formation* (VegeCom 2004) contains the following term(s): • Swamp Sclerophyll **OR** Where *Keith Class 2004* (VegeCom 2015) contains the following term(s): • Forested Wetlands	Yes (Swamp Oak Floodplain Forest of the NSW North Coast bioregions) where *Community* OR *Common_Name* contains one or more of the following term(s): • Swamp Oak • *Casuarina glauca* • Derivatives of the above (e.g. *C. glauca*) **OR** Yes (Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast bioregions) where *Community* OR *Common_Name* contains one or more of the following term(s): • *Melaleuca quinquenervia*/ Broad-leaved	Yes

Assigned Vegetation Community	Rules	EEC	Over-cleared Vegetation Community on Far North Coast
		Paperbark (only) • *Melaleuca quinquenervia*/ Broad-leaved Paperbark AND Swamp Oak /*Casuarina glauca* (in this order) **OTHERWISE:** Yes (Subtropical Coastal Floodplain Forest of the NSW North Coast bioregion)	
Heathlands	Where *SubFormation* or *Formation* (VegeCom 2004) or *Keith Class 2004* (VegeCom 2015) contains the following term(s): • Heathland	n/a	Yes
Rainforests	Where *SubFormation* or *Formation* (VegeCom 2004) or *Keith Class 2004* (VegeCom 2015) contains the following term(s): • Rainforest	Rainforest EEC (see section 3.6.4).	No
Saline Wetlands	Where *SubFormation* or *Formation* (VegeCom 2004) contains the following term(s): • Mangrove • Saltmarsh • Derivates of the above terms **OR** Where *Keith Class 2004* (VegeCom 2015) contains the following term(s):	Coastal Saltmarsh in the NSW North Coast Bioregion EEC = Saltmarsh complex **AND NOT** CM SEPP	Yes

Assigned Vegetation Community	Rules	EEC	Over-cleared Vegetation Community on Far North Coast
	• Saline Wetlands		
Wet Sclerophyll Forests (shrubby and grassy subformations)	Where *SubFormation* or *Formation* (VegeCom 2004) or *Keith Class 2004* (VegeCom 2015) contains the following term(s): • Wet Sclerophyll • Moist Sclerophyll		Yes
Camphor-dominant Rainforest	Where *SubFormation* or *Formation* (VegeCom 2004) or *Keith Class 2004* (VegeCom 2015) does not meet the other rules listed above **AND** *Coverage* contains either: • Camphor Laurel < 20% Rainforest • Camphor Laurel 20-50% Rainforest	Yes (see section 3.6.2.1).	No.
Exotic	Where *SubFormation* or *Formation* (VegeCom 2004) or *Keith Class 2004* (VegeCom 2015) does not meet the other rules listed above **AND** *Coverage* contains the following term(s): • Lantana • Bitou Other exotic species.	No	No

Assigned Vegetation Community	Rules	EEC	Over-cleared Vegetation Community on Far North Coast
Undecided	Where *SubFormation* or *Formation* (VegeCom 2004) or *Keith Class 2004* (VegeCom 2015) does not meet the other rules listed above **AND** Attributes contain some information about data (e.g. some species listed but no formation.		
Unknown	Where *SubFormation* or *Formation* (VegeCom 2004) or *Keith Class 2004* (VegeCom 2015) does not meet the other rules listed above **AND** No further information is present in VegeCom attributes.		See vegetation lookup table.

12 Appendix C Output Layer Metadata

12.1 Proposed E2/E3 Zoning

Dataset name
E2_E3_Zoning

Description
This layer represents proposed E2 and E3 zoning. These data were dissolved across the applied E2/E3 criteria to create single contiguous zones wherever possible, with some post-processing to reduce slivers, fragments and split zoning (section 6.3).

This means that granular data on the criteria responsible for the E2 or E3 attributes, such as whether falls in a Mapped Coastal Wetland or is considered an over-cleared vegetation community, is not present in this layer. This granular data on the E Zone criteria is found in the criteria and verification layers.

Attributes
A description of the metadata is provided in Table 8.

Table 8 Attributes for the E2/E3 zoning

Attribute	Data Type	Description
ZONE_TYPE	Text	BLEP 1987 zone identifier, e.g. 1(a1), 9(a).
DESCRIPTIO	Text	BLEP 1987 zone description.
NEW_MI_PRINX	Text	New unique identifier for DM Areas after splitting into single-part polygons, e.g.: 294-0, 294-1.
E2_ZONE	Text	Flag denoting whether polygon is a proposed E2 zone. Possible values are: • E2 (applied E2 criteria) • E2 fill (small fragments of non-E2 zoning cleaned up and absorbed into an adjacent area, as described in the previous section) • n/a (a few instances where a mapped polygon has an E3 flag, but is not a candidate for E2 zoning, e.g. Tuckombill Quarry)
E3_ZONE	Text	Flag denoting whether polygon is a proposed E3 zone. Possible values are:

		• E3 (applied E3 criteria) • E3 fill (small fragments of non-E3 zoning cleaned up and absorbed into an adjacent area, as described in the previous section) • n/a (a few instances where a mapped polygon has an E2 flag, but is not a candidate for E3 zoning, e.g. culturally significant lands)
Shape_Length	Double	Polygon perimeter (m)
Shape_Area	Double	Polygon area (m^2)

12.2 E2 Criteria and Verification

Dataset name
E2_Criteria_Verification

Description
This layer consists of proposed E2 zoning at the granular level of individual criteria. That is, all E2 zoning is broken down into one polygon per applicable criteria, providing detailed data on whether proposed zoning is triggered by a Mapped Coastal Wetland or an over-cleared vegetation community, or both.
As multiple layers of intersection exist in this layer, it contains a very high number of discrete polygons.
Note there are no 'E2 fill' attributes as in the proposed E2 zoning layer – the process to reduced split zoning lots occurs after this layer is generated.

Attributes
A description of the metadata is provided in Table 9.

Table 9 Attributes for the E2 criteria and verification

Attribute	Data Type	Description
ZONE_TYPE	Text	BLEP 1987 zone identifier, e.g. 1(a1), 9(a).
DESCRIPTION	Text	BLEP 1987 zone description.
NEW_MI_PRINX	Text	New unique identifier for DM Areas after splitting into single-part polygons, e.g.: 294-0, 294-1.
ID	Integer	Vegetation polygon identifier to relate records to the Vegetation Community dataset.
E2_ZONE	Text	Flag denoting whether polygon is an E2 area. Possible values are: • E2 (E2 criteria satisfied) • n/a (polygon does not meet E2 criteria)
VEGE_COMM_v4	Text	Assigned vegetation community.
NATIVE	Text	Whether polygon is considered native.
E2_PKH	Text	Whether polygon is considered preferred koala habitat.
E2_CM_Act	Text	Whether polygon is considered Coastal Wetlands or Littoral Rainforest under the CM SEPP.
EEC	Text	Whether the polygon is considered an EEC.
OV_CLRD_COMM	Text	Whether the polygon is considered an over-cleared community of the FNC.
E2_OC_LANDSCAPE	Text	Whether the polygon is considered native vegetation within an over-cleared Mitchell Landscape
E2_ACH	Text	Whether the polygon is considered significant cultural land.
VEGE_VERIFICATION	Text	Status of verification (links to plot_ident for field observation)
plot_ident	Text	Field survey record identifier.
assessor	Text	Field observer.
obs_type	Text	Type of field observation (within, edge, remote).
field_confidence	Text	Confidence of field observation based on type of observation (high, moderate, low)
Shape_Length	Double	Polygon perimeter (m)
Shape_Area	Double	Polygon area (m^2)

12.3 E3 Criteria and Verification

Dataset name
E3_Criteria_Verification

Description
This layer consists of proposed E3 zoning at the granular level of individual criteria. That is, all E3 zoning is broken down into one polygon per applicable criteria, providing detailed data on whether proposed zoning is triggered by a riparian corridor or coastal foreshore.

As multiple layers of intersection exist in this layer, it contains a very high number of discrete polygons.
Note there are no 'E3 fill' attributes as in the proposed E3 zoning layer – the process to reduced split zoning lots occurs after this layer is generated.

Attributes
A description of the metadata is provided in Table 10.

Table 10 Attributes for the E3 criteria and verification

Attribute	Data Type	Description
ZONE_TYPE	Text	BLEP 1987 zone identifier, e.g. 1(a1), 9(a).
DESCRIPTION	Text	BLEP 1987 zone description.
NEW_MI_PRINX	Text	New unique identifier for DM Areas after splitting into single-part polygons, e.g.: 294-0, 294-1.
ID	Integer	Vegetation polygon identifier to relate records to the Vegetation Community dataset.
E3_ZONE	Text	Flag denoting whether polygon is an E3 area. Possible values are: • E3 (E3 criteria satisfied) • n/a (polygon does not meet E3 criteria)
E3_REV	Text	Whether the polygon is considered a rare, endangered, or vulnerable forest ecosystem.

E3_Riparian	Text	Whether the polygon is considered to be riparian, estuarine or wetland vegetation, including vegetation within riparian corridors to those features.
E3_Coastal	Text	Whether the polygon is considered native vegetation on coastal foreshores.
Shape_Length	Double	Polygon perimeter (m)
Shape_Area	Double	Polygon area (m^2)

12.4 Areas Unsuitable for E2/E3 Zoning

Dataset name
Non_EZone_Areas

Description
This layer provides the proposed zoning of residual lands in DM areas that is left after application of proposed E2/E3 zones. It contains data on the original BLEP 1987 zone of the DM area, and the new proposed BLEP 2012 zone based on the process described in the report.

Attributes
A description of the metadata is provided in Table 11.

Table 11 Attributes for Areas Unsuitable for E2/E3

Attribute	Data Type	Description
ZONE_TYPE	Text	BLEP 1987 zone identifier, e.g. 1(a1), 9(a).
DESCRIPTIO	Text	BLEP 1987 zone description.
NEW_MI_PRINX	Text	New unique identifier for DM Areas after splitting into single-part polygons, e.g.: 294-0, 294-1.
BLEP2012	Text	Proposed new BLEP 2012 zone.
SIG_FARMLAND	Text	State or Regionally Significant Farmland, or other values from the Significant Farmland dataset.
AGCLASS	Text	Agricultural Land Class
Shape_Length	Double	Polygon perimeter (m)
Shape_Area	Double	Polygon area (m^2)

12.5 Excluded DM Areas Overview

Dataset name
DM_Areas_Excluded

Description
This layer provides an extract of the DM areas that were excluded from assessment due to initial minimum area threshold (500 m^2).

The intent of this layer is to preserve data excluded from the E2/E3 zoning to ensure a comprehensive validation against the original DM areas data.
It also includes a number of polygons in an area that may have transitioned to National Park – these are attributed as 'Refer Council' in the EXCLUDE field.

Attributes
A description of the metadata is provided in Table 12.

Table 12 Attributes for DM_Areas_Excluded

Attribute	Data Type	Description
ZONE_TYPE	Text	BLEP 1987 zone identifier, e.g. 1(a1), 9(a).
NEW_MI_PRI NX	Text	New unique identifier for DM Areas after splitting into single-part polygons, e.g.: 294-0, 294-1.
EXCLUDE	Text	Flag 'Exclude' denoting DM area was less than 500 m^2, was not contiguous with a larger DM Area, and was not contiguous with a Zone 7 area.
Shape_Length	Double	Polygon perimeter (m)
SHAPE_AREA	Double	Polygon area (m^2)