



Land Management Code - Pasture Expansion

Technical Guide

This technical guide is to assist landholders in applying the Pasture Expansion part of the Land Management (Native Vegetation) Code 2018 ('the Code'). It is designed to assist you to understand the requirements and best practice approach to removing native vegetation for Pasture Expansion.

Overview

The following technical guide is to assist landholders in applying Part 3 - Pasture Expansion of the Code under the *Local Land Services Act 2013* (the LLS Act).

This guide is designed to be used in conjunction with your discussions with Local Land Services. Specialist officers are available to guide you through all stages of considering and using the Code. This guide accompanies the factsheet 'Land Management Code - Pasture Expansion', which provides information regarding key aspects of the Code for clearing of woody native vegetation by uniform or mosaic thinning to promote native pastures.

Any clearing must be undertaken in accordance with the Code and requires notification or certification before commencement.

For further information, please refer to the 'Land Management Code 'Pasture Expansion' fact sheet and other fact sheets at www.lls.nsw.gov.au/help-and-advice/land-management-in-nsw/resources

Note – definitions of key concepts are found at the end of this guide.

How to decide if you should use the Pasture Expansion part of the Code

The Pasture Expansion part of the Code provides three pathways which vary in their level of impact, stem retention requirements and suitability for different land types.

The pathways are:

- Division 1 - Uniform thinning of woody native vegetation (notification or voluntary certificate)
- Division 2 - Uniform thinning of woody native vegetation (certification)
- Division 3 - Mosaic thinning of woody native vegetation (certification)

Table 1 on page 2 is designed to help you understand each division of the Pasture Expansion part of the Code and how they can be applied.

Want to know more?

We're here to help

Find us online: lls.nsw.gov.au

You'll find other land management resources including fact sheets

Call us: 1300 795 299 and ask for an officer to advise you on land management

Email us: slm.info@lls.nsw.gov.au

Contact us online: www.lls.nsw.gov.au/contact-us



Local Land Services

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Table 1: Summary of requirements and conditions for Part 3 - Pasture Expansion of the Land Management Code

Specifications	Division 1 - Uniform Thinning (notification)	Division 2 - Uniform Thinning (certification)	Division 3 - Mosaic Thinning (certification)
Minimum tree density retention	225 stems per hectare (ha)	Depends on vegetation formation and treatment area	30% canopy cover in treatment area (minimum retention is 5 ha)
Tree height retention	At least 2 m high	No conditions	No conditions
Retention distribution	Uniform (evenly dispersed)	Uniform (evenly dispersed)	Where possible patches of at least 5 ha, evenly distributed. At least 1 patch of at least 5 ha per 50 ha or part thereof.
Property limitations	Not on small holding	None	Not on small holding. Must have ≥ 30% Category 2 regulated land on the landholding (as determined by Local Land Services)
Can it be used in the Coastal Zone?	No	Yes, if primary use of land is for agricultural activities (as determined by Local Land Services)	Yes, if primary use of land is for agricultural activities (as determined by Local Land Services)
Keith Vegetation formation (figures in brackets indicate minimum stem density in non-EEC and then VEC/EEC)	(a) Arid Shrubland (Acacia sub-formation) (b) Dry Sclerophyll Forest (c) Forested Wetland (d) Grassy Woodland (e) Semi-arid Woodland (f) Wet Sclerophyll Forest (Grassy sub-formation)	(a) Arid Shrubland (Acacia sub-formation) (75 / 115) (b) Dry Sclerophyll Forest (150 / 225) (c) Forested Wetland (except in coastal zone) (115 / 170) (d) Grassy Woodland (115 / 170) (e) Semi-arid Woodland (75 / 115) (f) Wet Sclerophyll Forest (Grassy sub-formation) (150 / 225)	May be restricted to the following: (a) Arid Shrubland (Acacia sub-formation) (b) Dry Sclerophyll Forest (c) Forested Wetland (d) Grassy Woodland (e) Semi-arid Woodland (f) Wet Sclerophyll Forest (Grassy sub-formation)
Treatment area size	Not less than 1 ha	Not less than 1 ha	Maximum 30% of landholding on which Part 5A of the LLS Act 2013 applies
Clearing on Vulnerable Ecological Community (VEC) or Endangered Ecological Community (EEC)?	Not permitted	Yes, but with higher minimum stem density retention	Not permitted

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Specifications	Division 1 - Uniform Thinning (notification)	Division 2 - Uniform Thinning (certification)	Division 3 - Mosaic Thinning (certification)
Clearing method conditions	Clearing of trees and shrubs	Clearing of trees and shrubs	No more than minimal disturbance to soil and groundcover
Tree diameter retention	Trees > 90 cm diameter at breast height over bark must be retained	Trees > 90 cm diameter at breast height over bark must be retained	Trees > 90 cm diameter at breast height over bark must be retained
Plant genera limitations	None	In the coastal zone, plant genera are limited to Acacia, Allocasuarina, Angophora, Callitris, Casuarina, Corymbia, Eucalyptus, Leptospermum, Melaleuca and Syncarpia	No restrictions (unless specified in the certificate)
Vulnerable land clearing	Limited to clearing of individual plants with nil disturbance to soil and groundcover	Limited to clearing of individual plants with nil disturbance to soil and groundcover (unless otherwise specified in a certificate variation)	Not permitted (unless specified in certificate variation)
Within buffer distance of a water body clearing	Limited to clearing of individual plants with nil disturbance to soil and groundcover	Limited to clearing of individual plants with nil disturbance to soil and groundcover (unless otherwise specified in a certificate variation)	Not permitted (unless specified in certificate variation)
Sustainable grazing (allowable activity)	Permitted	Permitted	Permitted
Other conditions	This certificate does not re-categorise land to Category 1 - Exempt land	This certificate does not re-categorise land to Category 1 - Exempt land	This certificate does not re-categorise land to Category 1 - Exempt land nor authorise a change in land use in cleared areas. Local Land Services may specify in the certificate where retained patches of tree and shrubs may be cleared to the benchmark stem density for the Keith vegetation formation or sub-formation.

Note: In certain circumstances, some variations are possible on Pasture Expansion certificates for Division 2 – Uniform Thinning and Division 3 – Mosaic Thinning. For example, alternative stem densities, changes to plant genera, changes to clearing on vulnerable land and within buffer distances of water bodies and clearing restricted to certain vegetation formations. Enquire with Local Land Services for more information.

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Things to consider

- Minimal disturbance means no greater than 30 per cent disturbance to the soil and groundcover in the treatment area.
- Nil disturbance means no greater than 5 per cent disturbance to the soil and groundcover in the total treatment area.
- Does the treatment area have suitable native grass cover and/or will the existing groundcover respond to thinning? One way to determine this is to observe disturbed land close to the treatment area, for example, a cleared track running through the treatment area. If there is grass growth on the track, it is possible there will be grass growth following thinning in the treatment area.
- Does the soil and land capability support grasses? For land and soil information, refer to eSpade at www.environment.nsw.gov.au/eSpade2WebApp
- Will the land support a productive pasture outcome? Local Land Services can provide advice on pasture productivity.
- For assistance with assessing groundcover refer to the 'Assessing native groundcover' factsheet at www.lls.nsw.gov.au/help-and-advice/land-management-in-nsw/resources
- Select and prioritise stems to be thinned in the shrub layer, mid-storey and canopy that maximise a positive groundcover grass response (while operating within the terms of the Pasture Expansion certificate).
- Consider retaining trees with hollows (generally older, larger trees), sub-dominant trees (to allow trees with hollows to develop over time) and threatened plant species. Note: the retention of specific threatened plant species may be stipulated in some certificates.
- Retain a diversity of plant species and tree sizes to allow for development of healthy forest in the future.
- Retain non-listed genera for Division 2 – Uniform Thinning in the coastal zone.
- Evidence of wildlife can be found through scats, food scraps, scars and markings on trees, ground scrapings, and nests etc.
- Legally felled timber may be sold.
- Pasture improvements to thinned areas are permissible, e.g. fertiliser application or over-sowing, via the Allowable activities provisions of the LLS Act, as long as these improvements do not result in a substantial long-term decline in the structure and composition of the native vegetation present or significantly degrade the site. For example, over-sowing of non-persistent annual varieties to prevent long term change in vegetation composition is permitted. For further information on this, please contact Local Land Services.

How to apply the Pasture Expansion part of the Code using best practice methods

1. Determining vegetation density retention

If you have obtained the necessary authorisation from Local Land Services, the first thing you have to do is work out how much vegetation should be removed and where and what should be retained.

Local Land Services can provide information on:

- the vegetation type and formation for a treatment area e.g. forest, woodland, scrub/tall heath
- whether the treatment area contains an Endangered Ecological Community (EEC) or Vulnerable Ecological Community (VEC)
- the correct minimum stem density for a specific treatment area (as per the certificate) or for the vegetation formation (as per the legislation).

For **uniform thinning** you have two options.

Option A:

Work out the average distance between woody plants for the vegetation formation in the treatment area and keep this distance in mind when removing trees. **Note: only include distances between plant genera that can be thinned according to the Pasture Expansion certificate.**

For example, if the minimum stem density to be retained is 225 stems per hectare, calculate as follows:

$1 \text{ hectare} = 10,000 \text{ square metres}$. Divide 10,000 by 225 = 44.4. The square root of 44.4 = 6.66 metres.

This is the minimum average spacing between retained trees.

A laser rangefinder can be used to determine distance between trees.

Option B:

Count the number of woody plants in a 50m by 50m square. **Note: only include plant genera that can be thinned according to the Pasture Expansion certificate.**

Multiply the total by four to give a rough count per hectare. Then work out the difference between this count and the minimum stem density for the treatment area. The difference is the number of trees that can be removed in an evenly distributed manner.

For example, a 50m by 50m square contains 360 woody plants that can be thinned under the terms of the certificate. The vegetation formation is dry sclerophyll, neither EEC nor VEC, therefore the minimum stem density of trees to retain is 150 stems per hectare.

$360 \times 4 = 1440 = \text{average number of woody plants per hectare}$.
 $1440 - 150 (\text{minimum stem density}) = 1290$.

This is the approximate number of woody plants that can be removed in a uniform manner.

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If the treatment area is large, repeat this process across a representative number of sampling sites to determine an average count.

Local Land Services can assist with the processes above. For example, our officers can help you with measurements, demonstrating the use of the calculations on site, or identifying an area that equates to the target stem density.

For mosaic thinning:

Local Land Services can provide an advisory map showing what vegetation can be removed in order to keep 30% canopy cover in evenly dispersed patches of five hectares across the treatment area (refer to Figure 1 below).

Alternatively, draw a sketch map of the treatment area and be aware of its size. Sketch where woody vegetation will be removed and where woody vegetation will be kept. The area where woody vegetation will be kept must be at least 30 per cent of the total area, evenly dispersed in patches of five hectares, and with a minimum of one five hectare patch for every 50 hectares treated or part thereof.

Note: Canopy cover includes the gaps between leaves in the crown of a tree.

2. Method of thinning

Once you have determined the area to be thinned, the next thing you need to do is decide how and when you will undertake the thinning.

Figure 1: A treatment area that is 100 hectares in size will require at least two patches of 5 hectares and a further 20 ha (of any area or shape) that is an evenly dispersed. This meets the 30 per cent retention of the canopy cover in retained patches and clumps requirement.



Grass growth in response to thinning will vary depending on soil, seed bank, species composition, climatic conditions etc.

Thinning in a **staged** process and observing the results over time may help to determine the most effective thinning method and whether there will be suitable pasture growth.

Trees over 90 cm diameter breast height over bark (DBHOB) must be retained.

Refer to the factsheet 'How to measure stem diameter' at www.lls.nsw.gov.au/land-management under 'Resources'.

Woody vegetation to be retained should be labelled, particularly if contractors are used to undertake the thinning. For example, spray paint 'H' on trunks of important habitat trees, or use 'R' for retain. If using contractors to undertake the thinning, it is your responsibility to ensure they are aware of the legislative rules and necessary environmental protections before thinning commences.

During thinning operations it is important to protect soils and reduce run-off, maintain high water quality, and keep groundcover as intact as possible. The most appropriate thinning method (please see Table 2) will be determined by total treatment area, soil, vegetation structure and type, access and cost. Using a variety of thinning methods may be the most suitable approach. No single thinning process or method is suitable for all properties.

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Table 2: Some methods that may be used for thinning woody vegetation

Method	Technique	Advantages	Disadvantages	Disturbance level
Chemical	<p>a, Frilling - staggered axe cuts into sapwood and then stem injection with suitable herbicide. Important not to ringbark so movement of herbi-cide can continue up and down tree (reduces risk of suckering)</p> <p>b, Drilling into sapwood and then stem injection with suitable herbicide</p> <p>c, Foliar (leaf) application of suitable herbicide</p> <p>Note: Always read the herbicide label, follow the instructions and only apply as per the registered label rates for chemical type. Apply to plants in active growth for best results.</p>	<ul style="list-style-type: none"> Useful in areas where other thinning methods aren't practical Selective Allows dying plants to remain in situ allowing wildlife to move and less weed invasion 	<ul style="list-style-type: none"> May be time consuming and labour intensive but can be mechanised for large areas May not be economical for large stands May require follow-up treatment 	Nil
Felling	Chainsaw; may also include herbicide application to cut stumps	<ul style="list-style-type: none"> Selective Can be directional to protect certain trees, plants, hollows etc. 	<ul style="list-style-type: none"> Time-consuming and labour intensive 	Nil
Forest mulcher	A forestry mulching machine processes woody vegetation from the top down creating a mulch layer	<ul style="list-style-type: none"> Mulch layer improves soil and provides groundcover No felled vegetation to remove Good for dense stands of vegetation Selective 	<ul style="list-style-type: none"> Hire or purchase of machinery and contractors may be expensive Felling limited to smaller trees and shrubs 	Nil to minimal
Mechanical harvester	A mechanical harvester cuts the trunks and stems of woody vegetation to around 100 to 150 mm above ground level.	<ul style="list-style-type: none"> Cut trees may be sold as timber Selective Can be directional 	<ul style="list-style-type: none"> Stumps remain Hire or purchase of machinery and contractors may be expensive More suitable for larger trees 	Nil to minimal

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Method	Technique	Advantages	Disadvantages	Disturbance level
Selective Pushing	Linear or meandering pushing of trees using heavy machinery	<ul style="list-style-type: none"> • Relatively selective 	<ul style="list-style-type: none"> • Time-consuming • More difficult in dense stands • Disturbance to soil where roots are lifted • Ineffective on mature trees with large root system 	Can be no more than minimal
Grubbing	Small to medium sized woody species are uprooted using 'grubber' on tractor. Best after rain.	<ul style="list-style-type: none"> • Selective • Removes whole plant 	<ul style="list-style-type: none"> • Time-consuming • More difficult in dense stands • Disturbance to soil where roots are lifted • Ineffective on mature trees with large root system 	Can be no more than minimal
Chaining	Only suitable for mosaic thinning. Chain between 2 tractors. Need to chain both ways and requires follow-up.	<ul style="list-style-type: none"> • More suitable for younger woody vegetation • Logs left on ground may aid pasture growth • Relatively cost-effective 	<ul style="list-style-type: none"> • Soil disturbance and risk of erosion • Non-selective • Logs on ground may reduce pasture access • Ineffective on mature trees with large root system 	Can be no more than minimal (Chain and machinery used will determine disturbance level and it must be no more than minimal)

Note: If mechanical thinning methods are used there may be a lot of plant material generated. This can be left on the ground (as long as it doesn't create a bush fire hazard) which will be better for the soil in the long term but may suppress grass growth in the short term. Removal of the plant matter can be time-consuming and may encourage weed growth due to soil disturbance, but the grass response may be faster.

3. Soil and Erosion Considerations

Points to consider:

- Machinery can compact soils and lead to increased run off and erosion
- Steeper land and longer slopes can lead to greater erosive power of water/run-off
- Some soils are more erodible than others. A useful reference website for soils is eSpade at www.environment.nsw.gov.au/eSpade2Webapp
- Maintain good groundcover—the more organic matter in the soil the better.

- Consider rainfall intensity for the area; more intense rain may lead to more run-off/erosion.

With these points in mind, always:

- ensure proper track and drainage construction and maintenance to reduce erosion
- If using mechanical thinning methods, use walkover techniques when extracting logs-keep machinery blades up, drive as to minimise extra drainage requirements, use existing tracks and lift entire logs off ground to avoid log furrowing

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- piles of logs should be on ridge tops, away from water bodies and have good drainage-maintain good groundcover where possible, e.g. use mulch to cover bare soil.

Ongoing management

Thinning may encourage tree growth in a forest that has stopped growing due to over-competition for light and space, otherwise known as a 'lock-up' state. It may be necessary to control woody vegetation regrowth to allow the pasture grasses to flourish.

Ways to achieve good land management to ensure the best pasture results

- Sustainable grazing with an appropriate grazing regime undertaken in accordance with the Sustainable Grazing allowable activity under Schedule 5A of the LLS Act. Ensure that all necessary infrastructure is in place (i.e. fencelines, troughs, dams, livestock laneways etc.). Sustainable grazing may include over-sowing and applying fertiliser as long as there is no substantial and long-term decline in the structure and composition of the existing native vegetation.
- Ongoing regrowth control (within the term of the certificate).
- Ongoing weed control.
- Ongoing pest animal control.
- Maintenance of soil health.
- Management burning undertaken in accordance with the Environmental Protection Works allowable activity under Schedule 5A of the LLS Act, using suitable timing and frequency appropriate for the forest type and history of fire in the area. **Note: Always plan properly, seek professional advice from the Rural Fire Service and source the correct burn permits.** In some situations, fire may be an appropriate tool to control weeds prior to thinning, for example, Lantana. However, it is non-selective, only an intense fire will kill mature trees, and there are obvious risks associated with fire, such as uncontrolled burning.
- In controlling weeds (including burning) all activities should be undertaken in accordance with the provisions of the Environmental Protection Works allowable activity under Schedule 5A of the LLS Act 2013.
- Monitoring and observation of treatment area(s) to determine best ongoing management methods.

Image 1: Trees marked R for retain and H for hollows.



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Definitions

Agricultural activity - production of crops for commercial purposes, the grazing of livestock for commercial purposes or keeping of animals for the purposes of selling them or their bodily produce.

Allowable activities - activities required for the general, day-to-day management of rural land, as defined by Schedule 5A of the Local Land Services Act 2013 at: www.legislation.nsw.gov.au/#/view/act/2013/51/full

Buffer distances for water bodies - defined by clause 15 of the Land Management (Native Vegetation) Code 2018 at <https://legislation.nsw.gov.au/#/view/regulation/2018/83/whole>.

CEEC - Critically Endangered Ecological Community. An ecological community identified in Part 1 of Schedule 2 to the Biodiversity Conservation Act 2016 at www.legislation.nsw.gov.au/#/view/act/2016/63/full, which is protected due to its declining extent.

Coastal Zone - The local government areas of Ballina, Bega Valley, Bellingen, Byron, Central Coast, Clarence Valley (to the east of the line that follows Summerland Way from the north, then Armidale Road until its intersection with Orara Way, then Orara Way), Coffs Harbour, Eurobodalla, Kempsey, Kiama, Lake Macquarie, Lismore, Maitland, Mid-Coast (except the former area of Gloucester), Nambucca, Port Macquarie-Hastings, Port Stephens, Richmond Valley, Shellharbour, Shoalhaven, Tweed and Wollongong.

EEC - Endangered Ecological Community. An ecological community identified in Part 2 of Schedule 2 to the Biodiversity Conservation Act 2016, which is protected due to its declining extent.

Genera - groupings of taxonomic categories ranking below the family level and above the species level and is the plural of genus, which is the designation of a group of species that are presumed to be closely related and usually exhibit similar physiological characteristics.

Keith vegetation formation - a vegetation formation specified in Schedule 2 of the Land Management Code.

Minimal disturbance - means no greater than 30% of the soil surface and existing groundcover is disturbed (total area) as a result of the clearing.

Nil disturbance - means no greater than 5% of the soil surface and existing groundcover is disturbed (total area) as a result of the clearing.

Sensitive regulated land - Category 2 – sensitive regulated land under the Land Management Framework as mapped on the Native Vegetation Regulatory Map at www.lmbs.nsw.gov.au/Maps/index.html?viewer=NVRMap.

Small holding - means a single landholding in the same ownership that has an area of less than:

- 10 hectares in the case of Central and Coastal Zones of NSW, and
- 40 hectares in the case of the Western Zone.

Treatment area - an area of Category 2-regulated land subject to a current notification made under the Land Management Code or a parcel of land subject to a current voluntary or mandatory code compliant certificate issued under the Land Management Code. A treatment area constitutes the entire contiguous area of land within which clearing under a Division is to occur, as specified in the relevant notification or certificate.

Tree diameter - is measured as diameter at breast height over bark (dbhob). This means the diameter over the bark of the stem measured at 1.3 metres above the ground. If there are multiple stems on a tree, the diameter is measured on the largest stem.

VEC - Vulnerable Ecological Community. An ecological community identified in Part 3 of Schedule 2 to the Biodiversity Conservation Act 2016, which is protected due to its declining extent.

Vulnerable land - Category 2 - vulnerable regulated land under the Land Management Framework as mapped on the Native Vegetation Regulatory Map.

Woody shrubs - any native plant that generally grows to a height greater than 1.3 metres above the ground in its normal growth habit and exhibits a woody, measurable stem.

Other Advice

Local Land Services has specialist land management staff available to answer questions related to this technical guide. Local Land Services can also provide advice on agricultural production, biosecurity, environmental management, travelling stock routes, veterinary assistance and emergencies.

Local Land Services is here to help

Call us: 1300 795 299 and ask for an officer to advise you on land management

Email us: slm.info@lls.nsw.gov.au

Contact us online: www.lls.nsw.gov.au/contact-us

Note: The information in this Technical Guide does not constitute legal advice. Contact your nearest Local Land Services office before undertaking any clearing. The information contained in this publication is based on knowledge and understanding at the time of writing (July 2020). However, because of advances in knowledge, users are reminded to ensure they are using most up to date information. It is advised users should contact Local Land Services to check for currency if they are unsure.