Brief summary of prescriptions for the retention of hollow bearing trees in multiple-use forests throughout Australia

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Preamble

The purpose of this document is a quick reference guide to very briefly summarise current wildlife habitat provisions for hollow resources in standing trees within timber harvest areas in multiple-use forests throughout Australia. In so doing this serves to update and make more comprehensive the summary table presented by Gibbons and Lindenmayer (1997). More general prescriptions and/or guidelines intended for other purposes (e.g. crop or seed trees, etc) are not included here.

The summaries are generalised as briefly as possible and as a consequence may not completely communicate all of the complexities addressed in the source documents and /or what happens in practice. The information is summarised by State, region and forest type. Using a standardised format of headings each summary is limited to no more than one page. The information summarised under the heading, ‘Habitat retention at multiple scales’ is intended to put habitat trees in harvest cells in context with the other wildlife habitat provisions which occur across multiple scales.

The audience for this document is intended to be the RPCC, all members of the RWG4, and the State Agencies that are responsible for and/or manage wildlife conservation and native forest timber harvesting within Australia.

State - Region

Western Australia - Southwest

Forest type

Jarrah (*E. marginata*)

Number of retained trees per ha

5 Primary,
6-8 Secondary

Selection criteria

Primary: >70cm dbhob; crown senescence classes 3-8 [moderately to highly senescent]; visible hollows or use; avoid extreme lean, hollow-butts and termites; expected long-term survival; no tree species preference.

Secondary: 30-70cm dbhob; crown senescence classes 2-4 [moderately senescent]; potential to develop into primary habitat trees

Configuration of retained trees

Dependent on where the most appropriate trees are situated within the coupe. Small groups of primary and secondary habitat trees are preferred

Size of harvesting units

Gap release: <10 ha
Shelterwood: typically less than 200 ha

Habitat retention at multiple scales

Cell (~<30 ha): Primary and secondary habitat trees, hollow logs and balga (*Xanthorrhea preissii*), large marri trees,
Coupe (~10-1000+ ha): River and stream zones, Old-growth forest, Travel route zones, diverse ecotype zones (DEZ), Less well reserved vegetation complexes, Poorly reserved forest ecosystems, Regional Forest Agreement accredited linkage zones temporary exclusion areas (TEAS) **Landscape (~1000 – 500 000 ha):** Fauna habitat zones (FHZ), 200 ha each, located two to four kilometres apart)
Region (~>500 000 ha): National Parks, Nature Reserves, Conservation Parks, etc

Note: These scale ranges are somewhat arbitrary. In practice these strategies operate across the defined scales.

References

CALM (2004)
Whitford and Stoneman (2004)

State - Region

Western Australia - Southwest

Forest type

Karri (*E. diversicolor*)

Number of retained trees per ha

Karri stands: Primary habitat trees provided in adjoining informal reserve. Two (2) secondary habitat trees per hectare.

Mixed karri / jarrah forest: 5 primary per hectare, jarrah or marri preferred. Two (2) secondary habitat trees per hectare, except in clearfell where marri has been retained.

Selection criteria

Primary: > 70 cm dbhob; mature to senescent; visible hollows or use or broken branch stubs with the potential to develop hollows; minimum amount of hollow butt, avoid extreme lean and termites.

Secondary
Karri stands: trees 40-80 years of age
Mixed karri / jarrah stands: criteria same as for jarrah

Habitat trees not retained in immature even-aged stands.

Configuration of retained trees

Dependent on where the most appropriate trees are situated within the coupe. Small groups of primary and secondary habitat trees are preferred.

Size of harvesting units

Clearfell: < 20 hectares in regrowth forest, < 40 hectares in mature and two-tiered forest.

Habitat retention at multiple scales

Cell (~<30 ha): Primary and secondary habitat trees, large marri trees
Coupe (~10-1000+ ha): River and stream zones, Old-growth forest, Travel route zones, diverse ecotype zones (DEZ), less well reserved vegetation complexes, poorly reserved forest ecosystems, Regional Forest Agreement accredited linkage zones, temporary exclusion areas (TEA)
Landscape (~1000 – 500 000 ha): Fauna habitat zones (FHZ)
Region (~>500 000 ha): National Parks, Nature Reserves, Conservation Parks, etc

Note: These scale ranges are somewhat arbitrary. In practice these strategies operate across the defined scales.

References

CALM (2005)

State - Region

Tasmania – Whole State, State and Private forest

Forest type/Silvicultural practice

Forest types (predominantly wet eucalypt with dense understorey and some rainforest) subject to clear felling followed by regeneration to native forest.
Forest types (predominantly *E.regnans, E. obliqua, E. dele* with at least 500 stems per hectare larger than 17cm dbhob) subject to commercial thinning.

Prescription for retention of hollow bearing trees/ Number of retained trees per ha

Patches of trees of approximately 50mx20m (wildlife habitat clumps) retained every 200m along the harvest boundary (where mature forest is not reserved). Patches contain at least 2-3 habitat trees and other trees of a range of ages.

Selection criteria

A habitat tree is defined as a mature living tree with features of value to fauna (e.g. hollows). They are selected on the basis of form, size and the presence of hollows.
Other trees in the clump are selected for their potential to develop hollows.

Configuration of retained trees

Wildlife habitat clumps are retained along the boundary of the coupe.
Spacing of 200m or where the most suitable trees are found.
Consideration is also given to locating clumps where best protected from harvesting activities and high intensity burns (see Appendix 1 for further details).

Size of harvesting units

50 – 100ha

Habitat retention at multiple scales

Coupe(50 - 100ha) - Wildlife habitat clumps, streamside reserves, wildlife habitat strips, other forest practices informal reserves (e.g. flora, threatened fauna geomorph, landscape, archaeology and soil and water reserves), unloggable areas (steep slopes, rocky knolls).
Forest block (33,700ha) - Biodiversity spines (public land), fauna and flora special management zones (SMZ), wildlife habitat strips (minimum of 100m wide strips of reserved mature forest retained at a rate of 3-5km throughout production forest), streamside reserves, and other informal reserves.
Landscape/Catchment (>200 000ha) – CAR reserve system on public and private land. For example, National Parks, Forest reserves, biodiversity spines (State forest), conservation covenants, fauna and flora special management zones (SMZ), wildlife habitat strips (minimum of 100m wide strips of reserved mature forest retained at a rate of 3-5km throughout production forest), streamside reserves, and other informal reserves.

References

Forestry Commission Tasmania (1994)
Taylor (1991)
Commonwealth of Australia and State of Tasmania (1997)
Forest Practices Board (2000)
Forest Practices Board (2001)

State - Region

Tasmania – Whole State, State and Private forest

Forest type/Silvicultural practice

Forest types (predominantly dry) subject to partial logging (including seed tree retention, shelterwood, advanced growth retention, firewood operations, potential sawlog retention).

Prescription for retention of hollow bearing trees/ Number of retained trees per ha

Patches of trees (wildlife habitat clumps) of approximately 0.09ha retained at a rate of 1 clump per 5ha. Patches contain at least 2-3 habitat trees and other trees of a range of ages.
Approximately 0.4 - 0.6 habitat trees per ha and on average 2 'potential' habitat trees per ha.
Rate of patch retention increased in areas important for threatened fauna.
Unknown number of hollow-bearing trees also retained as part of the partial harvest, silvicultural system employed.

Selection criteria

A habitat tree is defined as a mature living tree with features of value to fauna (e.g. hollows). They are selected on the basis of form, size and the presence of potential hollows observed from the ground.
Other trees in the clump are selected for their potential to develop hollows.

Configuration of retained trees

A preference for wildlife habitat clump placement throughout the harvest area where suitable trees are found. Consideration is also given to locating clumps where best protected from harvesting activities and regeneration/fuel reduction burns (see Appendix 1 for further details)

Size of harvesting units

50 – 100ha

Habitat retention at multiple scales

Coupe (50-100 ha) – Habitat trees and potential habitat trees retained within the harvest area as a result of the silvicultural method used.
Wildlife habitat clumps, streamside reserves, wildlife habitat strips, other forest practices informal reserves (e.g. flora, threatened fauna geomorph, landscape, archaeology and soil and water reserves), unloggable areas (steep slopes, rocky knolls).
Forest block (33,700ha) - Biodiversity spines (State forest), fauna and flora special management zones (SMZ), wildlife habitat strips (minimum of 100m wide strips of reserved mature forest retained at a rate of 3-5km throughout production forest), streamside reserves, and other large informal reserves.
Landscape/Catchment (?200 000ha) – CAR reserve system on public and private land. For example, National Parks, Forest reserves, biodiversity spines (State forest), conservation covenants, fauna and flora special management zones (SMZ), wildlife habitat strips (minimum of 100m wide strips of reserved mature forest retained at a rate of 3-5km throughout production forest), streamside reserves, and other informal reserves.

References

Taylor (1991); Forestry Commission Tasmania (1994); Duhig *et al* (2000); Forest Practices Board (2000); Forest Practices Board (2001)

State - Region

Tasmania – Whole State, State and Private forest

Forest type/Silvicultural practice

Harvest of specialty timbers on State forest

Prescription for retention of hollow bearing trees/ Number of retained trees per ha

No ‘in-coupe’ retention measures required

State - Region
Victoria - Whole State

Forest type
All

Number of retained trees per ha
See table below

Selection criteria
See table below

Configuration of retained trees
Depends on availability; some local guidance in particular management plans

Size of harvesting units
<40 ha

Habitat retention at multiple scales
Under review

References
Government of Victoria 1996; State Forest Flora & Fauna Habitat Management Working Group, 2002; Department of Sustainability & Environment 2005; management plans for each region.

Table 1. Summary of Victorian prescriptions for retaining hollow-bearing trees for wildlife habitat in multiple-use native forests.

Region	Forest type	Number of retained trees per ha	Selection criteria	Configuration of retained trees
All regions	All	See below	See below	Depends on availability; some local guidance in particular management plans
East Gippsland	All	4 – 5 trees per ha	Seed trees currently left should be counted towards habitat tree numbers.	
Tambo	Ash/HEMS	4 – 5 trees per ha		
	Mixed Species	4 – 5 trees per ha	Seed trees currently left should be counted towards habitat tree numbers.	
Central Gippsland	Ash/HEMS	All trees originating before 1900 40+ trees per 10 ha for trees originating from 1900 onwards	Current prescription agreed in the Central Highlands FMP should be applied.	Current prescription in the Central Highlands FMP is applied.
	Mixed Species	4 – 5 trees per ha		
Central	Ash/HEMS	All trees originating before 1900 40+ trees per 10 ha for trees originating from 1900 onwards	Current prescription agreed in the Central Highlands FMP should be applied.	Current prescription in the Central Highlands FMP is applied.
	Mixed Species	40+ trees per 10 ha		
Dandenong	Ash/HEMS	All trees originating before 1900 40+ trees per 10 ha for trees originating from 1900 onwards	Current prescription agreed in the Central Highlands FMP should be applied.	
	Mixed Species	40+ trees per 10 ha		
Benalla / Mansfield	Ash/HEMS	4 – 5 trees per ha		
	Mixed Species	4 – 5 trees per ha		
North East (Wangaratta / Wodonga)	Ash/HEMS	4 – 5 trees per ha		
	Mixed Species	4 – 5 trees per ha		
Otways	All	5 trees per ha (net logged); 10 trees per ha (gross area logged)		
Midlands	All	3 trees per ha		
Mid Murray	All	20 trees/ 10 ha (50- 100 cm DBH) 20 trees/ 10 ha (100-150 cm DBH) retain all trees (> 150 cm DBH), modified in Mid Murray West.	Mid Murray west requires retention of all trees > 100 cm DBHOB.	
Bendigo	All	Between 6 and 14 trees per ha as follows: 2 + trees per ha (>= 60 cm DBH) 2 + trees per ha (40 - 60 cm DBH) 2 + trees per ha (20 - 40 cm DBH) Retain all trees > 80 cm DBH	Smaller diameter trees substitute if insufficient larger trees are present.	
Horsham	All	10 trees per 10 ha 5 potential habitat trees per 10 ha 5 dead trees with hollows per 10 ha	Any additional trees above the 10 trees per 10 ha should be retained in place of potential habitat and dead trees.	
Portland	All	Retain habitat trees to a basal area of 2 – 4 m^2/ha Specific prescriptions for Yellow Bellied Glider.	Group selection.	
Mildura	River Red Gum	20 trees/ 10 ha (50-100 cm DBH) 20 trees/ 10 ha (100-150 cm DBH) retain all trees (< 150 cm DBH)		

State - Region

New South Wales - South-east

Forest type

At least 37 forest types have been classified as either “high”, “moderate” or “low” quality habitat (based mainly on the requirements of arboreal marsupials)

Number of retained trees per ha

High quality habitat/non-regrowth zones: 12 hollow-bearing trees, plus 12 hollow tree recruits, per 2 ha.
Moderate quality habitat/non-regrowth zones: 8 hollow-bearing trees, plus 8 hollow tree recruits, per 2 ha.
Low quality habitat/non-regrowth zones: 4 hollow-bearing trees, plus 4 hollow tree recruits, per 2 ha.

In areas classified as a Regrowth Zone, the retention of hollow-trees and recruits is less, varying from 1-3 hollow trees per ha when such trees are present, to 2-6 recruits per ha.

Additional tree retention applies when (safe) dead stags are present, and to meet the additional requirements of certain species (e.g. yellow-bellied glider feed trees)

Selection criteria

Retained hollow trees are among the largest live trees available.

Recruits should be mature if possible and have good crown development.

Configuration of retained trees

Hollow- bearing trees and recruits are scattered throughout the net logged area

Size of harvesting units

20-50 ha coupes, alternately cut, within compartments of approx. 200 ha in size
Permanent exclusion zones along all mapped, and some unmapped, (1:25,000 scale) drainage lines

Habitat retention at multiple scales

Numerous other exclusions based on plant community types (e.g. rainforest, wetlands, heath and scrub) mapped areas of old growth forest, rocky outcrops and cliffs, mapped ridge and headwater habitat, and many additional species specific prescriptions e.g. owl nest and roost zone exclusions

References

http://www.racac.nsw.gov.au/rfa/pdf/Eden_TSL.pdf

State - Region
New South Wales - Upper North-east

Forest type
All

Number of retained trees per ha
Non-regrowth zones: a minimum of 10 hollow-bearing trees, plus 10 hollow tree recruits, per 2 ha.

In areas classified as a Regrowth Zone: *up to* 10 hollow-trees (if available) and the same number of recruits to be retained per 2 ha

Additional tree retention applies when (safe) dead stags are present, and to meet the additional requirements of certain species (e.g. yellow-bellied glider feed trees)

Selection criteria
Retained hollow trees are among the largest live trees available.

Recruits should be mature if possible and have good crown development.

Configuration of retained trees
Hollow- bearing trees and recruits are scattered throughout the net logged area

Size of harvesting units
Approx. 20-50 ha coupes within compartments of approx. 200 ha in size

Habitat retention at multiple scales
Permanent exclusion zones along all mapped, and some unmapped, (1:25,000 scale) drainage lines

Numerous other exclusions based on plant community types (e.g. rainforest, wetlands, heath and scrub) mapped areas of old growth forest, rocky outcrops and cliffs, mapped ridge and headwater habitat, and many additional species specific prescriptions e.g. owl nest and roost zone exclusions

References
http://www.racac.nsw.gov.au/rfa/pdf/npws_tsl_une.pdf

State - Region

New South Wales - Lower North-east

Forest type

All

Number of retained trees per ha

Non-regrowth zones: a minimum of 10 hollow-bearing trees, plus 10 hollow tree recruits, per 2 ha.

In areas classified as a Regrowth Zone: *up to* 10 hollow-trees (if available) and the same number of recruits to be retained per 2 ha

Additional tree retention applies when (safe) dead stags are present, and to meet the additional requirements of certain species (e.g. yellow-bellied glider feed trees)

Selection criteria

Retained hollow trees are among the largest live trees available.

Recruits should be mature if possible and have good crown development.

Configuration of retained trees

Hollow- bearing trees and recruits are scattered throughout the net logged area

Size of harvesting units

Approx. 20-50 ha coupes within compartments of approx. 200 ha in size

Habitat retention at multiple scales

Permanent exclusion zones along all mapped, and some unmapped, (1:25,000 scale) drainage lines

Numerous other exclusions based on plant community types (e.g. rainforest, wetlands, heath and scrub) mapped areas of old growth forest, rocky outcrops and cliffs, mapped ridge and headwater habitat, and many additional species specific prescriptions e.g. owl nest and roost zone exclusions

References

http://www.racac.nsw.gov.au/rfa/pdf/npws_tsl_licence.pdf

State - Region
New South Wales - South Coast

Forest type
All

Number of retained trees per ha
Similar to the above

Selection criteria
Similar to the above

Configuration of retained trees
Similar to the above

Size of harvesting units
Similar to the above

Habitat retention at multiple scales
Similar to the above

References
http://www.racac.nsw.gov.au/rfa/pdf/sc_tsl.pdf

State - Region
New South Wales - Tumut region

Forest type
All

Number of retained trees per ha
Similar to the above

Selection criteria
Similar to the above

Configuration of retained trees
Similar to the above

Size of harvesting units
Similar to the above

Habitat retention at multiple scales
Similar to the above

References
http://www.racac.nsw.gov.au/rfa/pdf/tumut_tsl.pdf

State - Region
New South Wales - Western

Forest type

Number of retained trees per ha

Selection criteria

Configuration of retained trees

Size of harvesting units

Habitat retention at multiple scales

References
Prescriptions currently being negotiated with regulators

State - Region

Queensland - Whole State

Forest type

Coastal wet/coastal moist hardwood forests

Number of retained trees per ha

A minimum of six live habitat trees and two recruitment trees per hectare will be designated and retained throughout the harvesting area.

Selection criteria

The selection of habitat trees must aim at retaining living trees that are > 80cm dbhob and have multiple hollows. At least one hollow has to be 10cm in diameter or greater. Selected habitat trees must be present in the stand as dominants or co-dominants, preferably having a healthy crown, deeply fissured bark, mistletoe and epiphytes. A 'hollow' must be visible and > 2m above the ground in a living tree. Where there are more than the required number of habitat trees that meet this standard, there is a hierarchy to follow in selection of habitat trees, based on size, spacing, species. Selection of recruitment trees is based on a hierarchy of size, spacing species, damage characteristics.

Configuration of retained trees

Under standard harvesting practice, where habitat trees are provided uniformly on harvesting areas, additional recruitment trees must be retained according to Table 3****** (see below) where >50 percent of the basal area of the stand is to be removed. Where the required numbers of these additional trees are not available in a particular size class, trees must be retained in the size class below at a rate of 1.5 trees for every tree below the required number (or round up if the number is a fraction). Where the required numbers of these additional trees are not available in a particular size class, trees must be retained in the size class below at a rate of 1.5 trees for every tree below the required number (or round up if the number is a fraction).

Size of harvesting units

No "coupe" logging occurs in Qld. Harvesting is restricted by exclusion zones (water courses, steepness, etc.). Harvesting units are MUIDS. Low impact tree selection is the norm.

Habitat retention at multiple scales

All trees greater than 60cm dbh must be retained as habitat trees or recruitment trees in areas designated as **wetlands** and within a 30m exclusion zone around wetlands (see definition of a wetland in Schedule 3 watercourse protection). No more than 50 percent of the habitat trees and recruitment habitat trees in any one hectare can be counted from exclusion zones.
Trees retained because they contain active bird nests, other native fauna or arboreal termite nests/mounds with hollows, and trees retained under SMP's (e.g. yellow bellied glider feed trees), may be counted as habitat or recruitment trees provided they meet the selection criteria. Standing dead trees and stags with hollows and/or deeply fissured bark or cracks must be retained unless they are a safety or fire hazard. Standing dead trees and stags that contain an active nest or any raptor nest must be retained.

References

Code of Practice for Native Forest Timber Production, The State of Queensland, EPA, 2002

State - Region

Queensland - Whole State

Forest type

Coastal/inland dry sclerophyll forests within the predicted greater glider range

Number of retained trees per ha

A minimum of six live habitat trees and two recruitment trees per hectare will be designated and retained throughout the harvesting area.

Selection criteria

The selection of habitat trees must aim at retaining living trees that are > 80cm dbhob and have multiple hollows. At least one hollow has to be 10cm in diameter or greater. Selected habitat trees must be present in the stand as dominants or co-dominants, preferably having a healthy crown, deeply fissured bark, mistletoe and epiphytes. A 'hollow' must be visible and > 2m above the ground in a living tree. Where there are more than the required number of habitat trees that meet this standard, there is a hierarchy to follow in selection of habitat trees, based on size, spacing, species. Selection of recruitment trees is based on a hierarchy of size, spacing species, damage characteristics.

Configuration of retained trees

Under standard harvesting practice, where habitat trees are provided uniformly on harvesting areas, additional recruitment trees must be retained according to Table 3**** (see below) where >50 percent of the basal area of the stand is to be removed. Where the required numbers of these additional trees are not available in a particular size class, trees must be retained in the size class below at a rate of 1.5 trees for every tree below the required number (or round up if the number is a fraction). Where the required numbers of these additional trees are not available in a particular size class, trees must be retained in the size class below at a rate of 1.5 trees for every tree below the required number (or round up if the number is a fraction).

Size of harvesting units

No "coupe" logging occurs in Qld. Harvesting is restricted by exclusion zones (water courses, steepness, etc.). Harvesting units are MUIDS. Low impact tree selection is the norm.

Habitat retention at multiple scales

All trees greater than 60cm dbh must be retained as habitat trees or recruitment trees in areas designated as **wetlands** and within a 30m exclusion zone around wetlands (see definition of a wetland in Schedule 3 watercourse protection). Trees retained because they contain active bird nests, other native fauna or arboreal termite nests/mounds with hollows, and trees retained under SMP's (e.g. yellow bellied glider feed trees), may be counted as habitat or recruitment trees provided they meet the selection criteria.
Standing dead trees and stags with hollows and/or deeply fissured bark or cracks must be retained unless they are a safety or fire hazard. Standing dead trees and stags that contain an active nest or any raptor nest must be retained.

References

Code of Practice for Native Forest Timber Production, The State of Queensland, EPA, 2002

State - Region

Queensland - Whole State

Forest type

Coastal/inland dry sclerophyll forests outside the predicted greater glider range

Number of retained trees per ha

A minimum of four live habitat trees and one recruitment tree per hectare will be designated and retained throughout the harvesting area.

Selection criteria

The selection of habitat trees must aim at retaining living trees that are > 80cm dbhob and have multiple hollows. At least one hollow has to be 10cm in diameter or greater. Selected habitat trees must be present in the stand as dominants or co-dominants, preferably having a healthy crown, deeply fissured bark, mistletoe and epiphytes. A 'hollow' must be visible and > 2m above the ground in a living tree. Where there are more than the required number of habitat trees that meet this standard, there is a hierarchy to follow in selection of habitat trees, based on size, spacing, species. Selection of recruitment trees is based on a hierarchy of size, spacing species, damage characteristics.

Configuration of retained trees

Under standard harvesting practice, where habitat trees are provided uniformly on harvesting areas, additional recruitment trees must be retained according to Table 3****** (see below) where >50 percent of the basal area of the stand is to be removed. Where the required numbers of these additional trees are not available in a particular size class, trees must be retained in the size class below at a rate of 1.5 trees for every tree below the required number (or round up if the number is a fraction). Where the required numbers of these additional trees are not available in a particular size class, trees must be retained in the size class below at a rate of 1.5 trees for every tree below the required number (or round up if the number is a fraction).

Size of harvesting units

No "coupe" logging occurs in Qld. Harvesting is restricted by exclusion zones (water courses, steepness, etc.). Harvesting units are MUIDS. Low impact tree selection is the norm.

Habitat retention at multiple scales

All trees greater than 60cm dbh must be retained as habitat trees or recruitment trees in areas designated as **wetlands** and within a 30m exclusion zone around wetlands (see definition of a wetland in Schedule 3 watercourse protection). Trees retained because they contain active bird nests, other native fauna or arboreal termite nests/mounds with hollows, and trees retained under SMP's (e.g. yellow bellied glider feed trees), may be counted as habitat or recruitment trees provided they meet the selection criteria.
Standing dead trees and stags with hollows and/or deeply fissured bark or cracks must be retained unless they are a safety or fire hazard. Standing dead trees and stags that contain an active nest or any raptor nest must be retained.

References

Code of Practice for Native Forest Timber Production, The State of Queensland, EPA, 2002

State - Region

Queensland - Whole State

Forest type

Inland cypress forests

Number of retained trees per ha

Where available, a minimum of two live habitat trees and one recruitment tree per hectare will be designated and retained throughout the harvesting area. Where the number of habitat trees available does not meet the required standards, additional recruitment habitat trees must be selected according to Table 2¶ (see below).

Selection criteria

The selection of habitat trees must aim at retaining living trees that are > 80cm dbhob and have multiple hollows. At least one hollow has to be 10cm in diameter or greater. Selected habitat trees must be present in the stand as dominants or co-dominants, preferably having a healthy crown, deeply fissured bark, mistletoe and epiphytes. A 'hollow' must be visible and > 2m above the ground in a living tree. Where there are more than the required number of habitat trees that meet this standard, there is a hierarchy to follow in selection of habitat trees, based on size, spacing, species. Selection of recruitment trees is based on a hierarchy of size, spacing species, damage characteristics.

Configuration of retained trees

Under standard harvesting practice, where habitat trees are provided uniformly on harvesting areas, additional recruitment trees must be retained according to Table 3****** (see below) where >50 percent of the basal area of the stand is to be removed. Where the required numbers of these additional trees are not available in a particular size class, trees must be retained in the size class below at a rate of 1.5 trees for every tree below the required number (or round up if the number is a fraction). Where the required numbers of these additional trees are not available in a particular size class, trees must be retained in the size class below at a rate of 1.5 trees for every tree below the required number (or round up if the number is a fraction).

Size of harvesting units

No "coupe" logging occurs in Qld. Harvesting is restricted by exclusion zones (water courses, steepness, etc.). Harvesting units are MUIDS. Tree selection is the norm.

Habitat retention at multiple scales

All trees greater than 60cm dbh must be retained as habitat trees or recruitment trees in areas designated as **wetlands** and within a 30m exclusion zone around wetlands (see definition of a wetland in Schedule 3 watercourse protection). Trees retained because they contain active bird nests, other native fauna or arboreal termite nests/mounds with hollows, and trees retained under SMP's (e.g. yellow bellied glider feed trees), may be counted as habitat or recruitment trees provided they meet the selection criteria.
Standing dead trees and stags with hollows and/or deeply fissured bark or cracks must be retained unless they are a safety or fire hazard. Standing dead trees and stags that contain an active nest or any raptor nest must be retained.

References

Code of Practice for Native Forest Timber Production, The State of Queensland, EPA, 2002

¶ Table 2 from Queensland COP, Schedule 6

Coastal Wet/Coastal Moist Hardwood (& areas within the range of the greater glider)		Coastal/Inland Dry Sclerophyll		Cypress	
Number of habitat trees available/ha	Number of recruitment trees/ha	Number of habitat trees available/ha	Number of recruitment trees/ha	Number of habitat trees available/ha	Number of recruitment trees/ha
6	2	4	1	2	1
5	4	3	3	1	3
4	5	2	4	0	4
3	7	1	6		
2	8	0	7		
1	10				
0	11				

Table 2 - Selection of Habitat and Recruitment Trees

**** Table 3 from Queensland COP, Schedule 6**

Size class (dbh in cm)	Number of additional recruitment trees to be retained per hectare
60 - 70	2
50 - 60	3
40 - 50	4
30 – 40	5
20 – 30	6
10 – 20	9

Table 3 - Additional recruitment trees where >50 percent of basal area is removed

References

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APPENDIX 1. TASMANIAN WILDLIFE HABITAT CLUMPS

Forest Practices Board
FAUNA TECHNICAL NOTE SERIES
No. 7

Wildlife Habitat Clumps

(version 17.10.02)

The *Fauna Technical Note Series* provides supplementary information and technical explanation for Forest Practices Officers on commonly encountered fauna management issues in production forests. These technical notes are advisory guidelines and do not constitute additions/alterations to the *Forest Practices Code*.

Background

The *Forest Practices Code* and *Regional Forest Agreement* requires that hollow-dependent fauna are taken into account in the planning and conducting of timber harvesting activities. It prescribes different rates of retention of habitat trees for different situations. This technical note is intended to clarify the requirements for wildlife habitat clump (WHC) retention for different silvicultural regimes, and to better define some of the associated terminology.

The flow diagram can be used to select the forestry activity being planned and by following through the diagram, a final prescription for habitat tree retention can be obtained.

Most forestry situations are included. However, there will be situations where further consultation with the Forest Practices Board Zoology Section will be necessary to decide the requirements for habitat tree retention.

Further information can be obtained from Taylor (1991) “Fauna Conservation in Production Forests in Tasmania” or by contacting the Forest Practices Board Senior Zoologist.

Using the Flow Diagram

Start at the top of the flow diagram by choosing the appropriate forestry activity. **Any activities not covered by the flow diagram should be referred to the Forest Practices Board Zoology Section**.
Please refer to the definitions provided in this technical note to assist in using the flow diagram and prescriptions. **Note that the guidelines for prescriptions for in-coupe and boundary retention of wildlife habitat clumps are provided as part of this technical note.**

Combining Special Values

WHCs can be used to target other special values requirements. For example, a WHC can be placed over a sawmill site requiring protection or a location of a threatened plant. However, where this is done, WHCs should still contain 2-3 habitat trees and a range of ages of other trees.

Using Wildlife Habitat Clumps to target Threatened Species Requirements

WHCs are primarily aimed at maintaining biodiversity values (i.e. non-threatened species) of an area by providing local refugia and by enhancing the ability of species to recolonise logged areas. In some situations, however, retention of WHCs may be recommended to protect certain habitat important for threatened species e.g. decaying logs for velvet worms, deep leaf litter patches for stag beetles, etc. In some situations it may be that a modified form of habitat tree retention is required for some species or forest types e.g. single tree retention of all ages classes of blue gum for swift parrot throughout an entire coupe. The Forest Practices Board Zoology Section or the *Threatened Fauna Adviser* Program will provide such variation to the standard *Forest Practices Code* provisions where necessary.

Definitions

The following definitions are provided for use with the flow diagram and prescriptions:

"Habitat Tree"

A habitat tree is a mature living tree selected to be retained in a coupe because it has features of special value for fauna (e.g. hollows). Habitat trees should be selected on the basis of size and the presence of hollows or the potential to develop hollows over time.

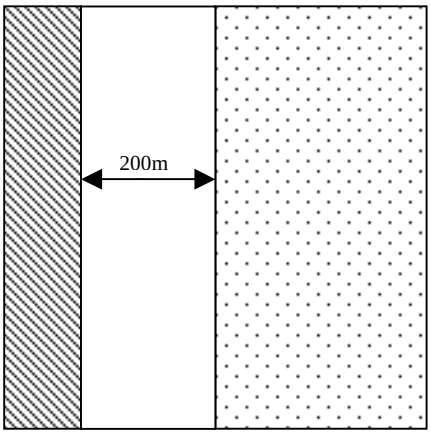
"Wildlife Habitat Clump"

A wildlife habitat clump is an area containing habitat trees set aside in a coupe to aid in the maintenance of fauna habitat diversity.

"Reserve"

The flow diagram refers to "reserved areas". This is intended to refer to areas of retained forest which will remain unlogged for several decades e.g. in the order of 60-100 years. Reserves on the boundary of coupes include formal reserves such as Forest Reserves, informal reserves such as wildlife habitat strips and other excluded areas such as streamside reserves. These areas should not be considered as "reserves" when using the flow diagram if they do not contain habitat trees e.g. buttongrass moorland, grassland, rainforest, etc. Areas set aside from logging due to silvicultural or operational constraints (e.g. steep country or non-commercial forest) can be considered as reserves when using the flow diagram provided that these areas contain suitable habitat trees. Reserves within coupes include such areas as streamside reserves (provided they contain habitat trees) and other retained areas for special values such as landscape or archaeological reserves.

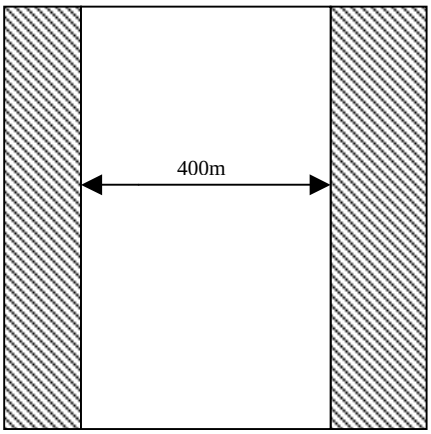
"200m Rule" For In-coupe Prescription



Retained mature forest containing habitat trees e.g. Wildlife Habitat Strip or Stream Side Reserve.

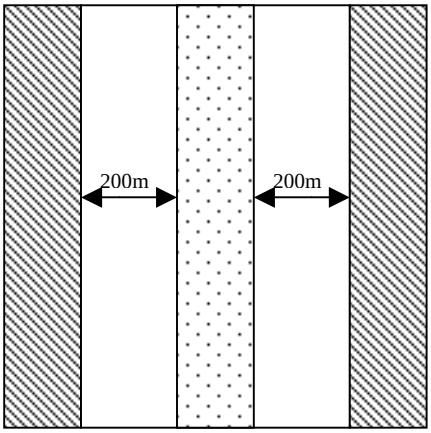
Area within which WHCs are to be retained

e.g. Coupe is **50**ha
Area within 200m of reserves is **20**ha
Therefore AREA REQUIRING WHCS IS 30ha



Retained mature forest containing habitat trees e.g. Wildlife Habitat Strip or Stream Side Reserve.

All of coupe is within 200m of reserves
therefore NO WILDLIFE HABITAT CLUMPS ARE REQUIRED.



Retained mature forest containing habitat trees e.g. Wildlife Habitat Strip or Stream Side Reserve.

Area within which WHCs are to be retained

e.g. Coupe is **50**ha
Area within 200m of reserves is **40**ha
Therefore AREA REQUIRING WHCS IS 10ha

Further reading

Taylor (1991) *Fauna Conservation in Production Forests in Tasmania*. Forestry Commission, Tasmania.

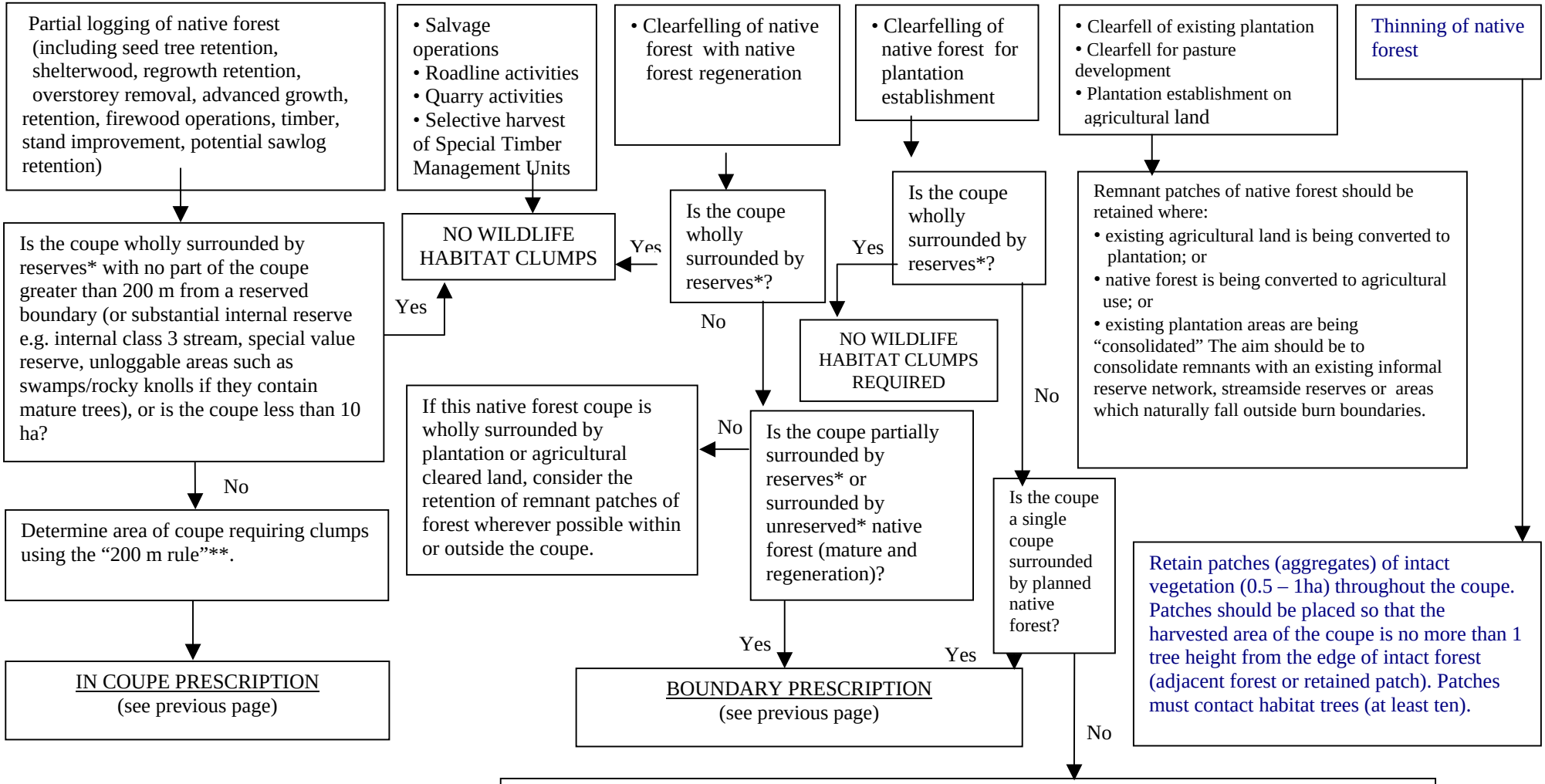
IN COUPE PRESCRIPTION

- Apply the '200m rule' to determine the area within the coupe requiring the retention of WHCs.
- Retain WHCs at a rate of 1 clump every 5 ha in the area of the coupe in which WHCs are required.
- In harvest areas where a large number of WHCs are required, consideration should be given to consolidating WHCs (e.g. consider halving the number of WHCs but including twice the number of habitat trees OR retaining areas such as drainage lines or fringes of forest adjacent to swamps).
- In the situation where a harvest area does not contain any habitat trees, WHCs should include the most mature trees present.
- WHCs should contain at least 2-3 mature trees with hollows (i.e. habitat trees) and a range of other ages of trees/shrubs.
- The range of tree species occurring in the harvest area should be represented within the WHCs.
- The WHCs should be placed to include the range of habitats within the harvest area (e.g. rocky knolls, swampy patches, slopes, flats).
- Ensure WHCs are protected from harvesting activities and high intensity burns. Note that light top disposal burning activities within partially logged coupes or fuel reduction burning activities over a large area is acceptable provided, where possible, that the intensity of burning is minimised within WHCs.
- Ensure WHCs are marked on the FPP map and are flagged on the ground. It is recommended that standard colours are used to flag WHCs and that an appropriately trained person (e.g. FPO or FLO) marks WHCs prior to the commencement of operations.
- Ensure prescriptions for retention of WHCs are included in the FPP and explained to contractors. Prescriptions for WHCs may need to be in several sections of the FPP including felling, conservation of other values and reforestation (particularly burning) sections.
- See pp 95-97 of "Fauna Conservation in Production Forests in Tasmania" for more detail and Figure 1 of this technical note.

BOUNDARY PRESCRIPTION

- Retain WHCs in patches of approx 50 m x 20 m along the harvest boundary where mature forest is not reserved.
- Retain WHCs at a rate of 1 clump every 200 m. WHCs should be placed in eucalypt forest rather than in non-forest vegetation types (e.g. buttongrass) or non-eucalypt forest types (e.g. rainforest). In situations where boundaries are made up of non-eucalypt vegetation types or plantation, consideration should be given to consolidating WHCs with existing reserves (e.g. streamside reserves) or increasing the size of the WHCs to prevent the effects of windthrow.
- Retain WHCs adjacent to one another when adjoining coupes are to be harvested.
- In the situation where a harvest area does not contain any habitat trees, WHCs should include the most mature trees present.
- Where the retention of WHCs is not feasible (e.g. coupe surrounded by non-forest such as HEC easement or pasture), please contact the Forest Practices Board Zoology Section for further advice.
- WHCs should contain at least 2-3 mature trees with hollows (i.e. habitat trees) and a range of other ages of trees/shrubs.
- Ensure WHCs are protected from harvesting activities and high intensity burns.
- Ensure WHCs are marked on the FPP map and are flagged on the ground. It is recommended that standard colours are used to flag WHCs and that an appropriately trained person (e.g. FPO or Accredited Fauna Officer) marks WHCs on the ground prior to the commencement of operations.
- Ensure prescriptions for retention of WHCs are included in the FPP and explained to contractors. Prescriptions for WHCs may need to be in several sections of the FPP including felling, conservation of other values and reforestation (particularly burning) sections.
- See pp 95-97 of “Fauna Conservation in Production Forests in Tasmania” for more detail and Figure 1 of this technical note

Figure 1



Please contact the FPB Zoology Section if a particular situation is not covered by this flow diagram, or the retention of WHCs is not feasible (e.g. harvest area bounded by HEC easement).

*see definition of "reserves"
** see definition of "200m rule"