APPENDICES

APPENDIX 1

OPERATIONAL PLANNING, SILVICULTURAL ASPECTS AND HARVEST VOLUME OF EXPERIMENTAL LOGGING TRIALS IN THE STUDY AREA

Operational planning and silvicultural aspects

There were three key components of the planning of the experimental logging trials. These included the field delineation of treatment zones, compliance with forest harvesting and wildlife protection regulations and associated community consultation, and forest landscape context. The pertinent aspects of these components are detailed below.

Field delineation of treatment zones

I established five zones of treatment in each of the two experimental logging plots: gap (wood production zone 1), thinning (wood production zone 2), interstitial, cluster (biodiversity conservation zone), and riparian buffers (see Chapter 2: Figs. 2.5 and 2.7).

Gaps

A gap is defined as a break or space in the canopy created by the removal of trees that have reached their maximum economic value or end-point (SFNSW 1995d). Three (3) canopy gaps were identified and marked in each of the two experimental plots. Gap boundaries were delineated by a square-and-bar-below symbol sprayed in pink fluorescent paint on tree stems or stumps and orange polka-dot flagging tape tied on saplings or shrubs at 5-15 metre intervals around proposed gap perimeters. Each gap was measured by hip-chain to a diameter of approximately 80 metres crown-to-crown, occupying an area of about 0.64 ha. A total of 1.92 ha or 21.33% of forest in each of the two 9 ha experimental plots was therefore set aside for gap establishment. This complied with the model Gaps and Clusters Technique (GCT) requirements that no more than 25% of the available forest area should be gapped in one cutting cycle and, for each cutting cycle, no more than 2-3 canopy gaps should be established per 5 ha of forest available for gap creation (SFNSW 1995d).

The size, shape and spatial distribution of all gaps delineated in the field were dictated by four main factors. These were the seed dispersal distances of the main commercial tree species present, regrowth suppression by competition from trees flanking the edges of identified gaps, adequate levels of site disturbance to promote regeneration (see Floyd 1962; Baur 1982), and site constraints such as the presence of trees of merchantable quality and requirements for environmental protection.

Experimental evidence suggests that, to allow rapid regrowth at the centre of gaps, canopy gaps in moist hardwood forest should be at least 80 metres in diameter crown-to-crown for tall stands with wide crowns such as Blackbutt, Sydney Blue Gum, Tallowwood and Brush Box (Baur 1984; SFNSW 1993b). This size approximates the maximum seed-throw distance recorded in Blackbutt (SFNSW 1993b). Gap shape was approximately circular to oval to allow maximum light penetration.

Canopy gap creation is recommended under specific conditions of growth stage and commercial suitability. These include stands that have reached their endpoint after a sequence of thinning, stands past their optimal commercial value, and stands where the regeneration is in poor condition (SFNSW 1995d). The forest identified for gapping in the study area generally satisfied these criteria.

A set of eight (8) additional gaps of similar size, shape and spatial distribution were identified and marked in forest surrounding each of the two experimental plots. These were included to achieve two goals: enhancement of within-plot detectability of bird responses to the disturbance events by reducing the amount of forest outside of the plots that was available to birds displaced by each GCT trial, and more realistic simulation of a GCT application. A resultant total of 22 gaps (16 located outside of the trial plots and 6 within the plots) or 6.48% (14.08 ha) of the study area (217.39 ha) was set aside for gap creation over the two year trial period.

Thinning areas

Areas of forest to be thinned from below were identified and marked in and around each of the two experimental plots. Thinning from below is a silvicultural technique that involves removing smaller trees to redistribute the growth to larger trees (SFNSW 1995d). The

trunks of individual trees to be harvested were sprayed with one or more pink dots. A total of 2.06 ha or 22.88% of forest was identified for thinning in E1 Plot and 0.83 ha or 9.22% of forest in E2 Plot. A further 2.2 ha of forest was identified for thinning around E1 Plot and 2.5 ha around E2 Plot. Therefore, a total of 7.59 ha of forest were set aside for thinning in the study area during the logging trials.

The spatial distribution of thinning zones in each experimental plot was determined by stand condition, requirements for environmental protection, tree species present and presence of habitat and recruitment habitat trees. Thinning from below is generally suited to young stands where the stocking rate is high and regeneration is not required to stimulate growth (SFNSW 1995d). Light thinning was generally planned for proposed thinning areas. The exception was a well-stocked area designated for heavier thinning in the south-west corner of E2 Plot.

The few habitat or hollow-bearing trees present in and around each trial plot were marked for retention by one pink horizontal line with the letter 'H' sprayed above the line. A recruitment habitat tree was identified by a pink horizontal line with the letters 'RH' or 'R' sprayed above the line. There were very few recruitment habitat trees identified in each plot. Dead stags were marked for retention providing that current and future operational safety could be assured.

Interstitial areas

Interstitial areas are portions of forest situated between gaps and clusters that can be selectively logged or thinned. In my study however, areas identified as interstitial comprised mostly non-merchantable species such as Bangalow Palm, Forest Oak, Turpentine and various rainforest trees and shrubs, or were in poor stand condition. Therefore, these areas were not scheduled for logging and were mostly not disturbed. They were marked by three pink horizontal bars sprayed on tree trunks at regular intervals along boundaries. They comprised a total of 1.37 ha or 15.28% of forest in E1 Plot and 1.12 ha or 12.5% of forest in E2 Plot.

Clusters

Clusters are groups of selected habitat and recruitment habitat trees identified for permanent conservation within the gapped and thinned forest mosaic.

The purpose of clusters is to provide fauna habitat in close proximity to canopy gaps, thus reducing the potential impacts of creating gaps on fauna (SFNSW 1993b, SFNSW 1995b). To this end, the shrub and litter layers remain generally undisturbed. Horne's GCT model described clusters as "localised, permanently undisturbed islands of animal habitat" (p. 6, SFNSW 1995e). Clusters should occupy about 15-25% of the area available for gap creation.

Three clusters were identified and marked in each experimental plot. The tree marking code used to define cluster boundaries was the same as for gap boundaries, only yellow paint and yellow polka-dot flagging tape were used.

Clusters adjoined or were in close proximity to gaps, depending on the presence of habitat and recruitment habitat trees. Clusters were connected to riparian and buffer zones, as requested by NSW NPWS (see *Regulatory compliance and community consultation* section).

Clusters were generally similar in size to (0.64 ha) or slightly larger than (0.7-0.85 ha) gaps. The larger size was designed in response to the outcomes of consultation with NSW NPWS. Clusters occupied 2.06 ha or 22.92% of forest in E1 Plot and 1.56 ha (17.36%) in E2 Plot. The smaller area of clusters in E2 Plot relative to E1 Plot reflected a larger amount of forest reserved as riparian buffers in E2 Plot (see *Riparian buffer zones*).

A further 8 clusters were identified and marked so as to match the corresponding gaps in the area around each trial plot. Therefore, a total of 22 clusters (16 located outside of the trial plots and 6 within the plots) or 6.37% (13.86 ha) of the study area was set aside for clusters over the two year trial period.

Riparian buffer zones

Logging is not permitted in riparian zones. This helps to protect water quality and plants and animals that utilise moist environments. Trees cannot be felled into riparian zones. The model GCT excludes logging in flora and fauna reserves and around sites where threatened plants and animals occur and in sites of special significance. However, these did not occur in areas identified for logging in the study area.

Riparian buffer zones were marked by spraying three pink horizontal bars on tree trunks at regular intervals along measured boundaries. Riparian zone width is determined by stream order and catchment size (SFNSW 1997, 1998b). In E1 Plot, two 40 metre-wide zones were established across the two main drainage lines (second order streams, <40 ha catchments) and one 20 metre-wide zone was marked across a side-tributary (first order stream, <40 ha catchment). In E2 Plot, one 80 metre-wide zone was delineated across the main drainage line (third order stream, 100+ ha catchment) and one 40 metre-wide zone was marked across both branches of a side-tributary (second order stream, 40+ ha catchment). No fauna movement corridors connecting major catchments were identified in the study area. Riparian buffer zones comprised a total of 1.59 ha or 17.66% of forest in E1 Plot and 3.57 ha or 39.66% of forest in E2 Plot.

Regulatory compliance and community consultation

To comply with the provisions of the SFNSW harvest planning process, pre-logging plant and animal surveys were undertaken, harvesting plans for each trial and other forest management activities at the compartment-level were prepared, and the relevant licences obtained (see SFNSW 1997, 1998b,c). An exemption from the moratorium imposed on this form of logging was granted by the Minister for Land and Water Conservation on 24 February 1997. This was contingent upon agreement being reached with the Northern Region Harvesting Advisory Board. This body had not been formed at this time so I consulted with NSW NPWS, SFNSW, a regional conservation group (North-East Forest Alliance), and the University of New England.

NSW NPWS approved the Year 1 phase of the project on 1 July 1997 by issuing a Section 120 (National Parks and Wildlife Act 1974) licence to harvest timber and construct roads,

subject to compliance with some specific conditions. These restricted the number of gaps to three in the experimental plot and eight in the surrounding identified forest, with gaps placed according to the presence of threatened species (see SFNSW 1997), and required a Year 1 progress report. NSW NPWS approved the Year 2 operation under the same conditions on 15 June 1998.

Forest landscape context

The GCT trials represented relatively local disruptions in the continuity of forest cover and maintained riparian and ridgeline connections. This satisfied the original model's spatial design requirements at the first cutting cycle. In the trials, the retained forest matrix originated from regrowth generated by past selective logging. Also, no flora reserves occur within or near the trial plots.

The GCT trials also took into account the location and intensity of past and concurrent logging in the compartment and throughout Lower Bucca State Forest. I reviewed SFNSW compartment history records, Forest Management Information System (FAMIS) data, Coffs Harbour Management Area Plan, and aerial photography. This revealed that while all of Lower Bucca State Forest has been selectively logged since the start of forest management records (mid-1920s), the intensity of logging has varied. To avoid bias, the GCT trials were planned for sites that had been selectively logged at similar intervals and intensities. These were areas of moist regrowth forest comprising a mix of older (41-60 year-old), intermediate (20-40 year-old) and younger (5-19 year-old) stands featuring a generally dense shrubby understorey and many fallen logs.

Existing aerial photographs of the study area were of poor quality, so new photographs were taken before and after the trials (see Chapter 2, Section 2.3.5). This photography was used in an ARCINFO (Version 7.0.4) Geographic Information System (GIS) (Environmental Systems Research Institute 1996) to produce maps showing the location of the study area, research plots and the experimental gaps and clusters trial area. An ARCVIEW GIS (Version 3.1.1) (Environmental Systems Research Institute 1999) was used to produce maps of extant forest cover and moist hardwood forest cover. Data were obtained from the North-East NSW Comprehensive Regional Assessment project (NSW Department of Urban Affairs and Planning 1999). Both sets of GIS-based maps allowed areas of forested land, moist

hardwood forest and treatment zones to be calculated, and the placement of my study in a local, regional, and State forest landscape context.

Harvest volume

The amount of wood harvested from both experimental trial plots was determined using the SFNSW timber delivery docket system. Codes were entered on each docket in the field to indicate whether logs were harvested from gaps located within each trial plot, gaps outside each plot, thinning areas within each plot, or thinning areas outside each plot. Volumes of product were then collated according to these zones of harvest origin and totals were derived. Table 1 shows the total volume of wood produced by each zone in the trial plots.

Table 1 Volume of wood extracted from E1 and E2 Plots in the study area, 1997-1998

PLOT	PRODUCT	VOLUME OF WOOD EXTRACTED BY ZONE[1]						
		A	B	C	D	E	F	TOTAL[2]
E1	quota sawlog	92.5	11.4	103.9	138.8	382.6	521.4	625.3
	thinnings	52.7	3.9	56.6	62.3	132.7	195	251.6
	salvage	135.7	24.4	160.1	198.7	419.7	618.4	778.5
	veneer	57.1	22.9	80	182.9	248.7	431.6	511.6
	poles,piles,girders	14.4	0	14.4	138	168.8	306.8	321.2
	PLOT TOTAL[3]	352.4	62.6	415	720.7	1352.5	2073.2	2488.2
E2	quota sawlog	94.4	10.2	104.6	124.7	90.9	215.6	320.2
	thinnings	50.5	25.6	76.1	55.3	59	114.3	190.4
	salvage	67.3	6.8	74.1	133.4	118.1	251.5	325.6
	veneer	79	12.3	91.3	9.6	66.2	75.8	167.1
	poles,piles,girders	0	0	0	27.8	0	27.8	27.8
	PLOT TOTAL[3]	291.2	54.9	346.1	350.8	334.2	685	1031.1
STUDY TOTAL[4]								3519.3

[1]zone of harvest origin - all volumes in m^3:
A all gaps within plot
B all thinning areas within plot
C all gaps and thinning areas within plot
D all gaps outside plot
E all thinning areas outside plot
F all gaps and thinning areas outside plot

[2]total volume (m^3) of wood extracted, by product type, from all gaps and thinning areas within and outside plot

[3]total volume of wood extracted across all product types by zone of harvest origin in each plot

[4]total volume of wood extracted from both trial areas during the study

APPENDIX 2

VEGETATION STRUCTURE AND FLORISTIC COMPOSITION AT REPRESENTATIVE NET STATIONS IN EACH RESEARCH PLOT

A botanical assessment was made of the structure and composition of vegetation in each plot before the logging trials. I sampled several attributes at net stations that were representative of the structure and floristic composition of plant communities in each plot. Attributes included slope, aspect, landscape unit, projective foliage cover, height of strata, and dominant plant species in each stratum. The following data relates to 5 net stations in each plot and samples riparian/lower slope, mid slope and upper slope vegetation communities. The full complement of net stations that were sampled in Year 1 (20 stations in each plot) is contained in Horton (1998). In Year 2, I prepared profiles of vegetation strata and identified the dominant plant species present at 28 net stations in E2 Plot and 35 net stations in C2 Plot.

VEGETATION STRATA, LANDSCAPE FEATURES AND DOMINANT PLANT SPECIES AT SAMPLED NET STATIONS IN YEAR 1 PLOTS

(from Horton [1998]: Layer 1=ground cover 0-1 m; Layer 2=shrub cover 1-5 m; Layer 3=small-medium trees 5-25 m; Layer 4=tall trees 25 m+)

SEE NEXT PAGE

Net Station
Vegetation Layers
(Dominants by Species)

Plot Experimental **Net Station No** 5 **Date** 25/6/97

Station Axis 72° **Station Slope** 9°

Aspect 25° **Slope** 11° **Landscape Unit** Upper Slope

Layer 1 **% Foliage Cover** **15%**

Gristle Fern	*Blechnum cartilageneum*	Lantana	*Lantana camara*

Layer 2 **% Foliage Cover** **40%**

Rusty Plum	*Amorphospermum whitei*	Rose Maple	*Cryptocarya rigida*
Narrow-leafed Palm-lily	Cordyline stricta	Lantana	Lantana camara
Bangalow Palm	*Archontophoenix cunninghamiana*		

Layer 3 **% Foliage Cover** **50%**

Murrogun	*Cryptocarya microneura*	Bangalow Palm	*Archontophoenix cunninghamiana*
Tree Heath	*Trochocarpa laurina*	Scrub Turpentine	*Rhodamnia rubescens*
Forest Oak	*Allocasuarina torulosa*		

Layer 4 **% Foliage Cover** **30%**

Forest Oak	*Allocasuarina torulosa*	Pink Bloodwood	*Corymbia intermedia*
Grey Gum	*Eucalyptus propinqua*		

Net Station
Vegetation Layers
(Dominants by Species)

Plot Experimental **Net Station No** 8 **Date** 25/6/97

Station Axis 320° **Station Slope** 3°

Aspect 30° **Slope** 5° **Landscape Unit** Mid Slope

Layer 1 **% Foliage Cover** **25%**

Gristle Fern	*Blechnum cartilageneum*	Narrow-leafed Palm-lily	*Cordyline stricta*
Ginger	*Alpinea arundinella*		

Layer 2 **% Foliage Cover** **40%**

Scentless Rosewood	*Synoum glandulosum*	Tree Heath	*Trochocarpa laurina*
Murrogun	*Cryptocarya microneura*	Corkwood	*Schizomeria ovata*

Layer 3 **% Foliage Cover** **55%**

Turpentine	*Syncarpia glomulifera*	Scentless Rosewood	*Synoum glandulosum*
Celerywood	*Polyscias elegans*	Murrogun	*Cryptocarya microneura*
Forest Oak	*Allocasuarina torulosa*		

Layer 4 **% Foliage Cover** **25%**

White Mahogany	*Eucalyptus acmenioides*	Turpentine	*Syncarpia glomulifera*
Tallowwood	*Eucalyptus microcorys*		

Net Station
Vegetation Layers
(Dominants by Species)

Plot Experimental **Net Station No** 25 **Date** 25/6/97

Station Axis 260° **Station Slope** 0°

Aspect 345° **Slope** 15° **Landscape Unit** Lower Slope

Layer 1 **% Foliage Cover** **20%**

Turpentine	*Syncarpia glomulifera*	Narrow-leafed Palm-lily	*Cordyline stricta*
Rose Maple	*Cryptocarya rigida*	Gristle Fern	*Blechnum cartilageneum*
Five-leafed Water Vine	*Cissus hypoglauca*	Yam	*Dioscorea transversa*
Veiny Wilkea	*Wilkea huegeliana*	Supplejack	*Ripogonum brevifolium*

Layer 2 **% Foliage Cover** **30%**

Bolwarra	*Eupomatia laurina*	Narrow-leafed Palm-lily	*Cordyline stricta*
Forest Oak	*Allocasuarina torulosa*	Scentless Rosewood	*Synoum glandulosum*
Scrub Turpentine	*Rhodamnia erubescens*	Rose Maple	*Cryptocarya rigida*
Turpentine	*Syncarpia glomulifera*		

Layer 3 **% Foliage Cover** **55%**

Forest Oak	*Allocasuarina torulosa*	Scentless Rosewood	*Synoum glandulosum*
Bolwarra	*Eupomatia laurina*	Blueberry Ash	*Elaeocarpus reticulatus*
Turpentine	*Syncarpia glomulifera*	Rose Maple	*Cryptocarya rigida*

Layer 4 **% Foliage Cover** **15%**

Blackbutt	*Eucalyptus pilularis*	Bloodwood	*Corymbia intermedia*
Forest Oak	*Allocasuarina torulosa*		

Net Station
Vegetation Layers
(Dominants by Species)

Plot Experimental **Net Station No** 32 **Date** 27/6/97

Station Axis 345° **Station Slope** 6°

Aspect 175° **Slope** 9° **Landscape Unit** Lower Slope

Layer 1	**% Foliage Cover 15%**		
Gristle Fern	*Blechnum cartilageneum*	Narrow-leafed Palm-lily	*Cordyline stricta*
Morinda	*Morinda jamsinoides*		
Layer 2	**% Foliage Cover 50%**		
Bangalow Palm	*Archontophoenix cunninghamiana*	Lantana	*Lantana camara*
Five-leafed Water Vine	*Cissus hypoglauca*		
Layer 3	**% Foliage Cover 70%**		
Bangalow Palm	*Archontophoenix cunninghamiana*	Forest Oak	*Allocasuarina torulosa*
Layer 4	**% Foliage Cover 25%**		
Blue Gum	*Eucalyptus saligna*	Brushbox	*Lophostemon confertus*
Turpentine	*Syncarpia glomulifera*		

Net Station
Vegetation Layers
(Dominants by Species)

Plot Experimental **Net Station No** 42 **Date** 27/6/97

Station Axis 195° **Station Slope** 1°

Aspect 290° **Slope** 4° **Landscape Unit** Mid Slope

Layer 1	**% Foliage Cover 30%**		
Gristle Fern	*Blechnum cartilageneum*	Murrogun	*Cryptocarya microneura*
Layer 2	**% Foliage Cover 20%**		
Guoia	*Guoia semiglauca*	Rose Maple	*Cryptocarya rigida*
Tree Heath	*Trochocarpa laurina*	Jackwood	*Cryptocarya glaucescens*
Layer 3	**% Foliage Cover 50%**		
Brushbox	*Lophostemon confertus*	Murrogun	*Cryptocarya microneura*
Turpentine	*Syncarpia glomulifera*	Brushbox	*Lophostemon confertus*
Layer 4	**% Foliage Cover 20%**		
Ironbark	*Eucalyptus siderophloia*	Black Apple	*Planchonella australis*

Net Station
Vegetation Layers
(Dominants by Species)

Plot Control **Net Station No** 1 **Date** 4/7/97

Station Axis 120° **Station Slope** 1°

Aspect 33° **Slope** 8° **Landscape Unit** Lower Slope

Layer 1 **% Foliage Cover** **40%**

Gristle Fern	*Blechnum cartilageneum*	Scentless Rosewood	*Synoum glandulosum*
Bolwarra	*Eupomatia laurina*	Water Vine	*Cissus antarctica*
Supplejack	*Ripogonum brevifolium*		

Layer 2 **% Foliage Cover** **80%**

Narrow-leafed Palm-lily	*Cordyline stricta*	Rose Walnut	*Endiandra discolour*
Scentless Rosewood	*Synoum glandulosum*	Bolwarra	*Eupomatia laurina*
Tree Heath	*Trochocarpa laurina*	Veiny Wilkea	*Wilkea huegeliana*

Layer 3 **% Foliage Cover** **60%**

Rose Walnut	*Endiandra discolour*	Bangalow Palm	*Archontophoenix cunninghamiana*
Crabapple	*Schizomeria ovata*	Turpentine	*Syncarpia glomulifera*
Smooth-barked Apple	*Angophora costata*	Blackbutt	*Eucalyptus pilularis*

Layer 4 **% Foliage Cover** **30%**

Blue Gum	*Eucalyptus saligna*	Blackbutt	*Eucalyptus pilularis*
Broad-leafed Ironbark	*Eucalyptus siderophloia*		

Net Station
Vegetation Layers
(Dominants by Species)

Plot Control **Net Station No** 10 **Date** 3/7/97

Station Axis 350° **Station Slope** 6°

Aspect 80° **Slope** 8° **Landscape Unit** Upper Slope

Layer 1	**% Foliage Cover**	**20%**	
Gristle Fern	*Blechnum cartilageneum*	Bangalow Palm	*Archontophoenix cunninghamiana*
Ginger	*Alpinea arundinella*	Bolwarra	*Eupomatia laurina*
Rose Maple	*Cryptocarya rigida*		*Lepidosperma laterale*
Narrow-leafed Palm-lily	*Cordyline stricta*		
Layer 2	**% Foliage Cover**	**25%**	
Rose Maple	*Cryptocarya rigida*	Scrub Turpentine	*Rhodamnia rubescens*
Forest Oak	*Allocasuarina torulosa*	Rose Walnut	*Endiandra discolour*
Layer 3	**% Foliage Cover**	**35%**	
Tallowwood	*Eucalyptus microcorys*	Rose Walnut	*Endiandra discolour*
Cassine	*Cassine australe*	White Mahogany	*Eucalyptus acmenioides*
Layer 4	**% Foliage Cover**	**35%**	
Tallowwood	*Eucalyptus microcorys*	White Mahogany	*Eucalyptus acmenioides*
Grey Gum	*Eucalyptus propinqua*		

Net Station
Vegetation Layers
(Dominants by Species)

Plot Control **Net Station No** 14 **Date** 4/7/97

Station Axis 200° **Station Slope** 6°

Aspect 155° **Slope** 14° **Landscape Unit** Lower Slope

Layer 1 **% Foliage Cover** **20%**

Gristle Fern	*Blechnum cartilageneum*	Spinyhead Matrush	*Lomandara longifolia*
Blue Flax Lily	*Dianella caerulea*	Orange Thorn	*Citriobatus pauciflorus*
Supplejack	*Ripogonum brevifolium*		

Layer 2 **% Foliage Cover** **25%**

Narrow-leafed Cordyline	*Cordyline stricta*	Native Ginger	*Alpinea arundinelliana*
Grey Possumwood	*Quintinia verdonii*	Scentless Rosewood	*Synoum glandulosum*
Rose Maple	*Cryptocarya rigida*	Jackwood	*Cryptocarya glaucescens*
Banana Bush	*Tabernaemontana pandacaqui*		

Layer 3 **% Foliage Cover** **50%**

Murrogun	*Cryptocarya microneura*	Rusty Plum	*Amorphospermum whitei*
Grey Possumwood	*Quintinia verdonii*	Forest Oak	*Allocasuarina torulosa*
Rose Maple	*Cryptocarya rigida*		

Layer 4 **% Foliage Cover** **40%**

Blue Gum	*Eucalyptus saligna*	Red Mahogany	*Eucalyptus resinifera*

Net Station
Vegetation Layers
(Dominants by Species)

Plot Control **Net Station No** 19 **Date** 3/7/97

Station Axis 220° **Station Slope** 0°

Aspect 150° **Slope** 7° **Landscape Unit** Upper Slope

Layer 1	**% Foliage Cover**	**30%**	
Tree Heath	*Trochocarpa laurina*	Gristle Fern	*Blechnum cartilageneum*
Yam	*Dioscorea transversa*	Ginger	*Alpinea arundinella*
Layer 2	**% Foliage Cover**	**75%**	
Tree Heath	*Trochocarpa laurina*	Rose Maple	*Cryptocarya rigida*
Bolwarra	*Eupomatia laurina*	Callicoma	*Callicoma serratifolia*
Scrub Turpentine	*Rhodamnia rubescens*	Scentless Rosewood	*Synoum glandulosum*
Blackbutt	*Eucalyptus pilularis*		
Layer 3	**% Foliage Cover**	**55%**	
Rose Maple	*Cryptocarya rigida*	Callicoma	*Callicoma serratifolia*
Scentless Rosewood	*Synoum glandulosum*	Rose Myrtle	*Archirrhodomyrtus beckleri*
Forest Oak	*Allocasuarina torulosa*	Tree Heath	*Trochocarpa laurina*
Layer 4	**% Foliage Cover**	**20%**	
Blackbutt	*Eucalyptus pilularis*	Tallowwood	*Eucalyptus microcorys*
Grey Gum	*Eucalyptus propinqua*		

Net Station
Vegetation Layers
(Dominants by Species)

Plot	Control	**Net Station No**	31	**Date**	2/7/97
Station Axis	330°	**Station Slope**	6°		
Aspect	50°	**Slope**	9°	**Landscape Unit**	Mid- Lower Slope
Layer 1		**% Foliage Cover**	**35%**		
Bolwarra	*Eupomatia laurina*			Scentless Rosewood	*Synoum glandulosum*
Layer 2		**% Foliage Cover**	**70%**		
Scentless Rosewood	*Synoum glandulosum*			Bolwarra	*Eupomatia laurina*
Layer 3		**% Foliage Cover**	**75%**		
Ironbark	*Eucalyptus siderophloia*			Brushbox	*Lophostemon confertus*
Layer 4		**% Foliage Cover**	**20%**		
Blue Gum	*Eucalyptus saligna*			Bloodwood	*Corymbia intermeda*

VEGETATION PROFILES AND DOMINANT PLANT SPECIES AT SAMPLED NET STATIONS IN ALL PLOTS

(Year 1 plots from Horton [1998], Year 2 plots completed by A. Huggett with species ID by D. Binns)

Key to dominant plant species in Year 2 plots (some are shown in the profiles on the following pages)

1 *Guioa semiglauca*
2 *Notelaea longifolia*
3 *Synoum glandulosum*
4 *Archirhodomyrtus beckleri*
5 *Cryptocarya microneura*
6 *Endiandra discolor*
7 *Schizomeria ovata*
8 *Cryptocarya rigida*
9 *Quintinia verdonii*
10 *Randia benthamiana*
11 *Denhamia celastroides*
12 *Scolopia braunii*
13 *Endiandra muelleri*
14 *Melodinus australis*
15 *Canthium coprosmoides*
16 *Acmena smithii*
17 *Jagera pseudorhus*
18 *Croton verreauxii*
19 *Caldcluvia paniculosa*
20 *Hibbertia scandens*
21 *Diospyros pentamera*
22 *Tasmannia insipida*
23 *Morinda jasminoides*
24 *Asterolasia* sp.
25 *Pilidiostigma glabrum*
26 *Ficus coronata*
27 *Cissus hypoglauca*
28 *Backhousia myrtifolia*
29 *Hibiscus splendens*
30 *Ceratopetalum apetalum*

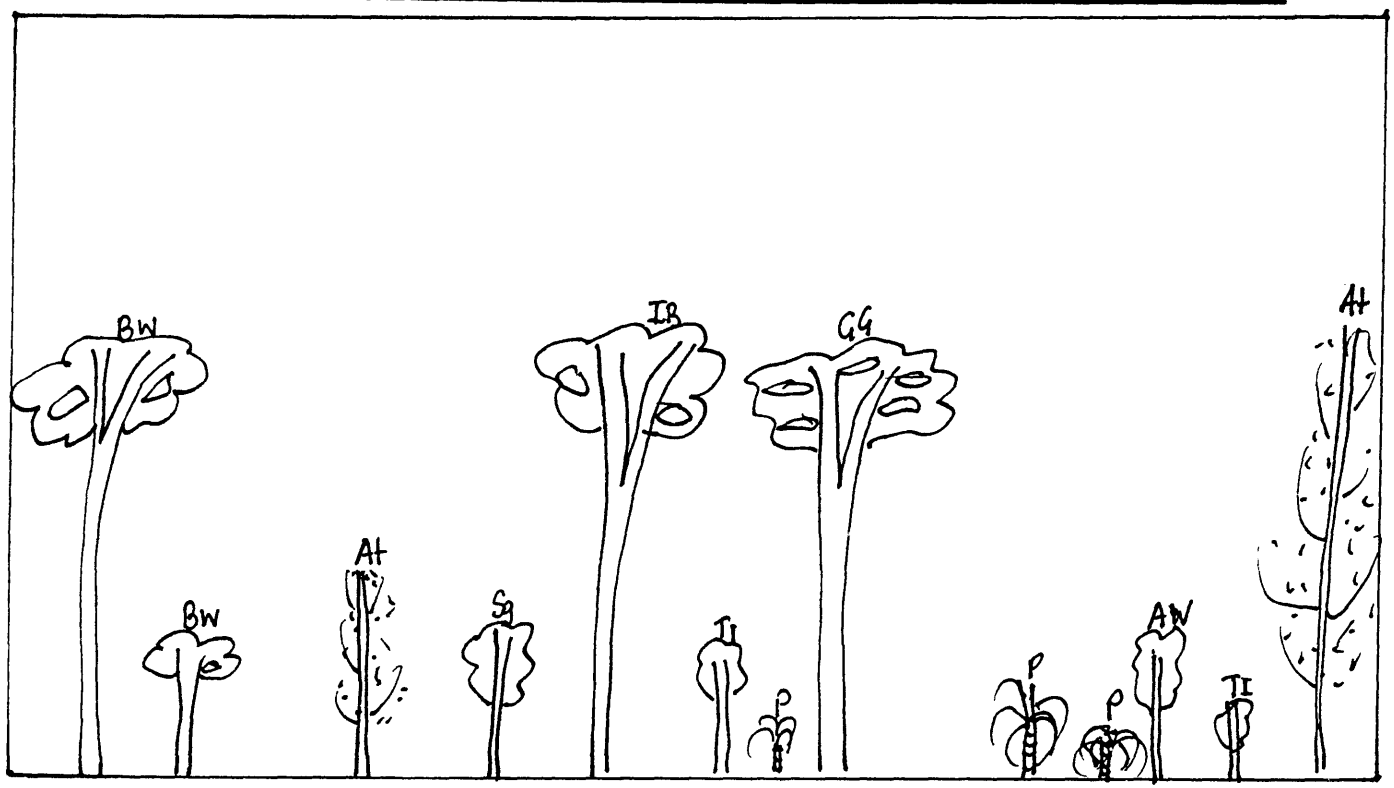
Eucalypts & other trees

BBx Brushbox *Lophostemon confertus*
At Forest Oak *Allocasuarina torulosa*
T Turpentine *Syncarpia glomulifera*
PB Pink Bloodwood *Corymbia intermedia*
BG Sydney Blue Gum *Eucalyptus saligna*
TW Tallowwood *E. microcorys*
BBt Blackbutt *E. pilularis*
IB Broad-leafed Ironbark *E. siderophloia*
WM White Mahogany *E. acmenioides*
RM Red Mahogany *E. resinifera*
FG Flooded Gum *E. grandis*

31 *Ripogonum discolor*
32 *Citriobatus pauciflorus*
33 *Eupomatia laurina*
34 *Ripogonum fawcettianum*
35 *Alpinia arundinella*
36 *Wilkea huegeliana*
37 *Neolitsea dealbata*
38 *Smilax australis*
39 *Amorphospermum whitei*
40 *Dodonaea triquetra*
41 *Billardiera scandens*
42 *Parsonsia straminea*
43 *Rapanea variabilis*
44 *Euroschinus falcatus*
45 *Rhodamnia rubescens*
46 *Elaeocarpus reticulatus*
47 *Acacia melanoxylon*
48 *Gahnia aspera*
49 *Ozothamnus diosmifolius*
50 *Alpinia caerulea*
51 *Cyathea australis*
52 *Dianella caerulea*
53 *Cissus antarctica*
54 *Claoxylon australe*
55 *Blechnum cartilagineum*
56 *Ricinocarpus speciosus*
57 *Alphitonia excelsa*
58 *Lomandra spicata*
59 *Acacia longissima*
60 *Seringia arborescens*
61 *Archontophoenix cunninghamiana*
62 *Cupaniopsis anacardioides*
63 *Cordyline stricta*
64 *Trochocarpa laurina*
65 *Callicoma serratifolia*

Avifauna Research Project
Lower Bucca State Forest
Net Station Site Experimental 5
Vegetation Profile

Horizontal Scale 1cm = 0.67 m Vertical Scale 1cm = 5m

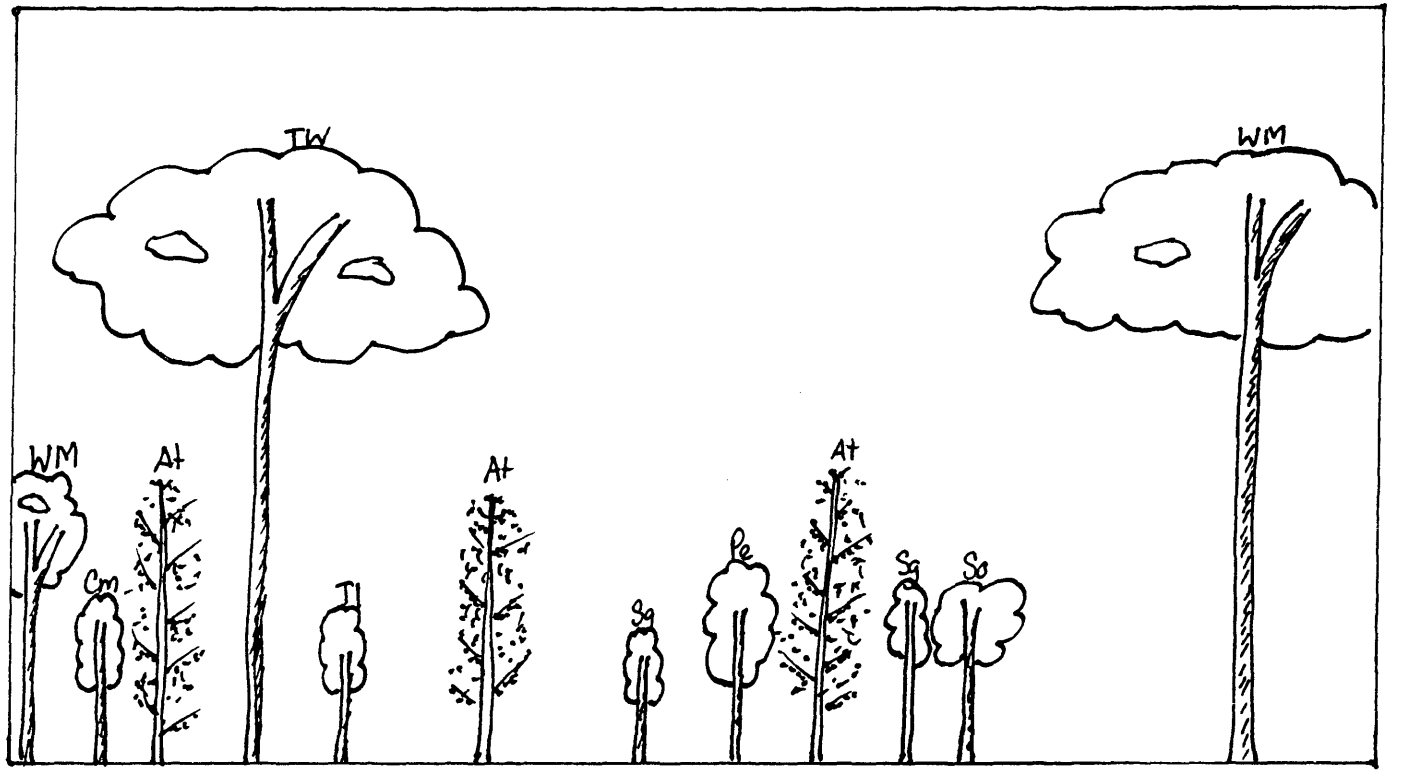


Net Station Experimental 5
Key:

At	Forest Oak	*Allocasuarina torulosa*	BW	Pink Bloodwood	*Corymbia intermedia*
Tl	Tree Heath	*Trochocarpa laurina*	GG	Grey Gum	*Eucalyptus propinqua*
AW	Rusty Plum	*Amorphospermum whitei*	IB	Ironbark	*Eucalyptus siderophloia*
Sg	Scentless Rosewood	*Synoum glandulosum*	P	Bangalow Palm	*Archontophoenix cunninghamiana*

Avifauna Research Project
Lower Bucca State Forest
Net Station Site Experimental 8
Vegetation Profile

Horizontal Scale 1cm = 0.67 m Vertical Scale 1cm = 4m

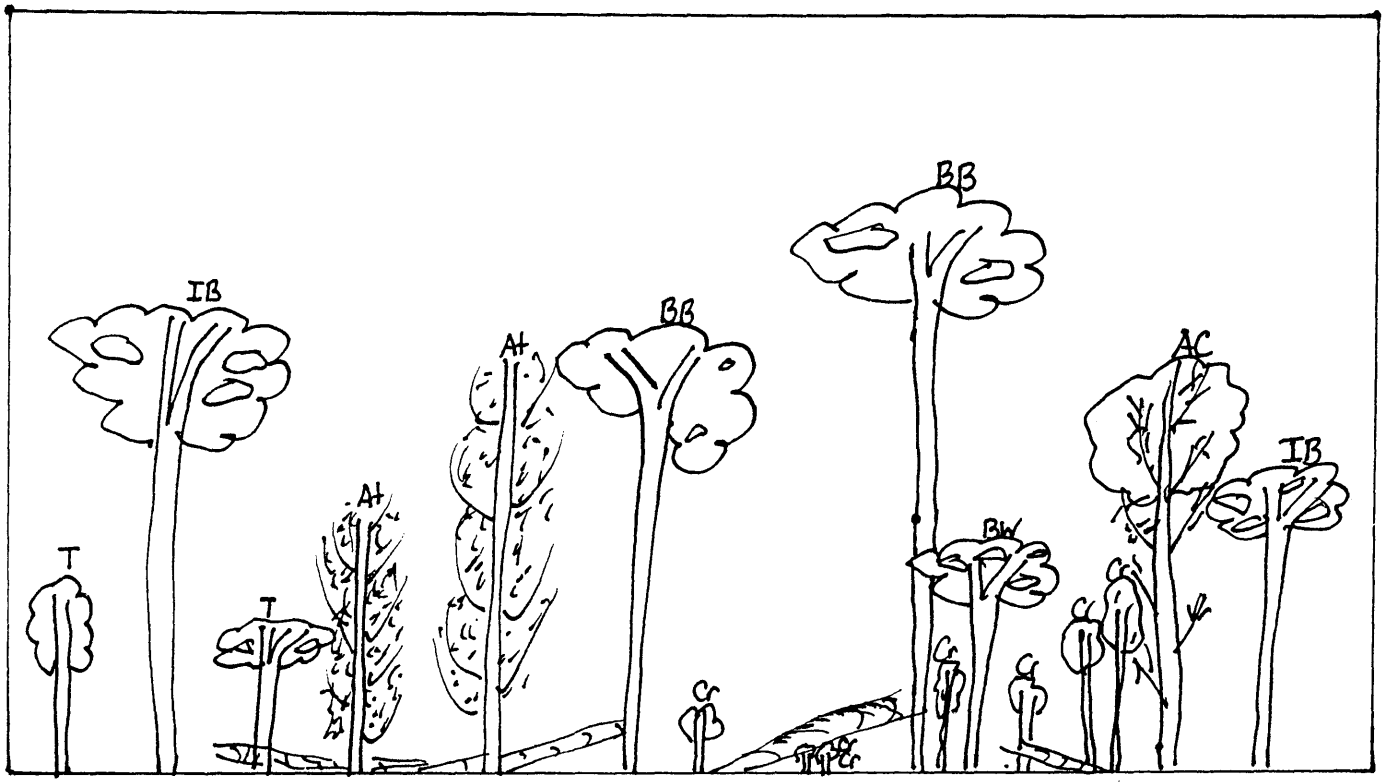


Net Station Experimental 8
Key:

WM	White Mahogany	*Eucalyptus acmenioides*	At	Forest Oak	*Allocasuarina torulosa*
Tl	Tree Heath	*Trochocarpa laurina*	Sg	Scentless Rosewood	*Synoum glandulosum*
Pe	Celerywood	*Polyscia elegans*	So	Crabapple	*Schizomeria ovata*
TW	Tallowwood	*Tallowwood*	Cm	Murrogun	*Cryptocarya microneura*

Avifauna Research Project
Lower Bucca State Forest
Net Station Site Experimental 25
Vegetation Profile

Horizontal Scale 1cm = 0.67 m Vertical Scale 1cm = 4m

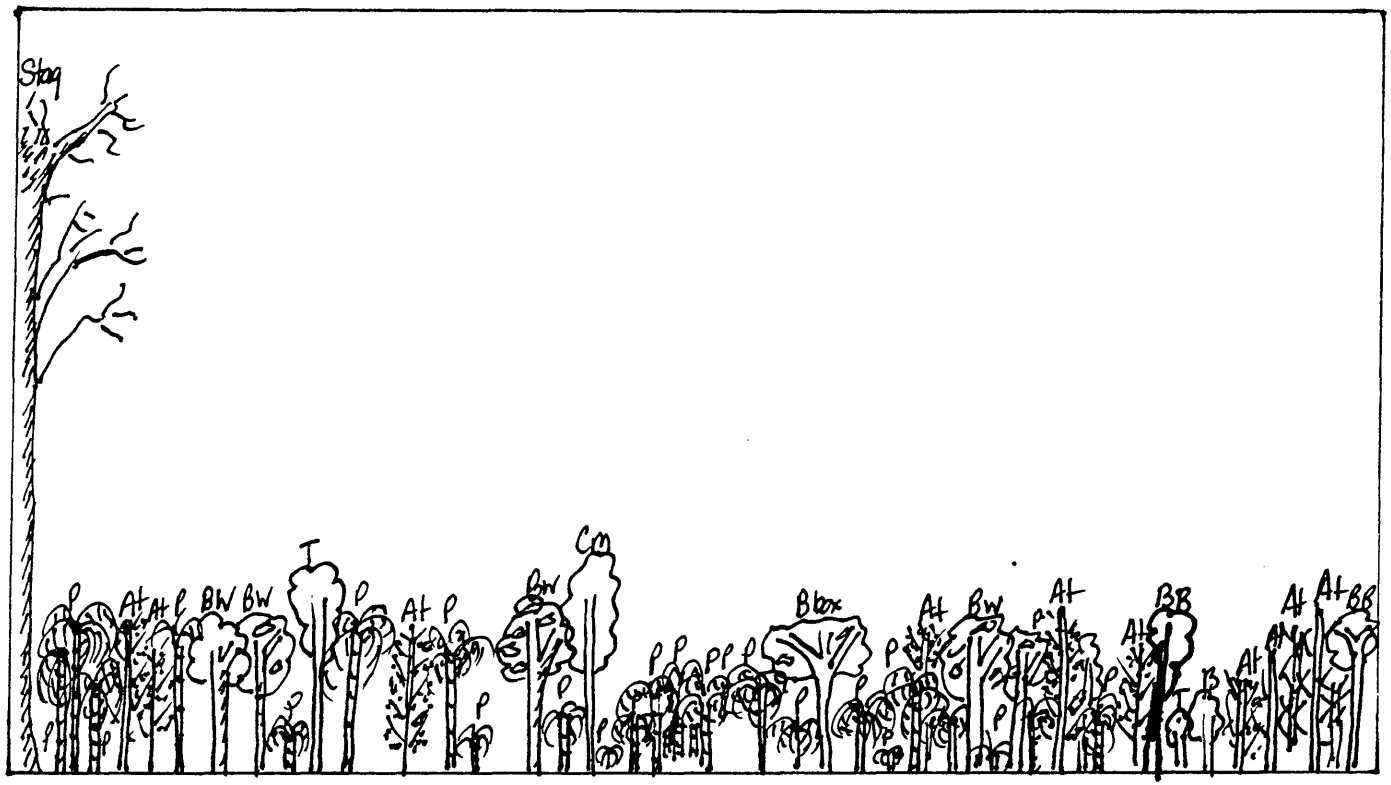


Net Station Experimental 25
Key:

T	Turpentine	*Syncarpia glomulifera*	Cr	Rose Maple	*Cryptocarya rigida*
BB	Blackbutt	*Eucalyptus pilularis*	AC	Smooth-barked Apple	*Angophora costata*
At	Forest Oak	*Allocasuarina torulosa*	IB	Ironbark (Northern Grey)	*Eucalyptus siderophloia*
BW	Bloodwood (Pink)	*Corymbia intermedia*			

Avifauna Research Project
Lower Bucca State Forest
Net Station Site Experimental 32
Vegetation Profile

Horizontal Scale 1cm = 0.67 m Vertical Scale 1cm = 4m

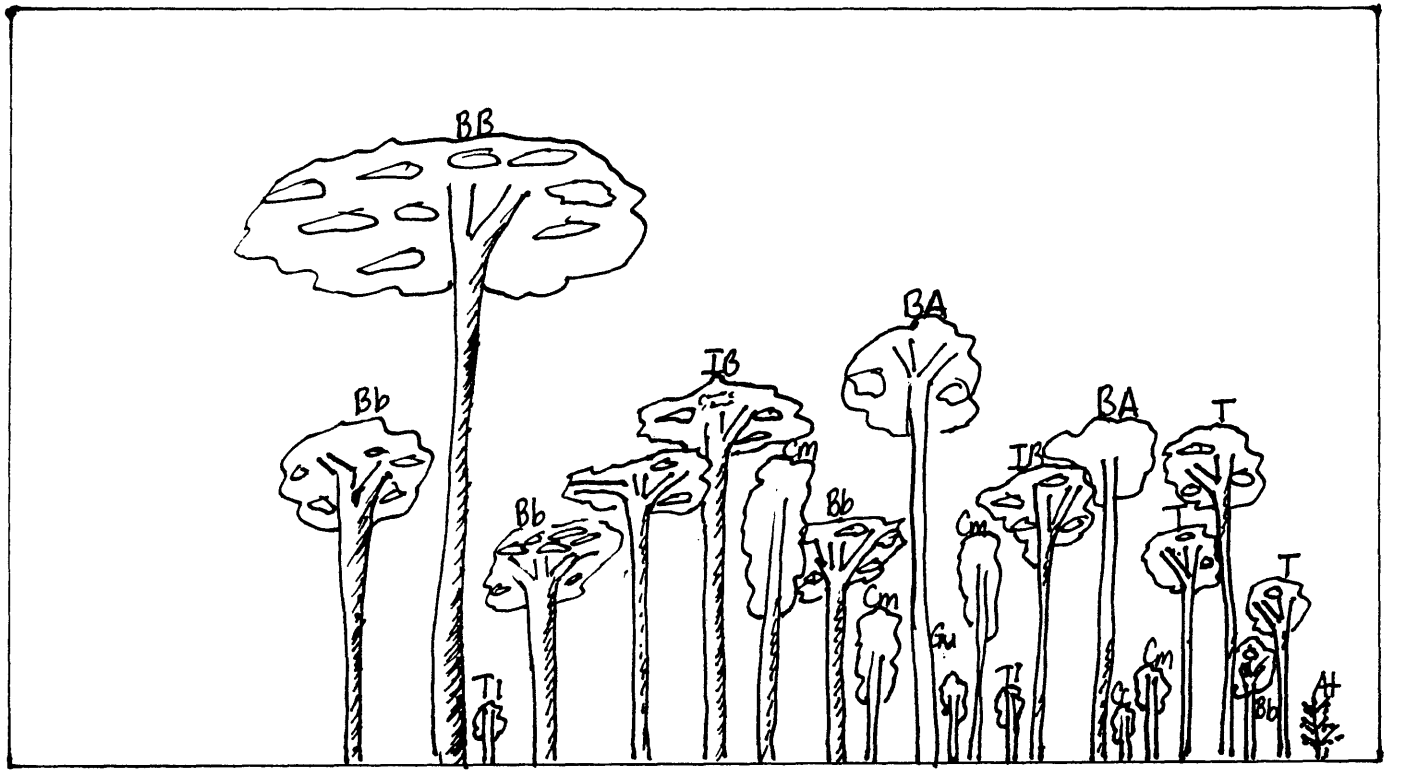


Net Station Experimental 32
Key:

P	Bangalow Palm	*Archontophoenix cunninghamiana*	BW	Bloodwood (Pink)	*Corymbia intermedia*
Cr	Rose Maple	*Cryptocarya rigida*	T	Turpentine	*Syncarpia glomulifera*
Cm	Murrogun	*Cryptocarya microneura*	At	Forest Oak	*Allocasuarina torulosa*
Bb	Brushbox	*Lophostemon confertus*			

Avifauna Research Project
Lower Bucca State Forest
Net Station Site Experimental 42
Vegetation Profile

Horizontal Scale 1cm = 0.67 m Vertical Scale 1cm = 4m

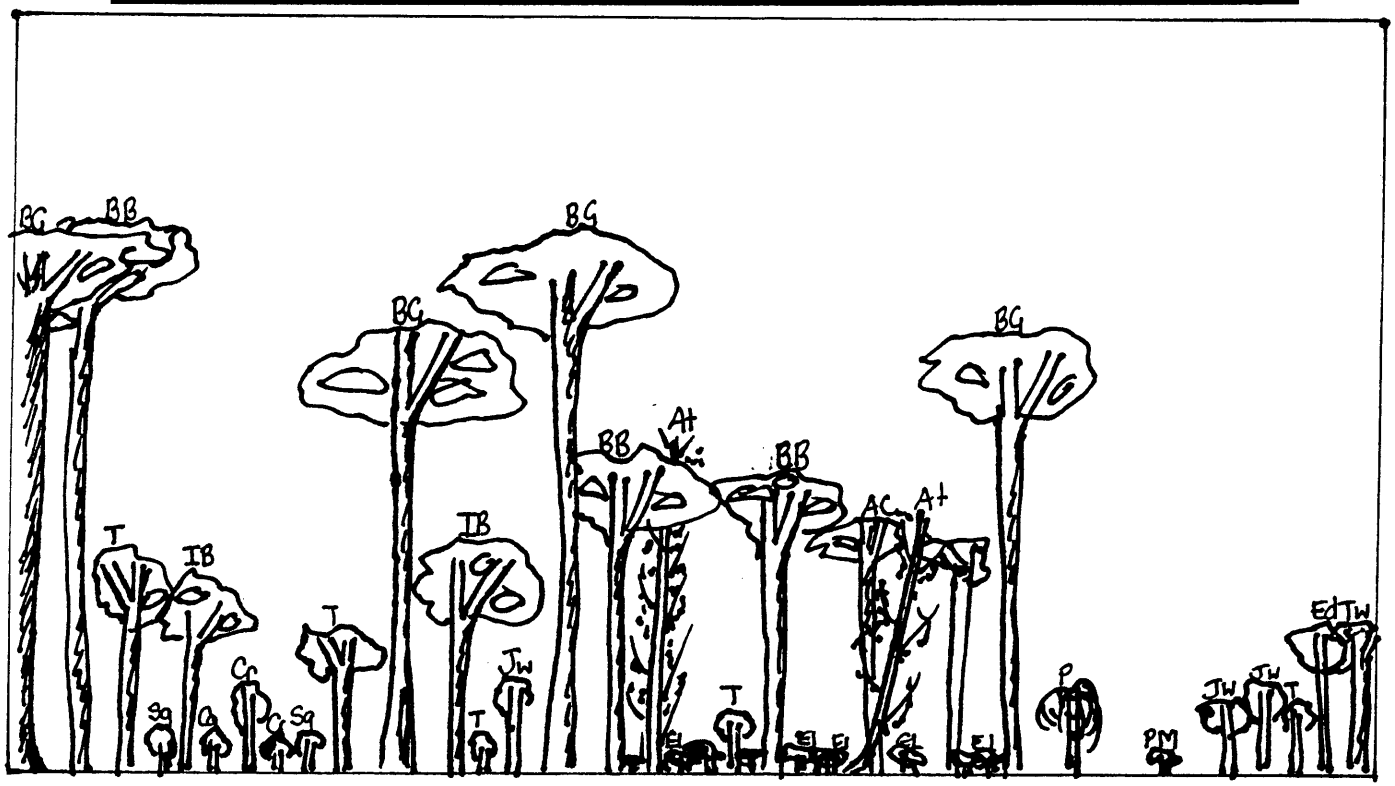


Net Station Experimental 42
Key:

Bb	Brushbox	*Lophostemon confertus*
Cm	Murrogun	*Cryptocarya microneura*
Cr	Rose Maple	*Cryptocarya rigida*
T	Turpentine	*Syncarpia glomulifera*
BA	Black Apple	*Planchonella australis*
Tl	Tree Heath	*Trochocarpa laurina*
Gu	Guoia	*Guoia semiglauca*
IB	Ironbark	*Eucalyptus siderophloia*
BB	Blackbutt	*Eucalyptus pilularis*

Avifauna Research Project
Lower Bucca State Forest
Net Station Site Control 1
Vegetation Profile

Horizontal Scale 1cm = m Vertical Scale 1cm = 5m

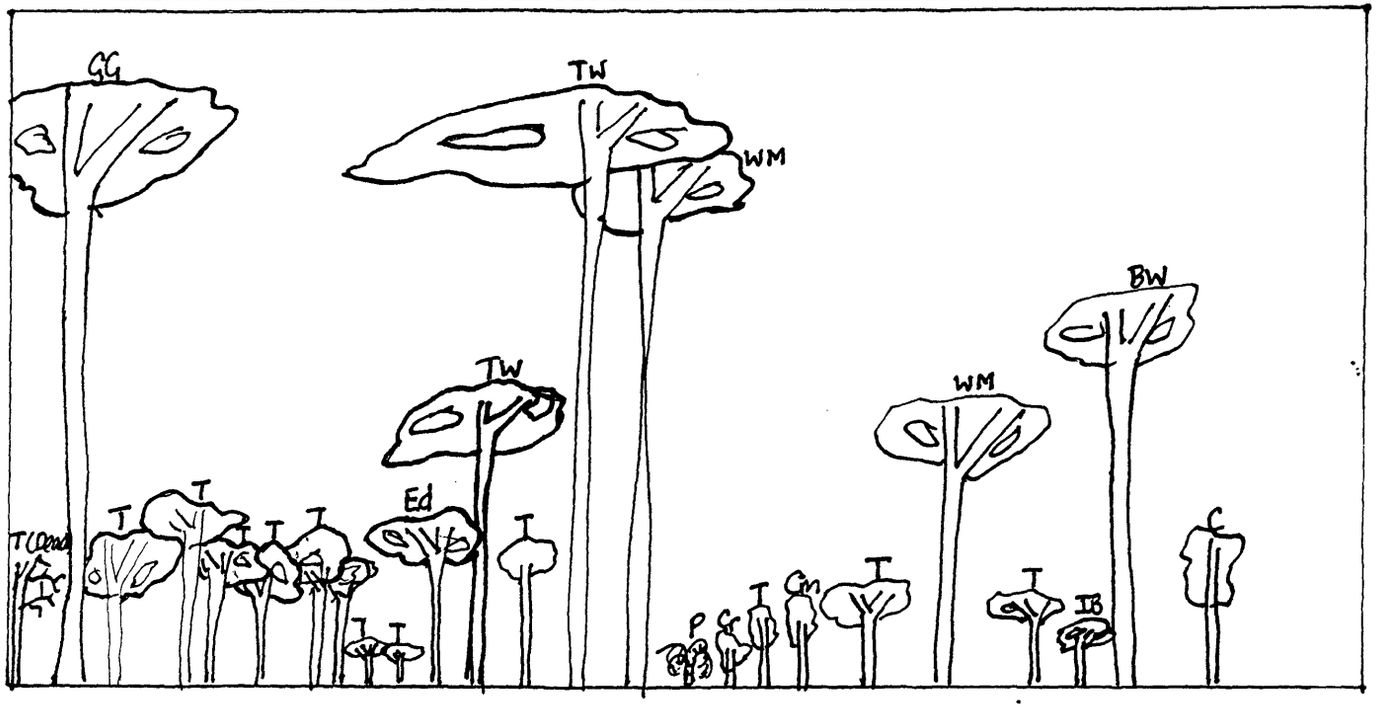


Net Station Control 1
Key:

BG	Blue Gum	*Eucalyptus saligna*	T	Turpentine	*Syncarpia glomulifera*
Sg	Scentless Rosewood	*Synoum glandulosum*	IB	Ironbark (Northern Grey)	*Eucalyptus siderophloia*
BB	Blackbutt	*Eucalyptus pilularis*	Cr	Rose Maple	*Cryptocarya rigida*
TW	Tallowwood	*Eucalyptus microcorys*	AC	Smooth-barked Apple	*Angophora costata*
At	Forest Oak	*Allocasuarina torulosa*	P	Bangalow Palm	*Archontophoenix cunninghamiana*
Ca	Brittlewood	*Claoxylon australe*	Jw	Jackwood	*Cryptocarya glaucescens*
PM	Plum Myrtle	*Plidioistigma glabrum*	El	Bolwarra	*Eupomatia laurina*
			Ed	Rose Walnut	*Endiandra discolor*

Avifauna Research Project
Lower Bucca State Forest
Net Station Site Control 10
Vegetation Profile

Horizontal Scale 1cm = 0.67 m Vertical Scale 1cm =4m

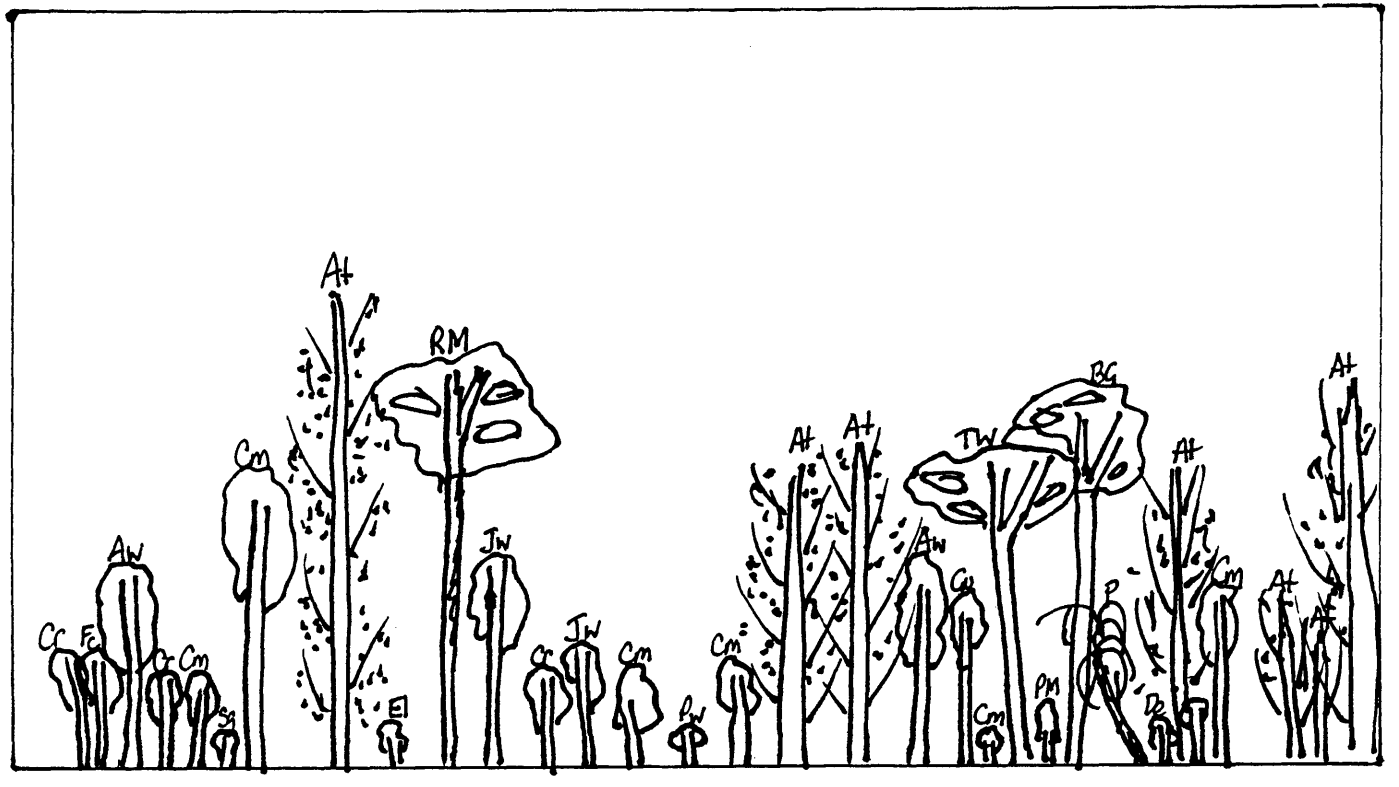


Net Station Control 10
Key:

GG	Grey Gum	*Eucalyptus propinqua*	TW	Tallowwood	*Eucalyptus microcorys*
C	Cassine	*Cassine australe*	Cr	Rose Maple	*Cryptocarya rigida*
T	Turpentine	*Syncarpia glomulifera*	Cm	Murrogun	*Cryptocarya microneura*
Ed	Rose Walnut	*Endiandra discolour*	P	Bangalow Palm	*Archontophoenix cunninghamiana*
BW	Bloodwood (Pink)	*Corymbia intermedia*	IB	Ironbark	*Eucalyptus siderophloia*
WM	White Mahogany	*Eucalyptus acmenioides*			

Avifauna Research Project
Lower Bucca State Forest
Net Station Site Control 14
Vegetation Profile

Horizontal Scale 1cm = 0.67 m Vertical Scale 1cm = 5m



Net Station Control 14
Key:

Cr	Rose Maple	*Cryptocarya rigida*	Aw	Rusty Plum	*Amorphospermum whitei*
At	Forest Oak	*Allocasuarina torulosa*	TW	Tallowwood	*Eucalyptus microcorys*
PM	Plum Myrtle	*Plidioistigma glabrum*	Jw	Jackwood	*Cryptocarya glaucescens*
Pw	Possumwood	*Quintinnia virdonii*	Fc	Sandpaper Fig	*Ficus coronata*
RM	Red Mahogany	*Eucalyptus resinifera*	El	Bolwarra	*Eupomatia laurina*
Gu	Guoia	*Guoia semiglauca*	De	Denhamia	*Denhamia celastroides*
Cm	Murrogun	Cryptocarya microneura			

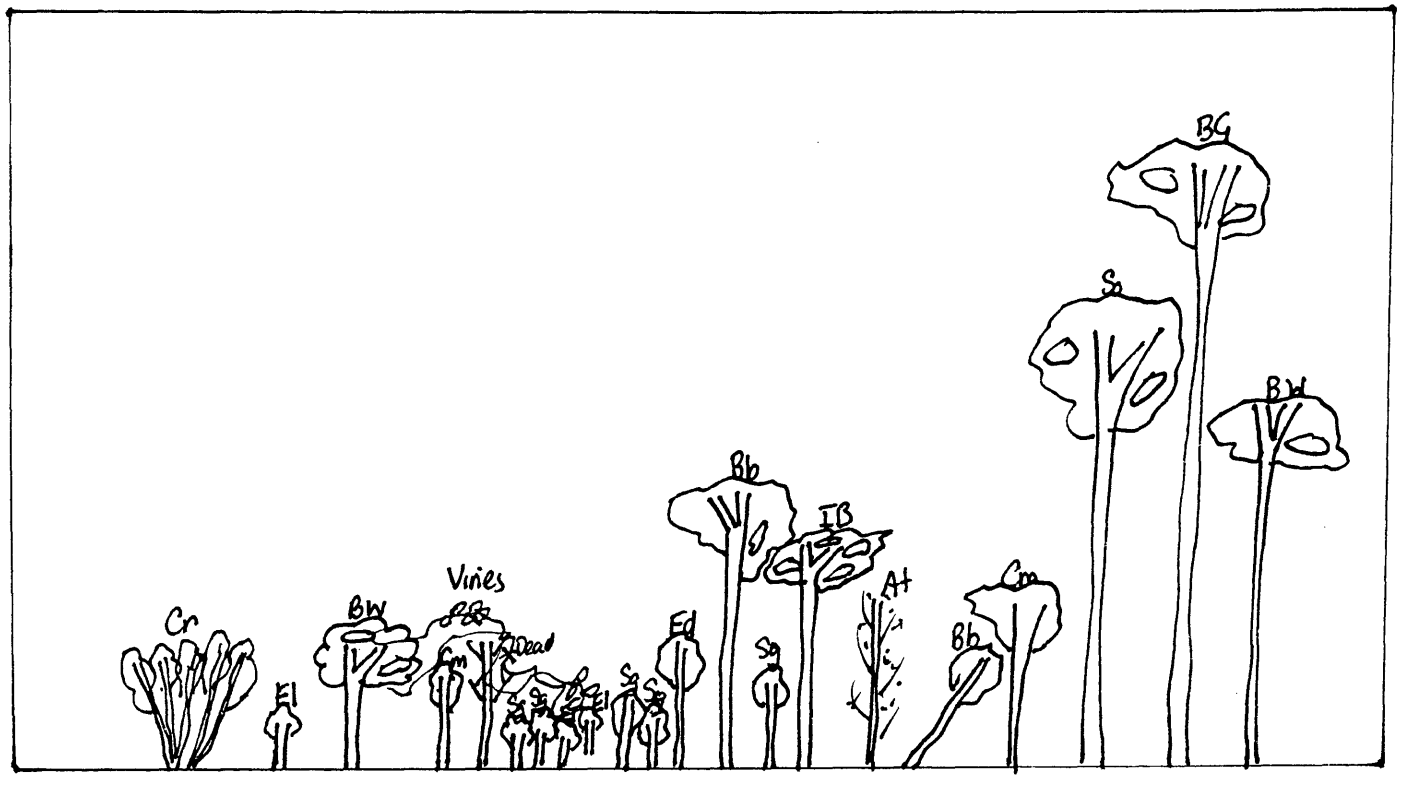
Avifauna Research Project
Lower Bucca State Forest
Net Station Site Control 19
Vegetation Profile 0.67
Horizontal Scale 1cm = m Vertical Scale 1cm = 4m

Net Station Control 19
Key:

BB	Blackbutt	*Eucalyptus pilularis*	At	Forest Oak	*Allocasuarina torulosa*
T	Turpentine	*Syncarpia glomulifera*	Cm	Murrogun	*Cryptocarya microneura*
GG	Grey Gum	*Eucalyptus propinqua*	Dm	Duboisia	*Duboisia myoporoides*
Rr	Scrub Turpentine	*Rhodamnia rubescens*	Ba	Blueberry Ash	*Elaeocarpus reticulatus*
El	Bolwarra	*Eupomatia laurina*	Cs	Callicoma	*Callicoma serratifolia*
Ab	Rose Myrtle	*Archirrhodomyrtus beckleri*	Cr	Rose Maple	*Cryptocarya rigida*
Ps	Persoonia	*Persoonia stradbrokensis*			

Avifauna Research Project
Lower Bucca State Forest
Net Station Site Control 31
Vegetation Profile

Horizontal Scale 1cm = 0.67 m Vertical Scale 1cm = 4m



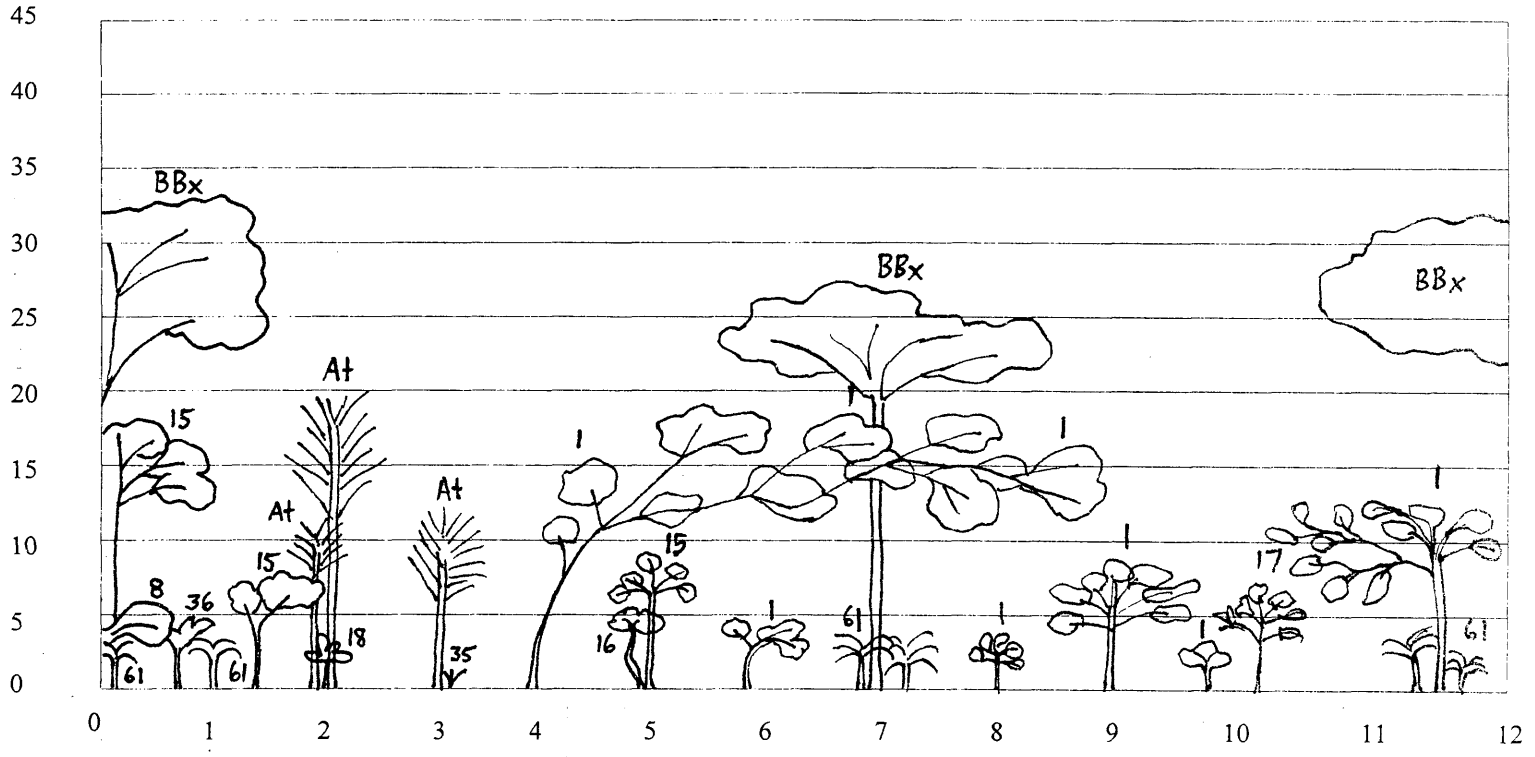
Net Station Control 31
Key:

El	Bolwarra	*Eupomatia laurina*	Cm	Murrogun	*Cryptocarya microneura*
Bb	Brushbox	*Lophostemon confertus*	IB	Ironbark (Northern Grey)	*Eucalyptus siderophloia*
BG	Blue Gum	*Eucalyptus saligna*	BW	Bloodwood (Pink)	*Corymbia intermedia*
Sg	Scentless Rosewood	*Synoum glandulosum*	At	Forest Oak	*Allocasuarina torulosa*
Ed	Rose Walnut	*Endiandra discolour*	So	Crabapple	*Schizomeria ovata*

VEGETATION PROFILE

PLOT: *Year 2 Experimental*
NET STATION: *2*

Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m



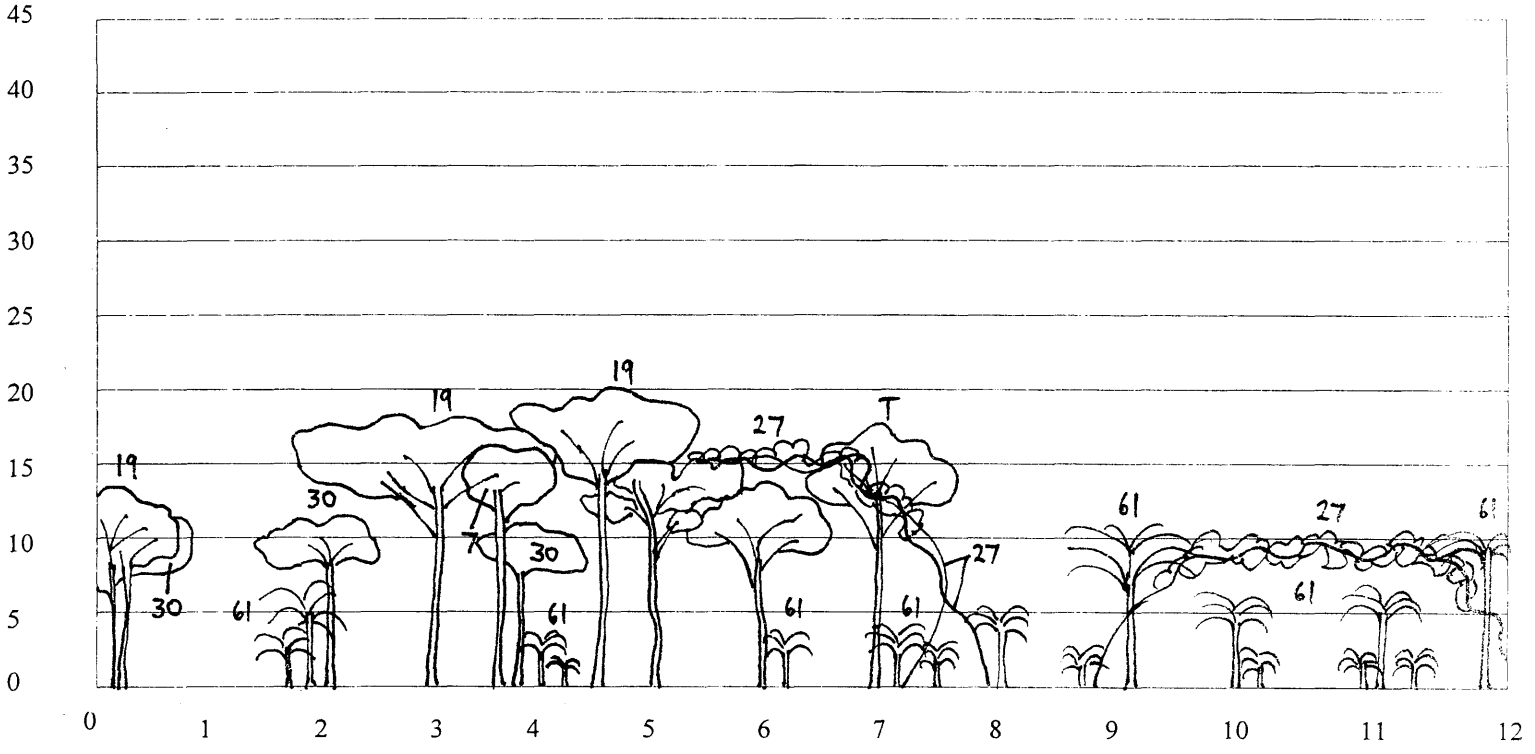
estimated height (m)

distance along net station (m)

VEGETATION PROFILE

PLOT: *Year 2 Experimental*
NET STATION: *12*

Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m



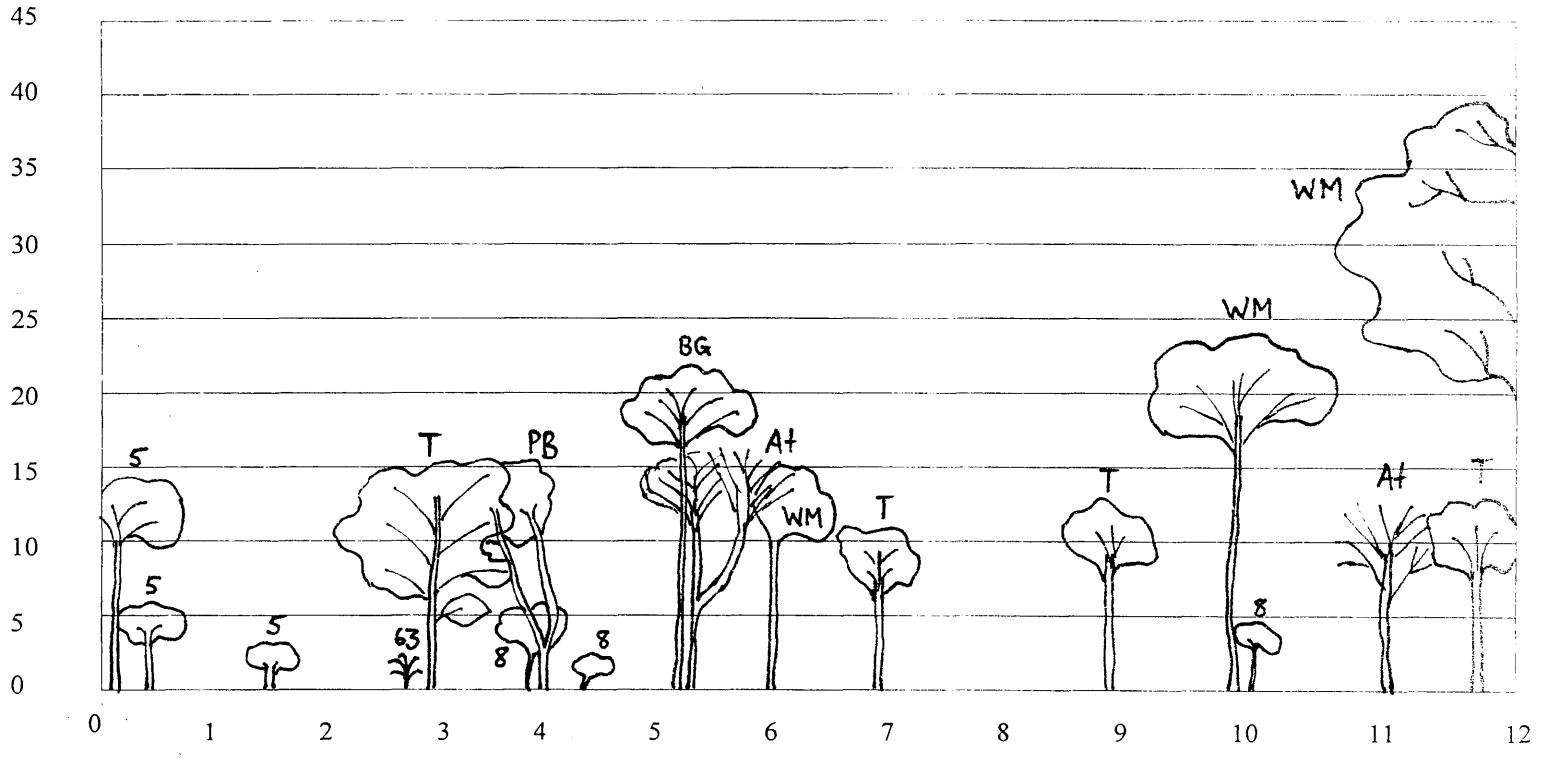
estimated height (m)

distance along net station (m)

VEGETATION PROFILE

PLOT: *Year 2 Experimental*
NET STATION: *42*

Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m



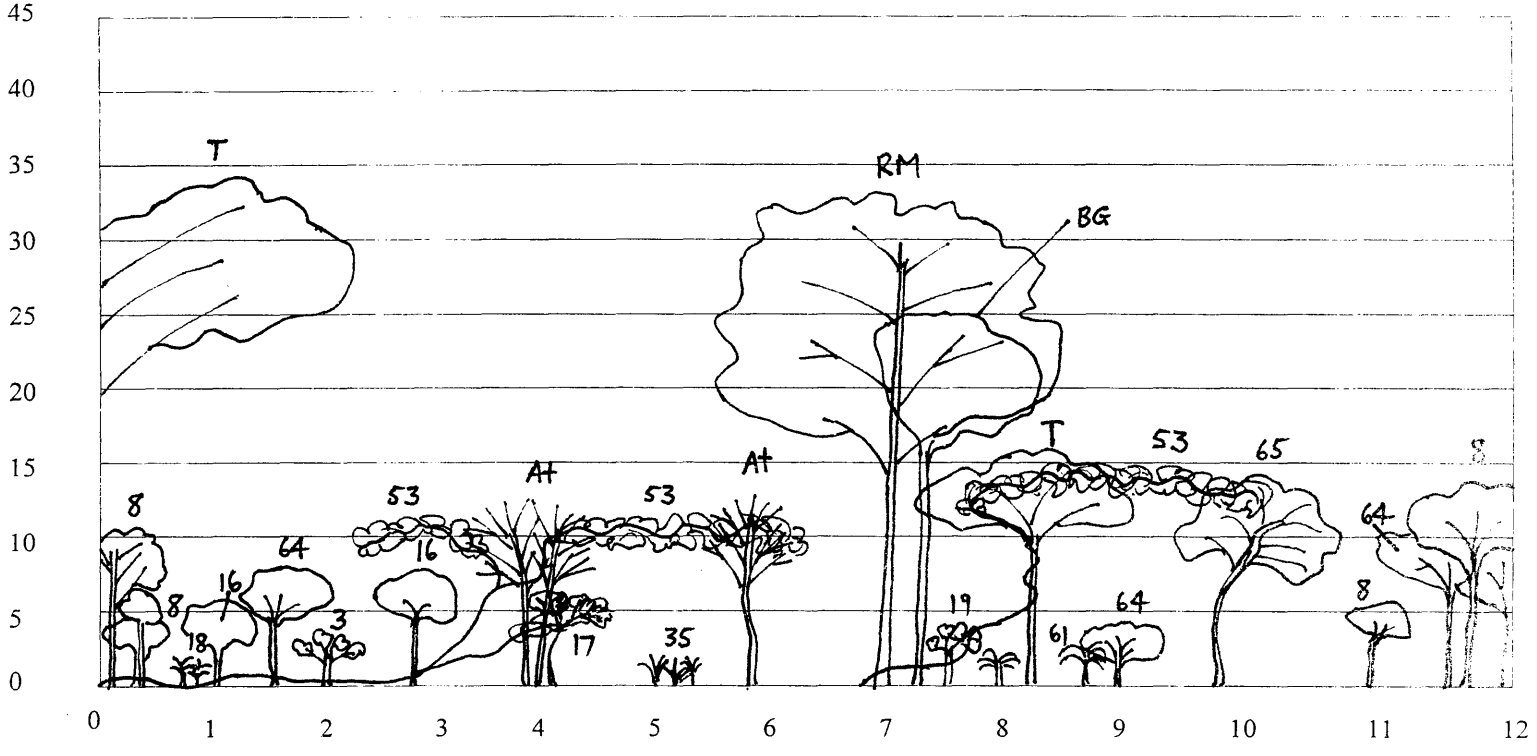
estimated height (m)

distance along net station (m)

VEGETATION PROFILE

PLOT: *Year 2 Experimental*
NET STATION: *45*

Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m



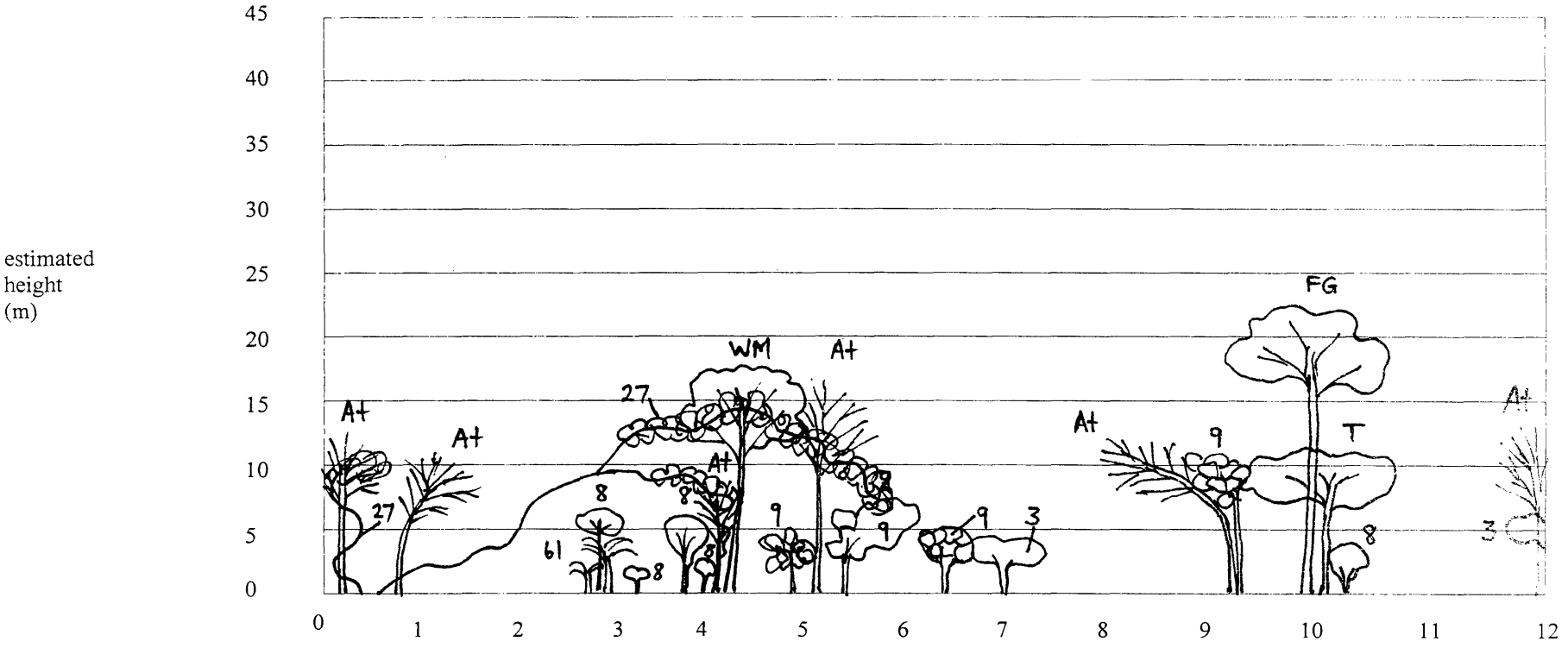
estimated height (m)

distance along net station (m)

VEGETATION PROFILE

PLOT: *Year 2 Experimental*
NET STATION: *66*

Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m

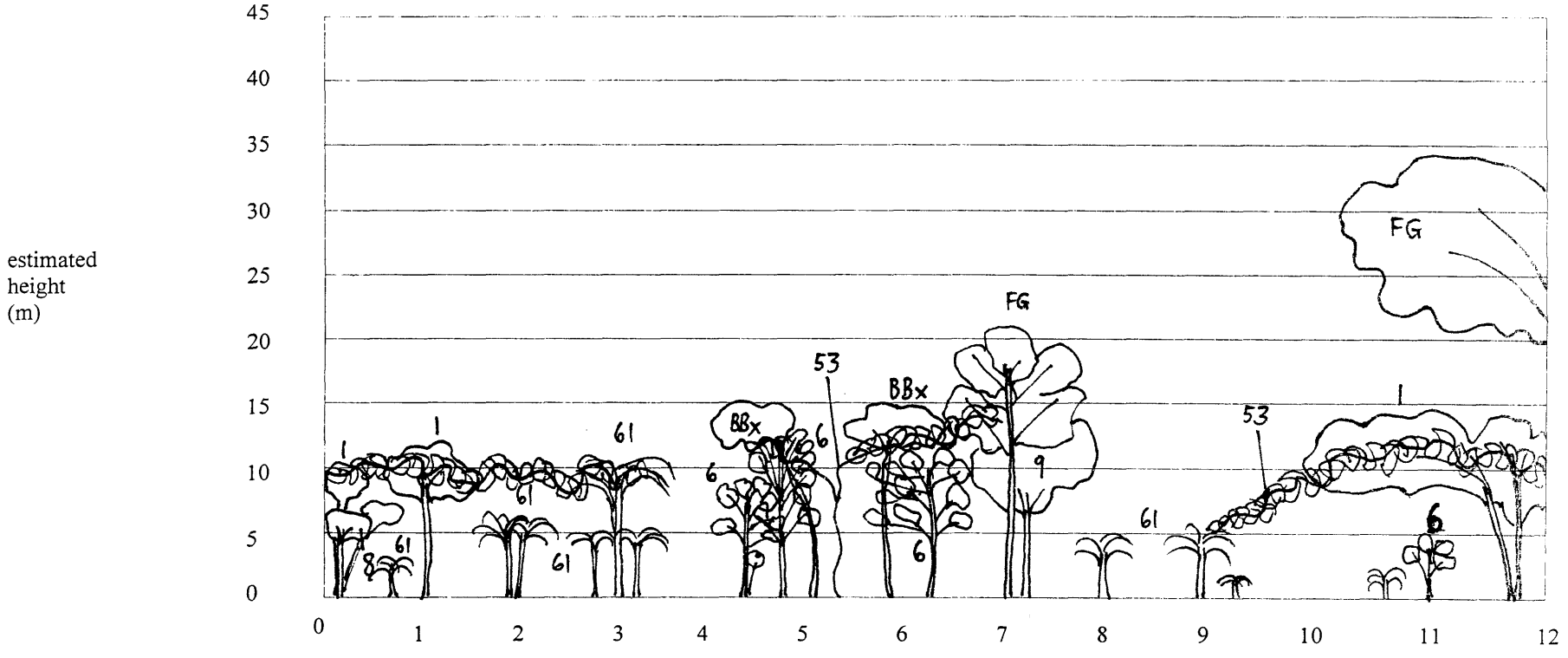


distance along net station (m)

VEGETATION PROFILE

PLOT: *Year 2 Control*
NET STATION: *3*

Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m

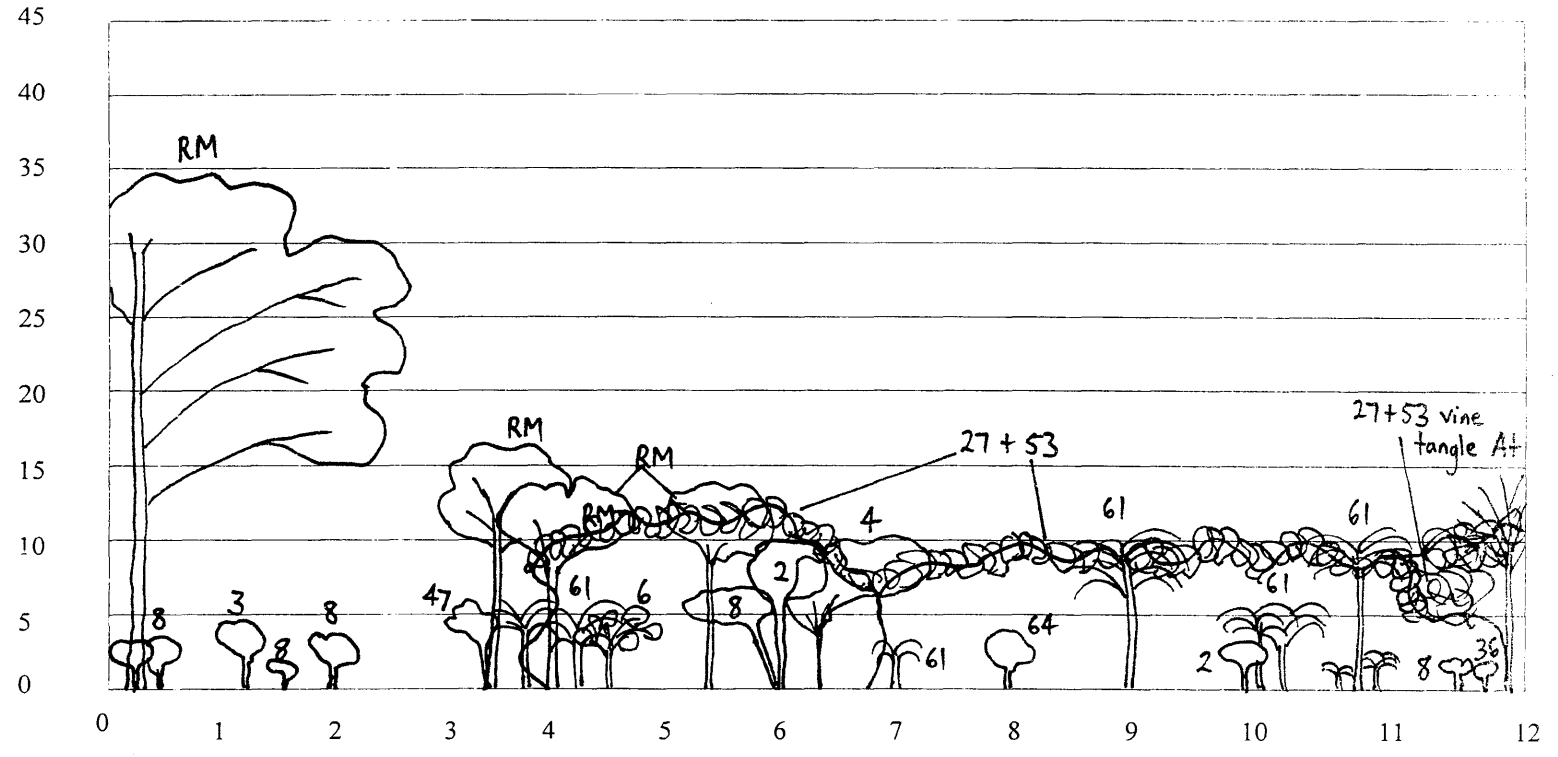


distance along net station (m)

VEGETATION PROFILE

PLOT: *Year 2 Control*
NET STATION: *8*

Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m



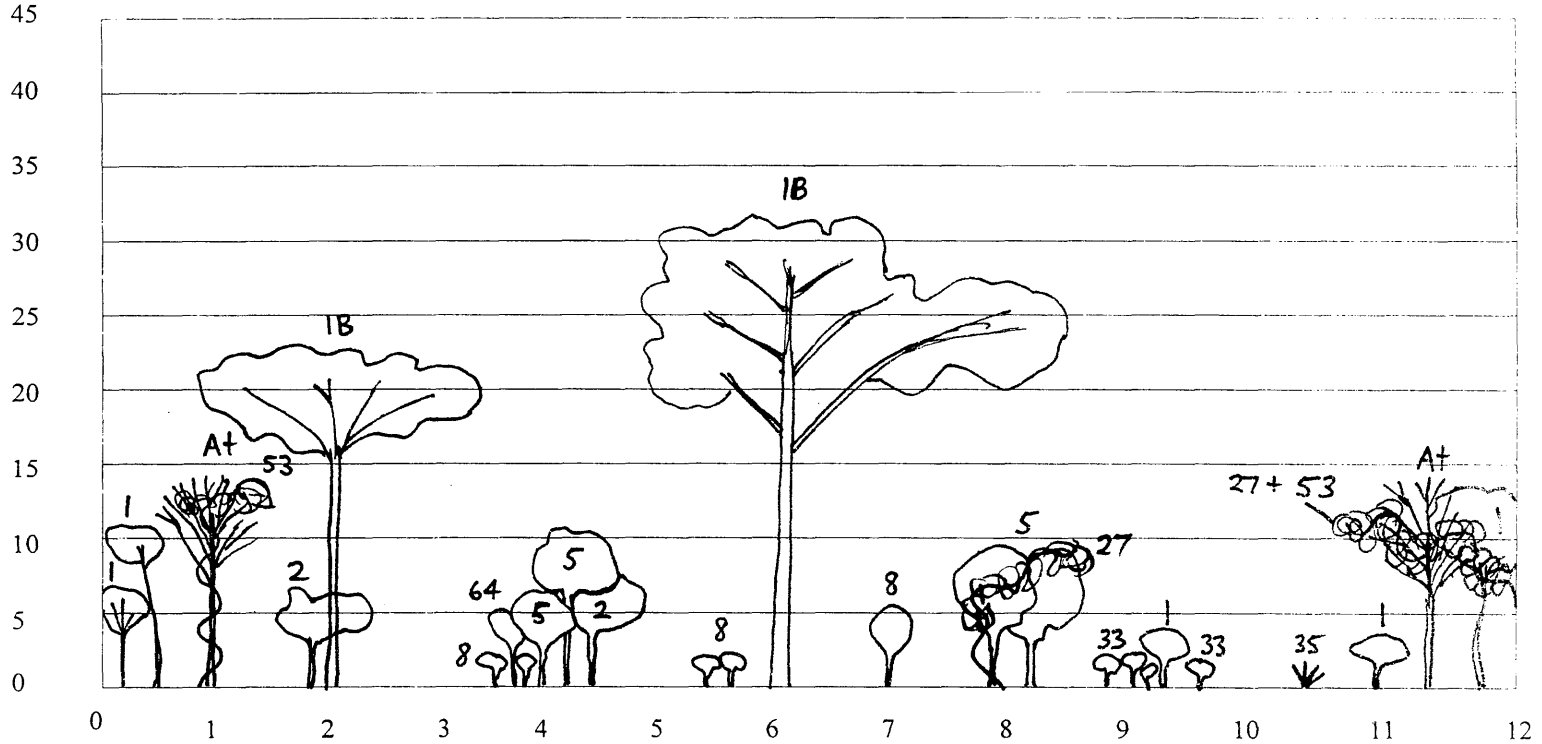
estimated height (m)

distance along net station (m)

VEGETATION PROFILE

PLOT: *Year 2 Control*
NET STATION: *57*

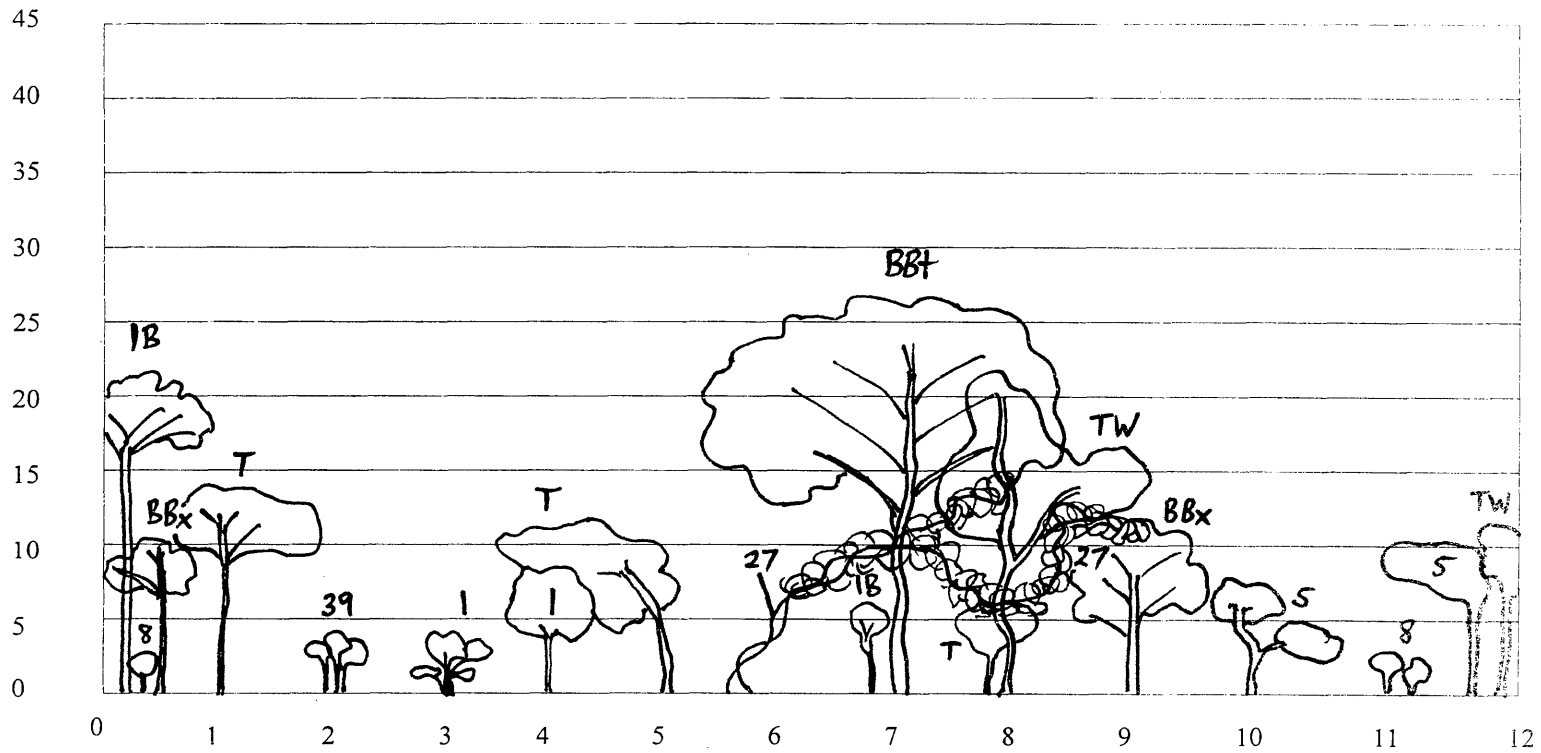
Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m



VEGETATION PROFILE

PLOT: *Year 2 Control*
NET STATION: *64*

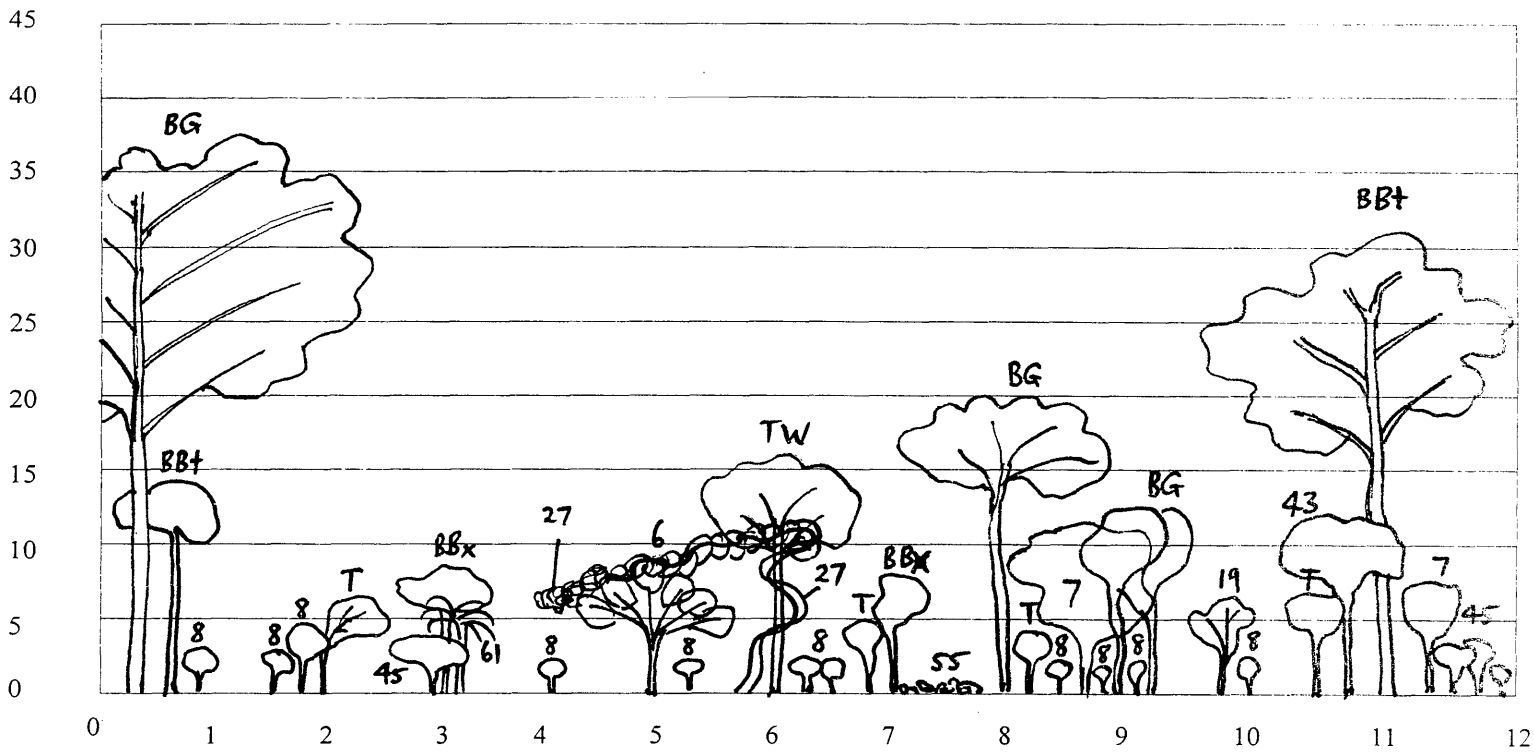
Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m



VEGETATION PROFILE

PLOT: *Year 2 Control*
NET STATION: *78*

Vertical scale 10 mm = 5 m
Horizontal scale 15 mm = 1 m



estimated height (m)

distance along net station (m)

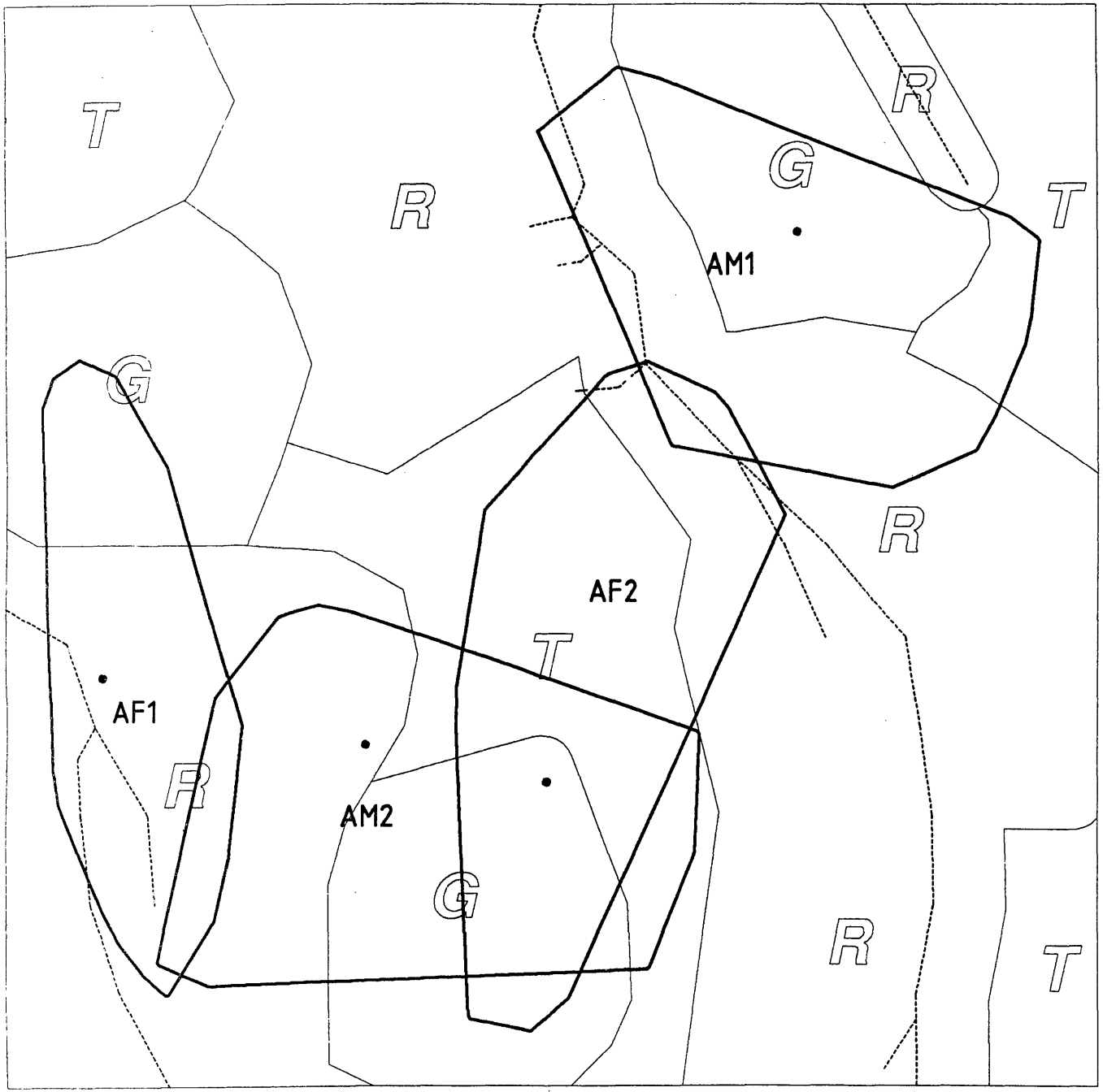
APPENDIX 3

MAPS OF HOME RANGES OF INDIVIDUALS OF THE STUDY SPECIES BEFORE AND AFTER LOGGING IN EACH RESEARCH PLOT

Page guide to map sets (by species)

Presentation

Home range maps are presented for each study species in two separate versions: the first uses the Minimum Convex Polygon (MCP, 95%) method, and the second uses the Harmonic Mean (HM, 95%) approach (see Chapter 5). Where applicable, these are presented for both the before and after logging sampling periods in each plot. Therefore, a total of 4 home range maps are provided for each study species in each plot (ie. 16 maps per sedentary species and 4 maps per migratory species over the study period). The small number of maps obtained for Rufous Fantails and Spectacled Monarchs reflects the limited amount of home range data that I obtained for these species (ie. from the Year 2 plots after logging only).



Map: 1
Eastern Yellow Robin: E1 Plot
home ranges (95% MCP) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
-------	creek
———	home range boundary

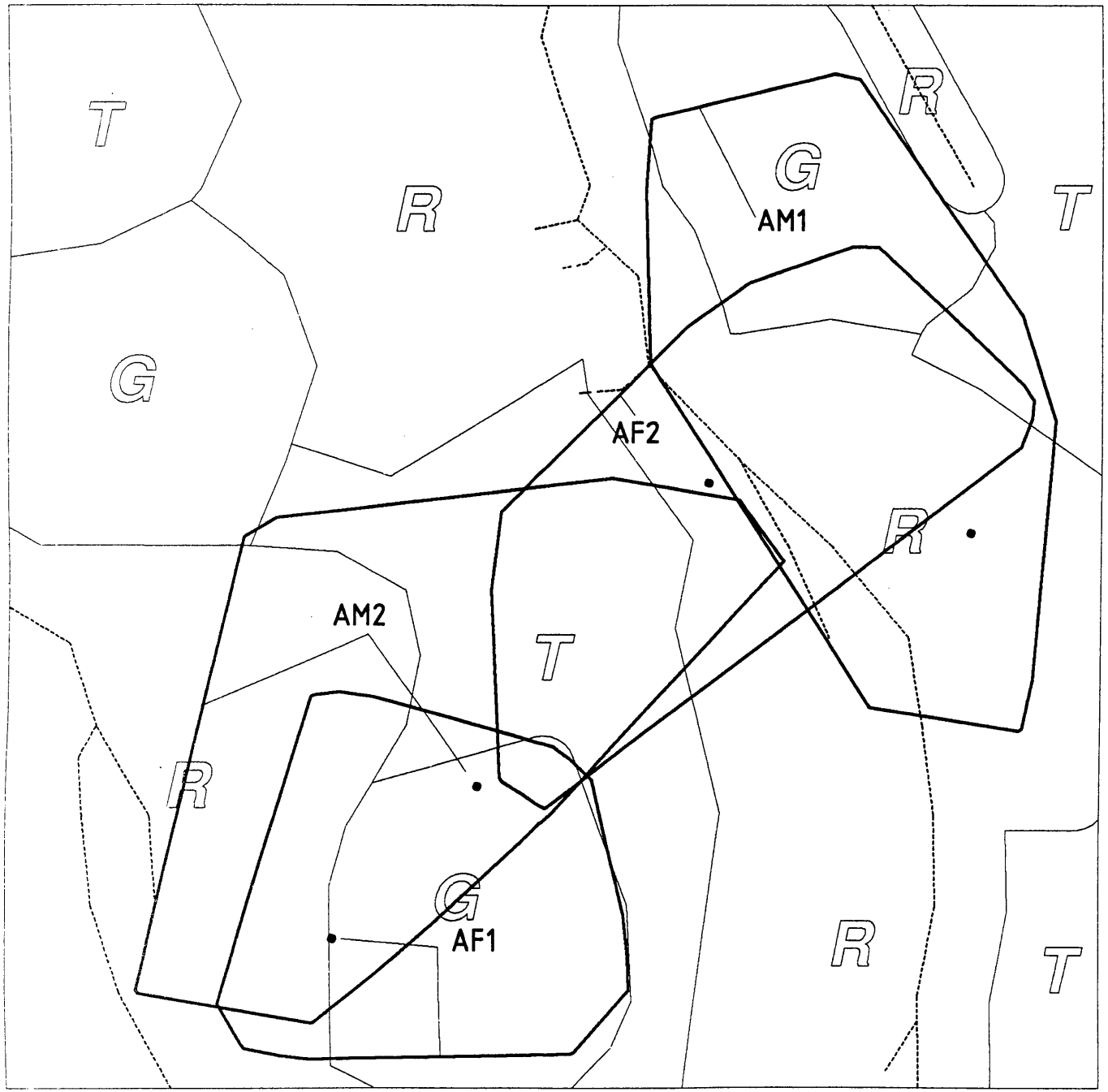
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 2
Eastern Yellow Robin: E1 Plot
home ranges (95% MCP) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
——	creek
——	home range boundary

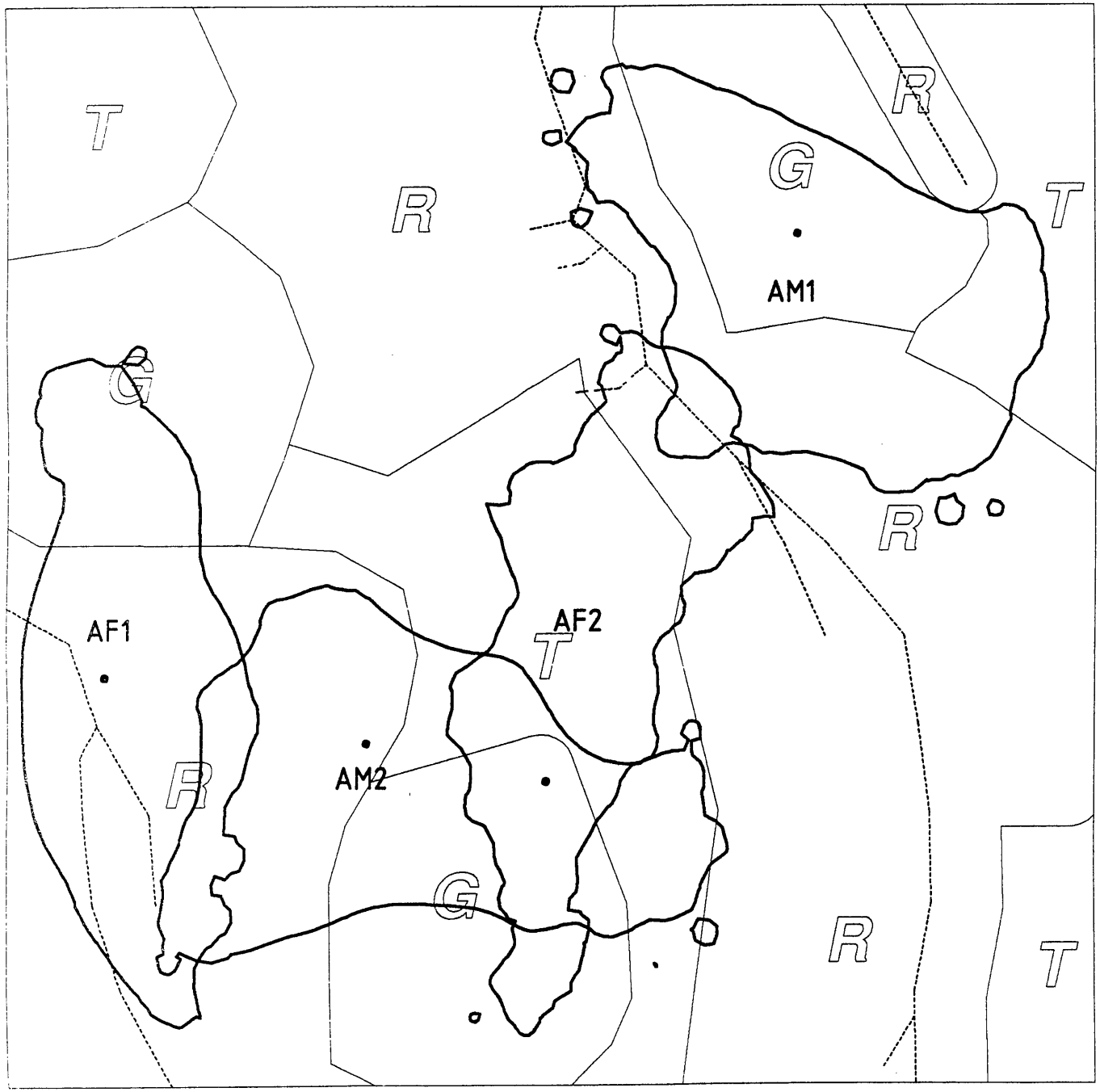
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 3
Eastern Yellow Robin: E1 Plot
home ranges (95% HM) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
----------	creek
———	home range boundary

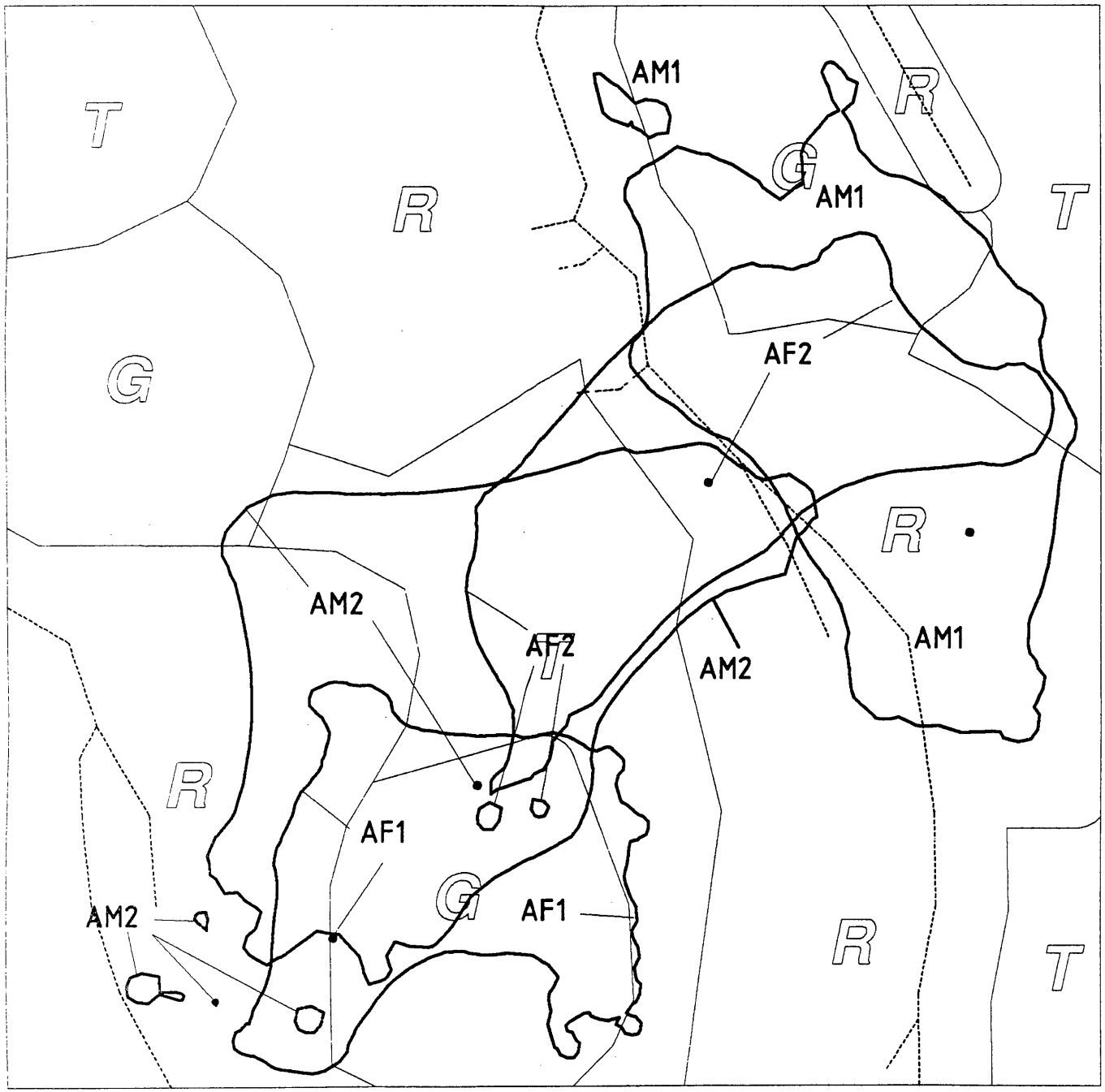
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 4
Eastern Yellow Robin: E1 Plot
home ranges (95% HM) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
-------	creek
——	home range boundary

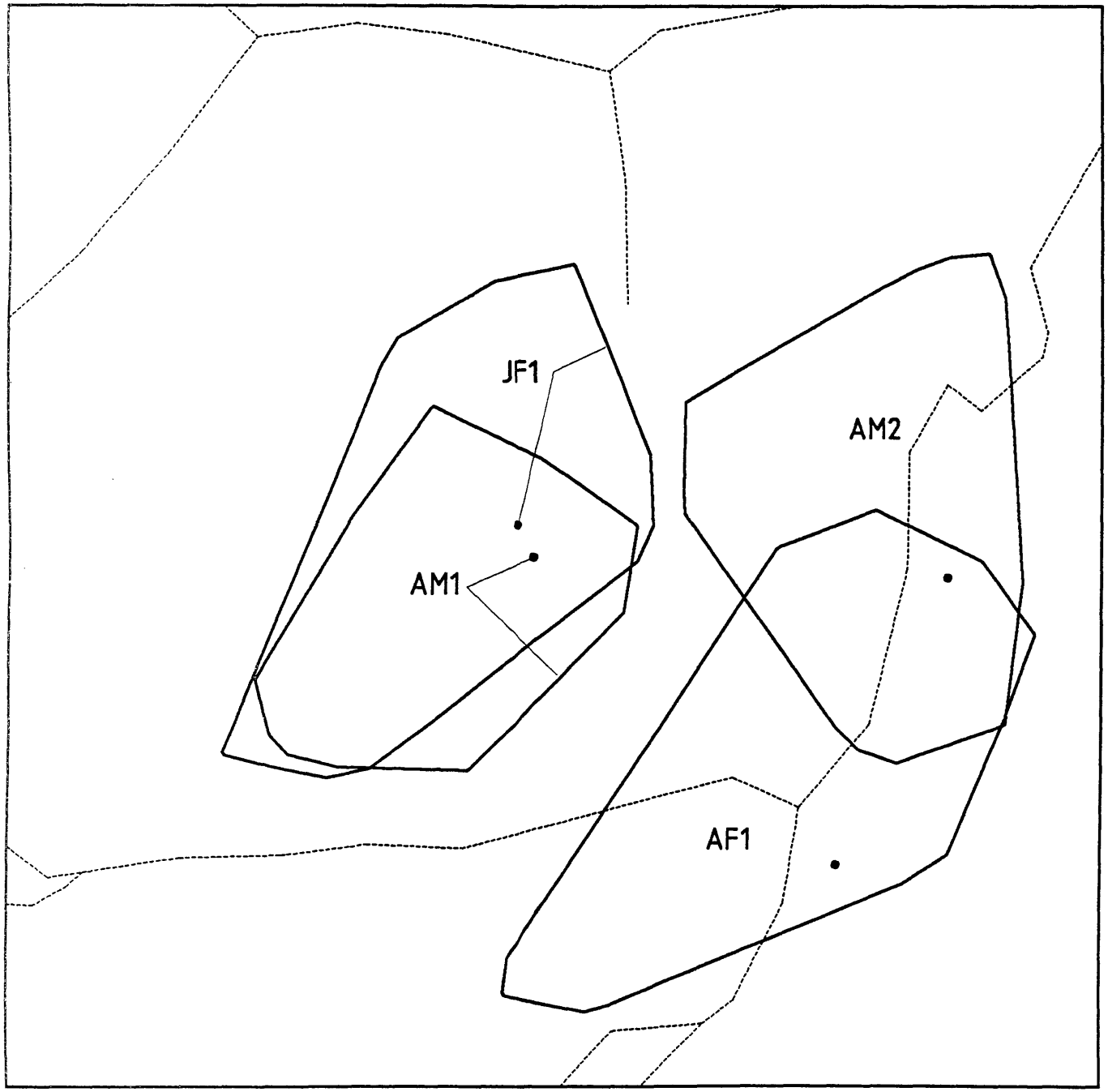
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 5
Eastern Yellow Robin : C1 Plot
home ranges (95% MCP) before logging

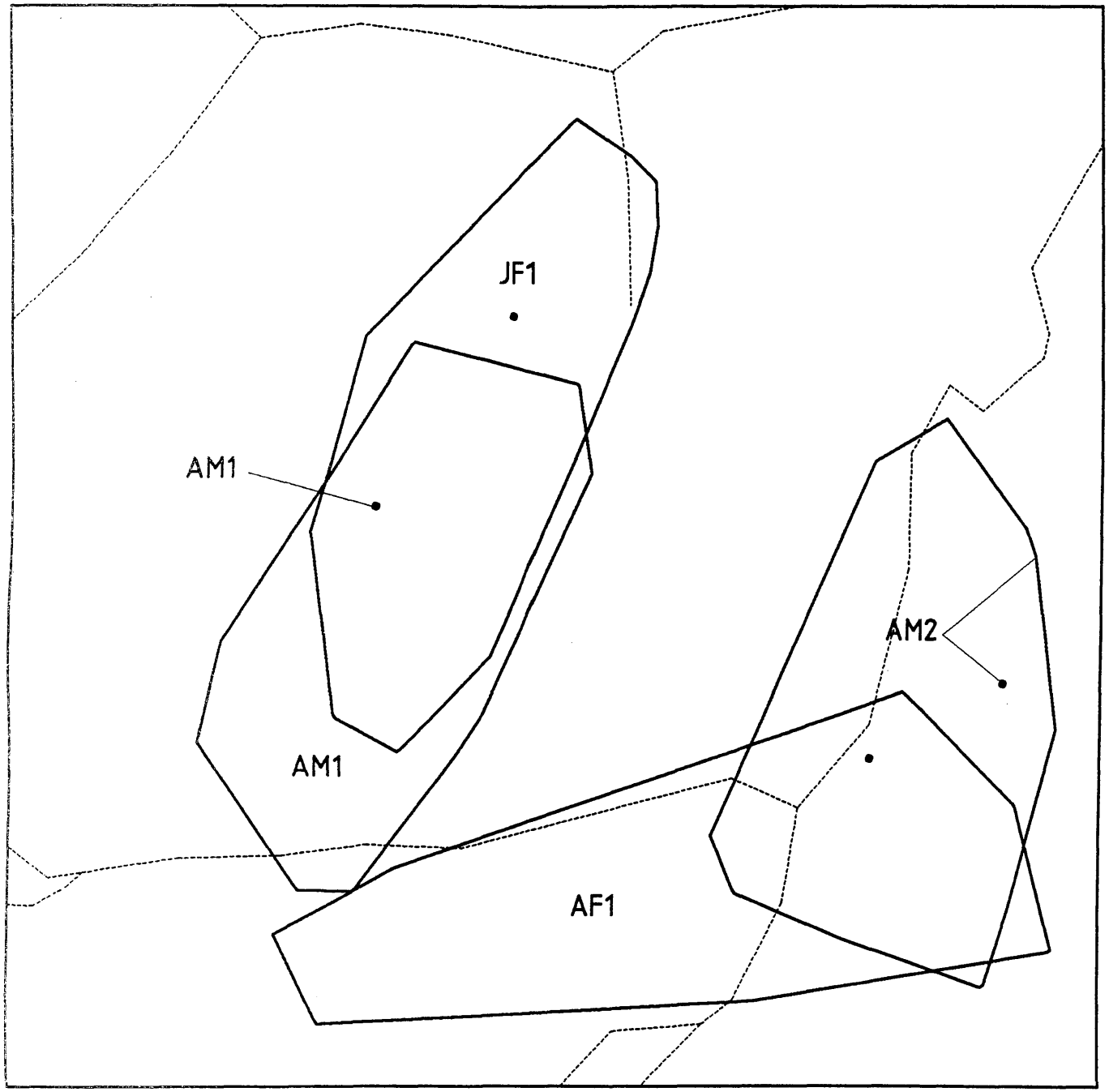
LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
JF1	juvenile female 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 6
Eastern Yellow Robin : C1 Plot
home ranges (95% MCP) after logging

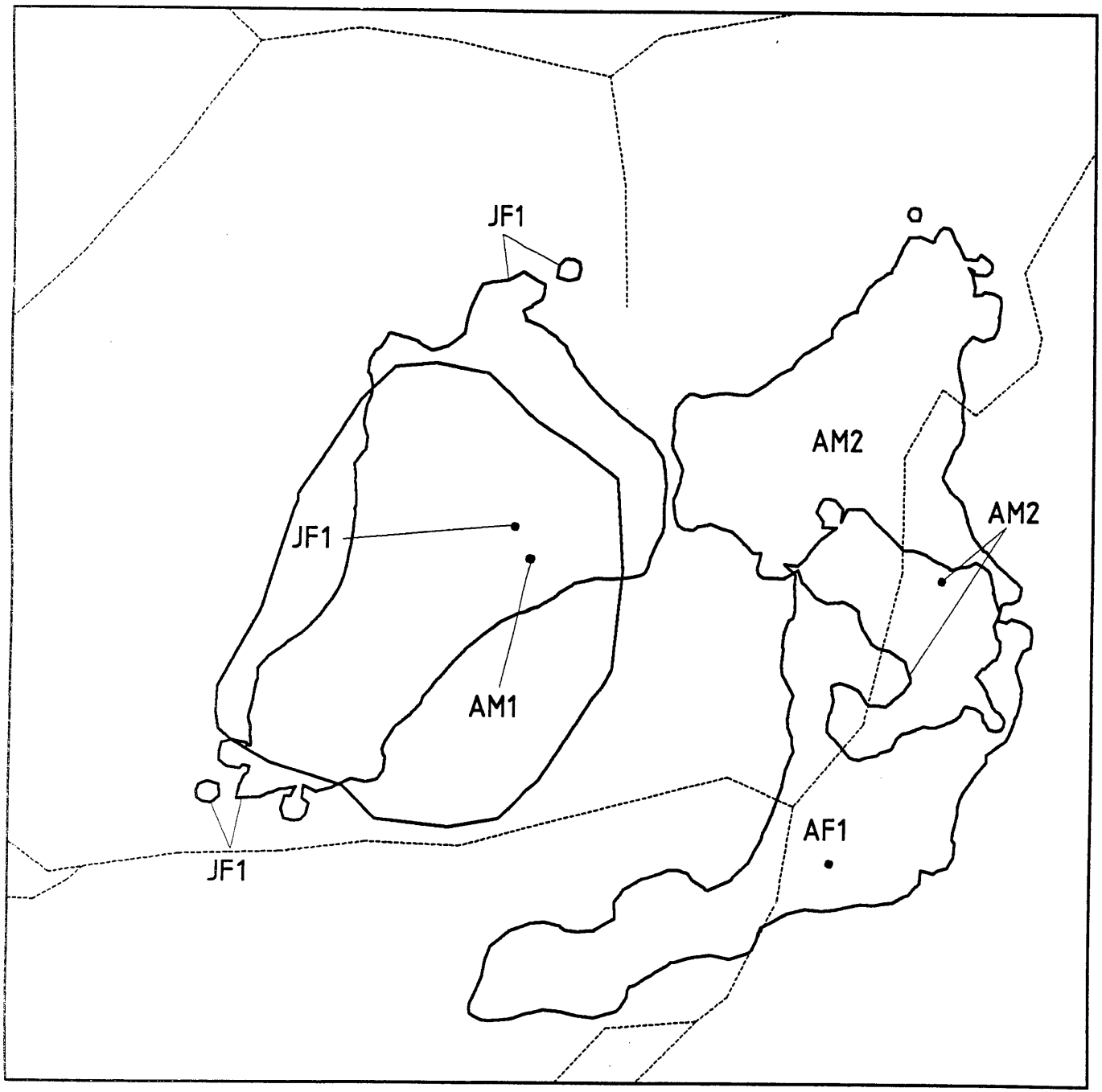
LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
JF1	juvenile female 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 7
Eastern Yellow Robin : C1 Plot
home ranges (95% HM) before logging

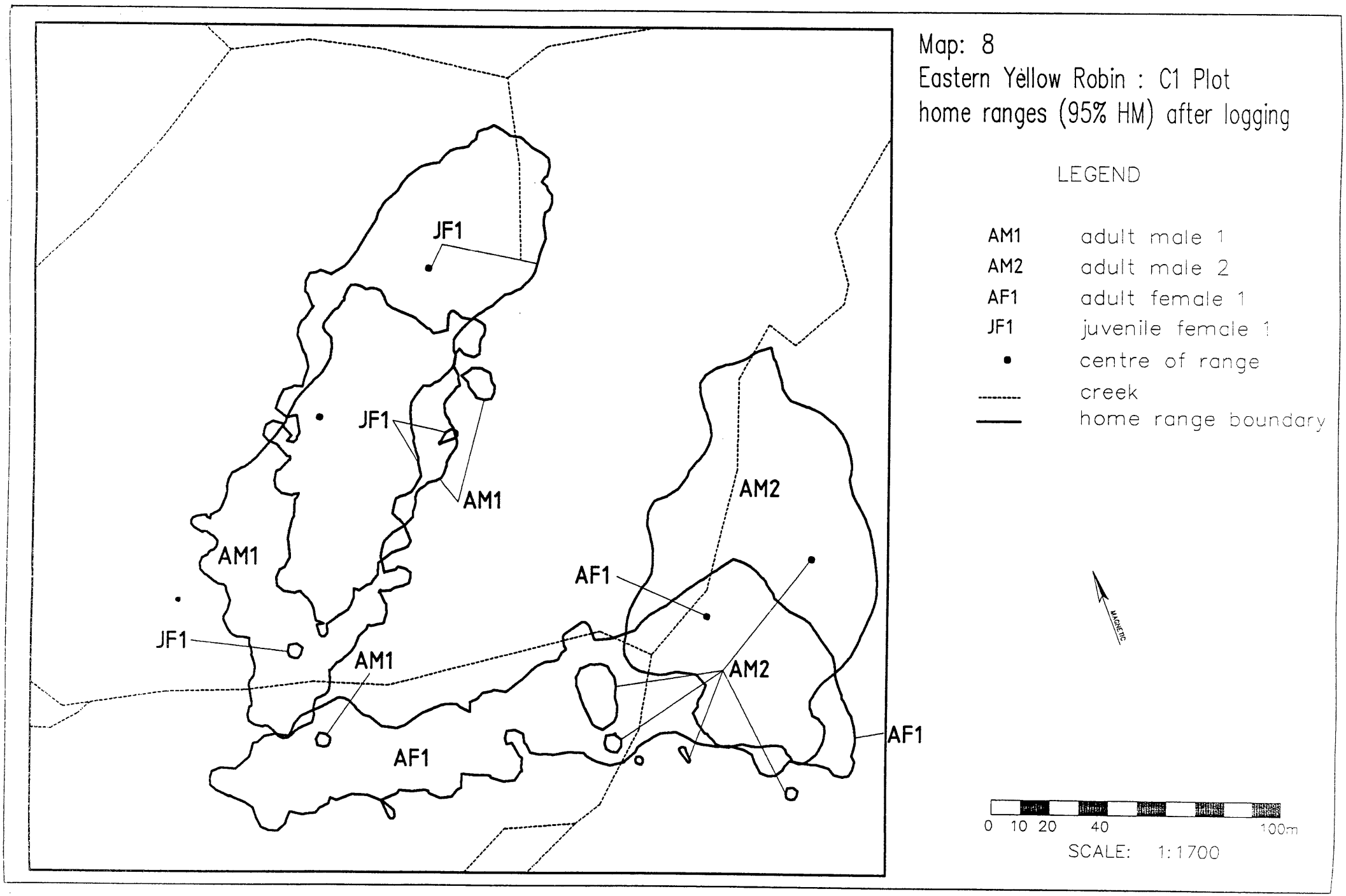
LEGEND

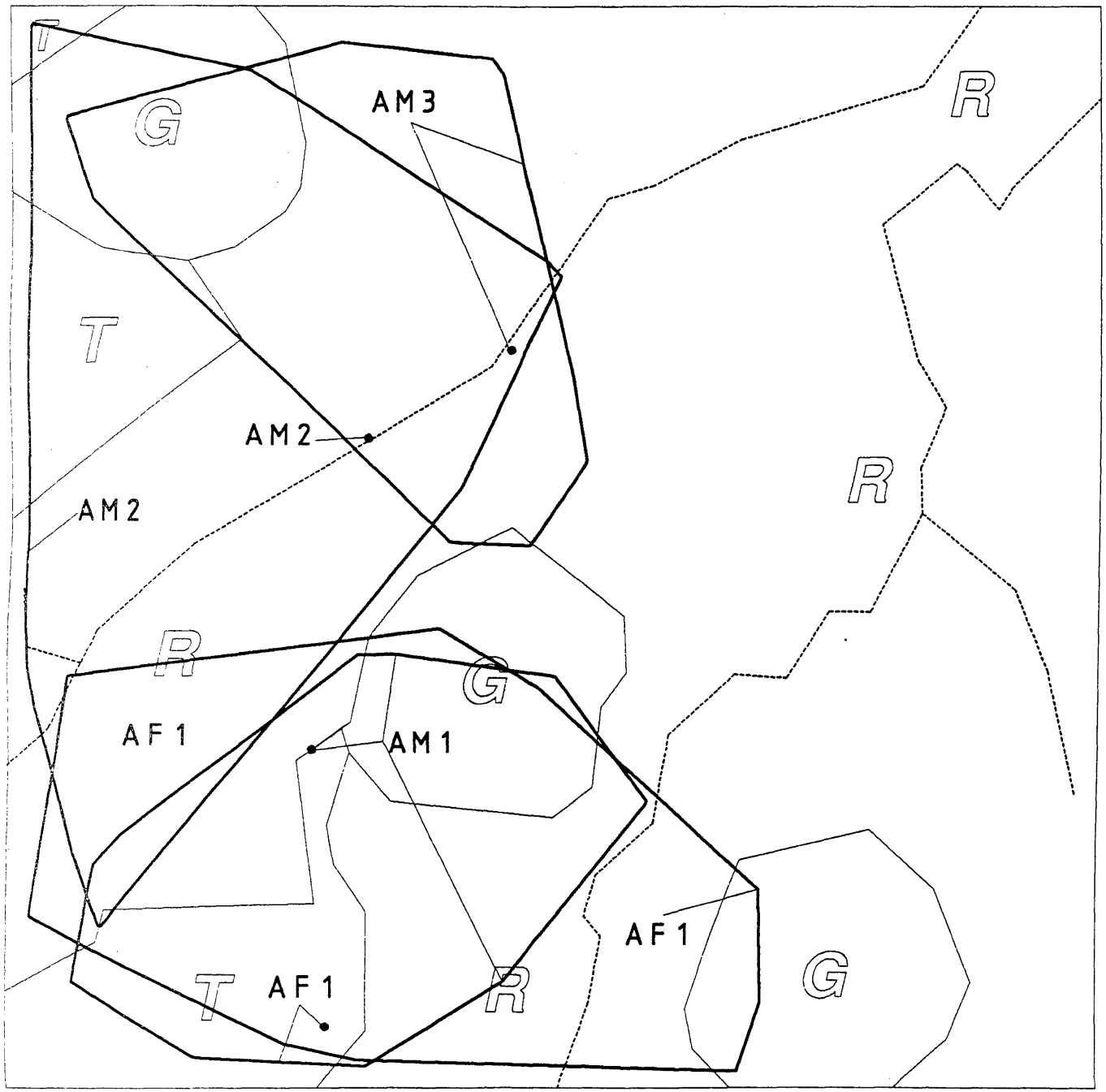
AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
JF1	juvenile female 1
•	centre of range
-------	creek
———	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700


JF1
JF1
AM1
AM1
AM1
JF1
AM1
AF1
AF1
AM2
AM2
AF1
Map: 8
Eastern Yellow Robin : C1 Plot
home ranges (95% HM) after logging
LEGEND
AM1 adult male 1
AM2 adult male 2
AF1 adult female 1
JF1 juvenile female 1
centre of range
creek
home range boundary
MAGNETIC
0 10 20 40 100m
SCALE: 1:1700



Map: 9
Eastern Yellow Robin : E2 Plot
home ranges (95% MCP) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
———	home range boundary

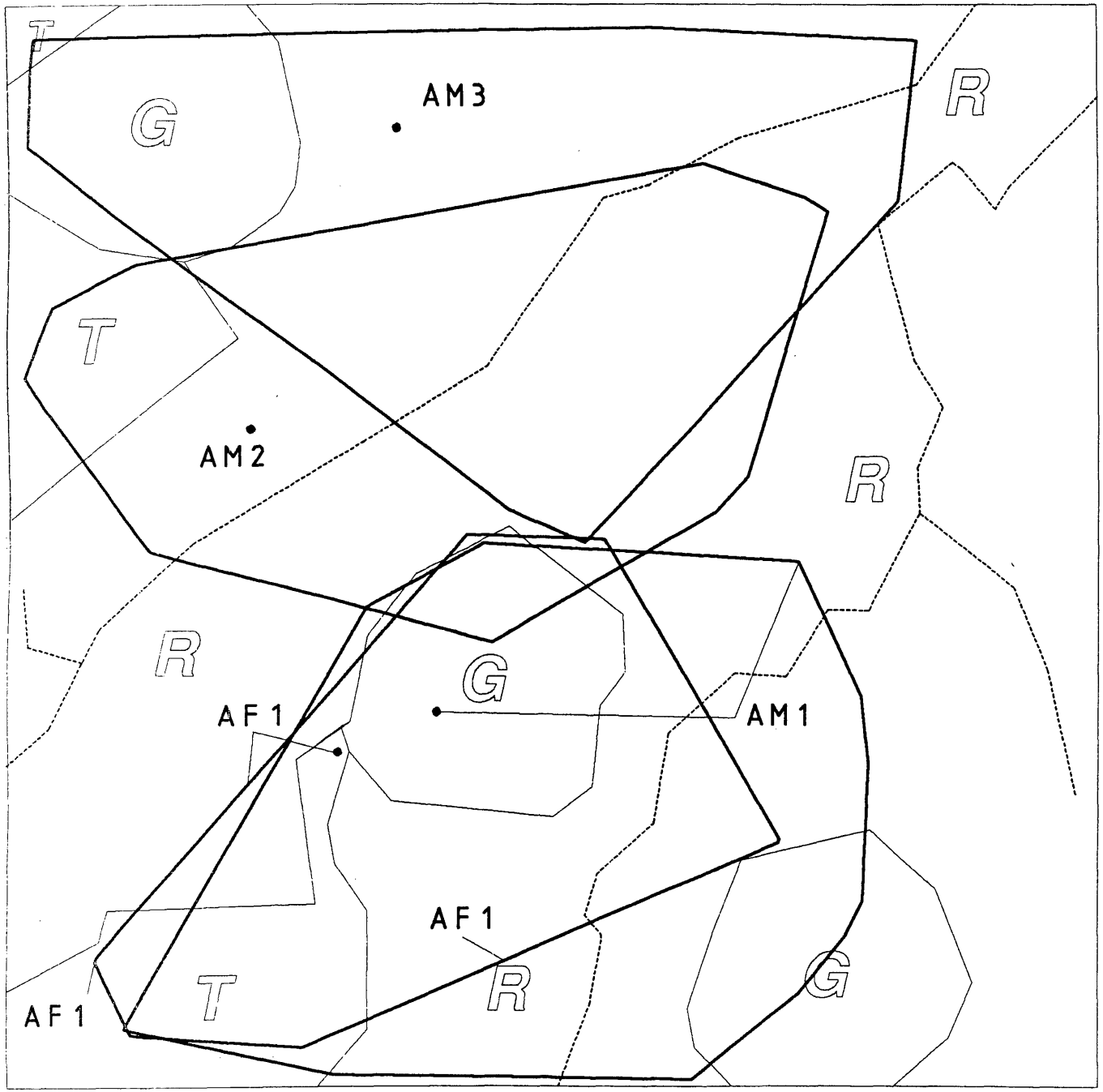
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 10
Eastern Yellow Robin : E2 Plot
home ranges (95% MCP) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
———	home range boundary

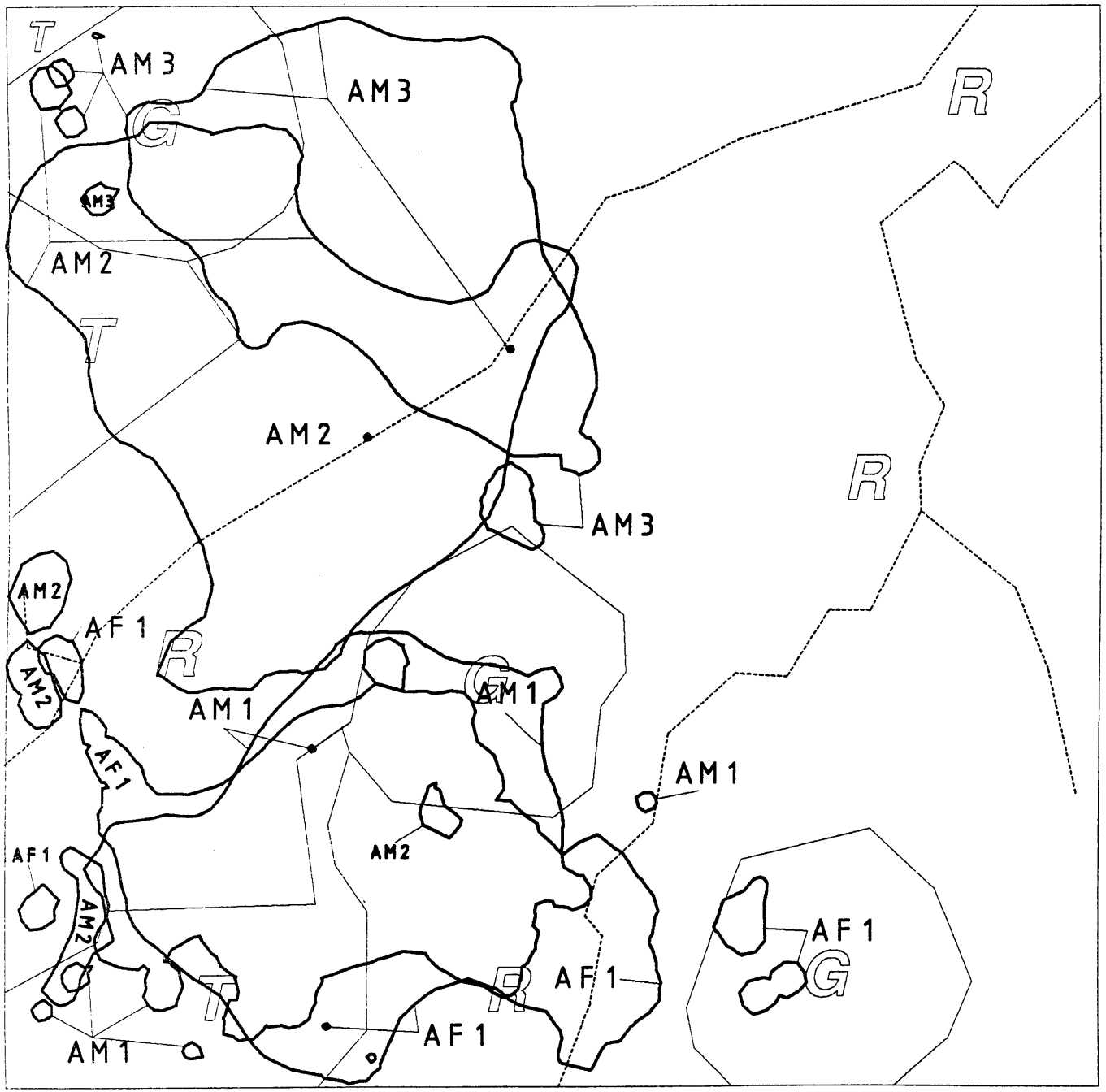
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 11

Eastern Yellow Robin : E2 Plot

home ranges (95% HM) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

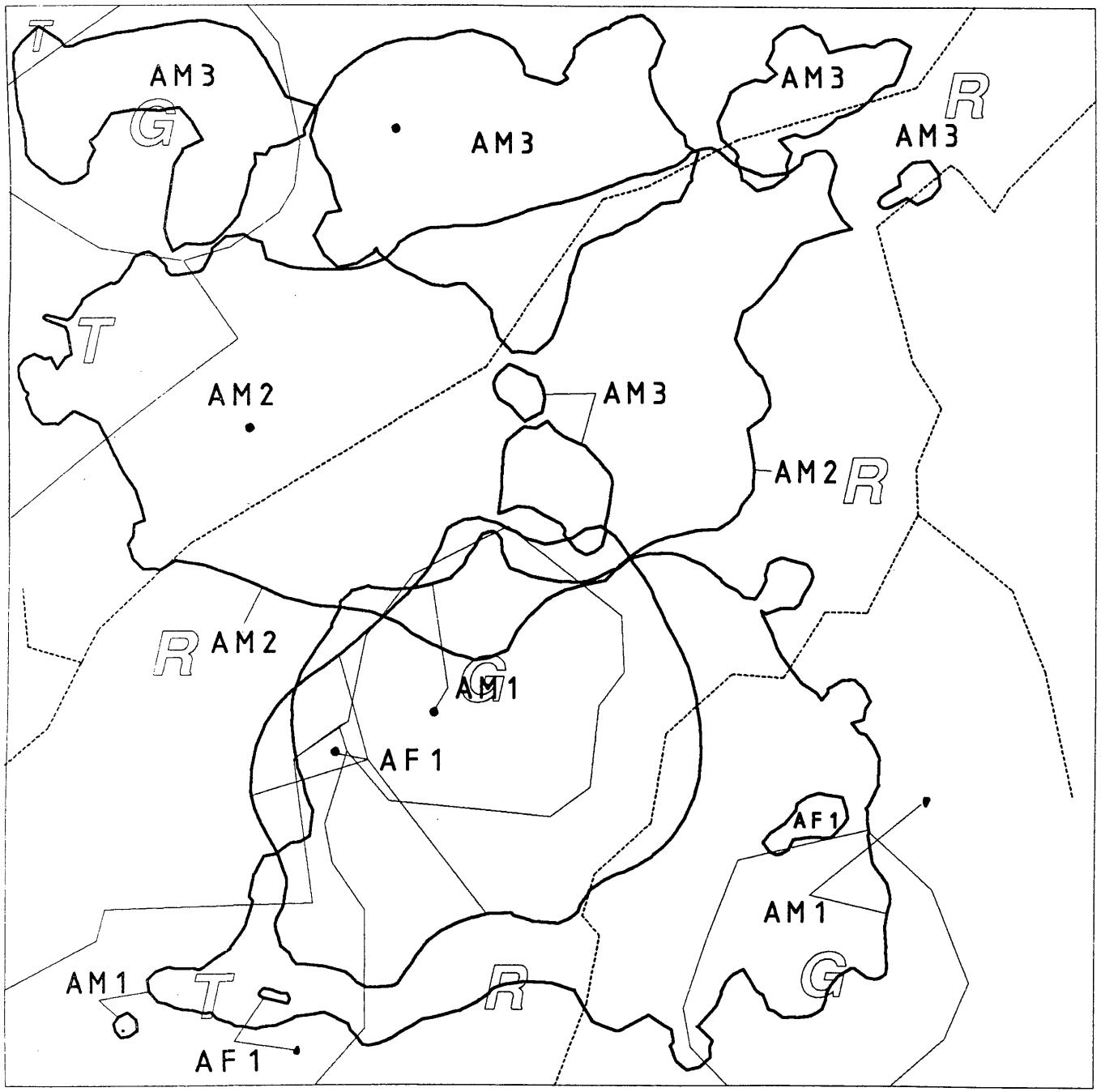
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 12

Eastern Yellow Robin : E2 Plot

home ranges (95% HM) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

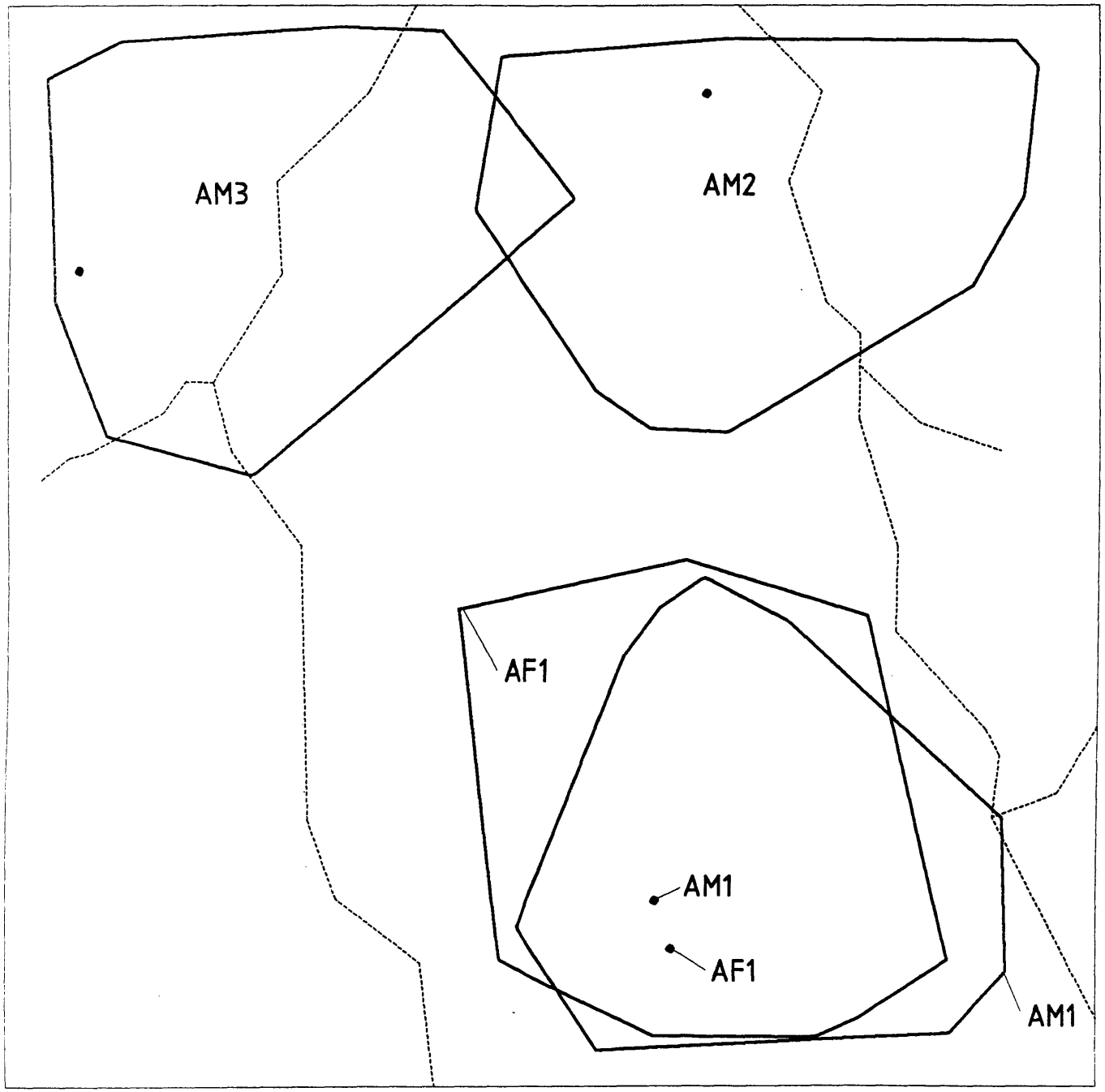
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 13
Eastern Yellow Robin : C2 Plot
home ranges (95% MCP) before logging

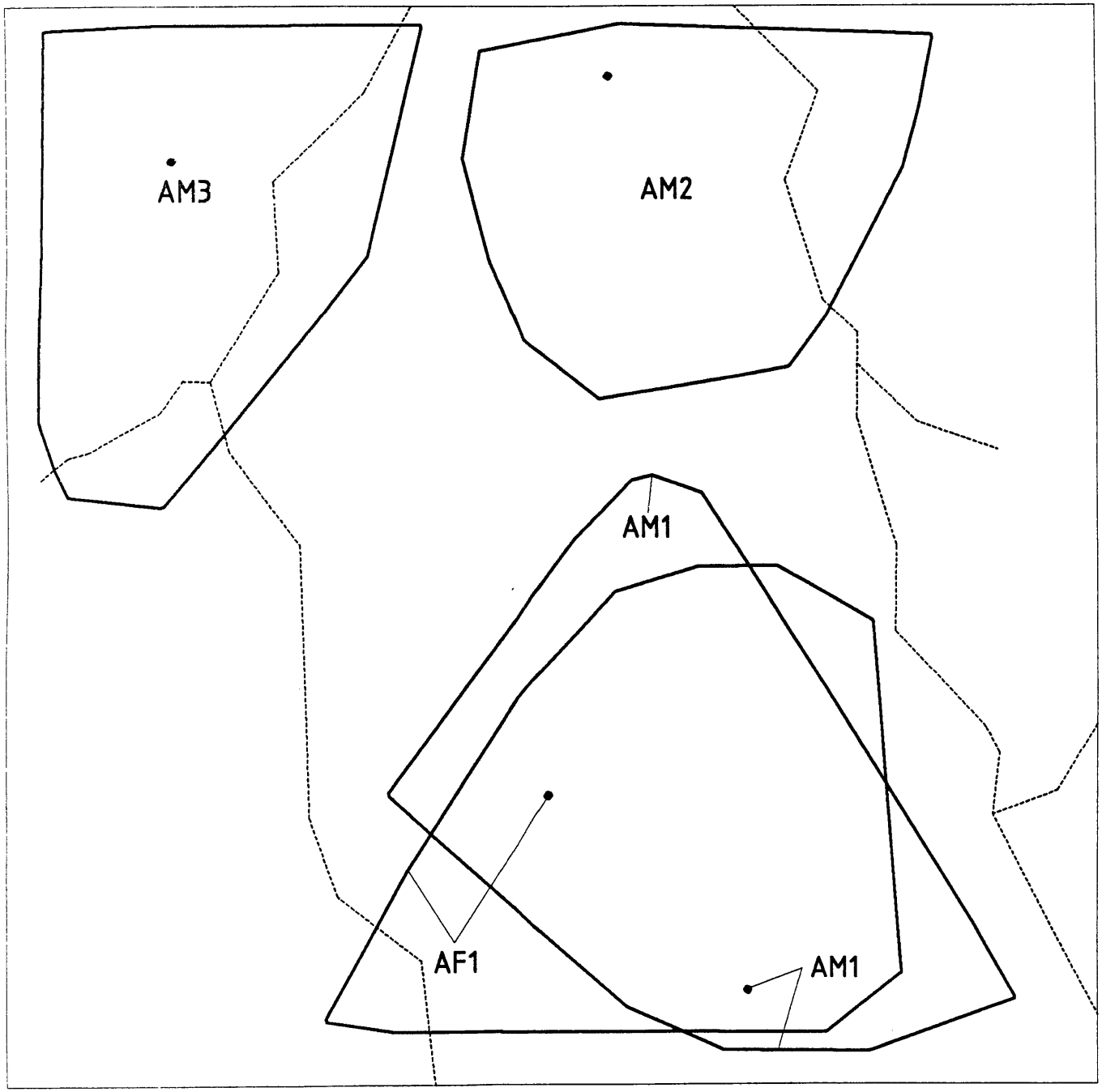
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 14
Eastern Yellow Robin : C2 Plot
home ranges (95% MCP) after logging

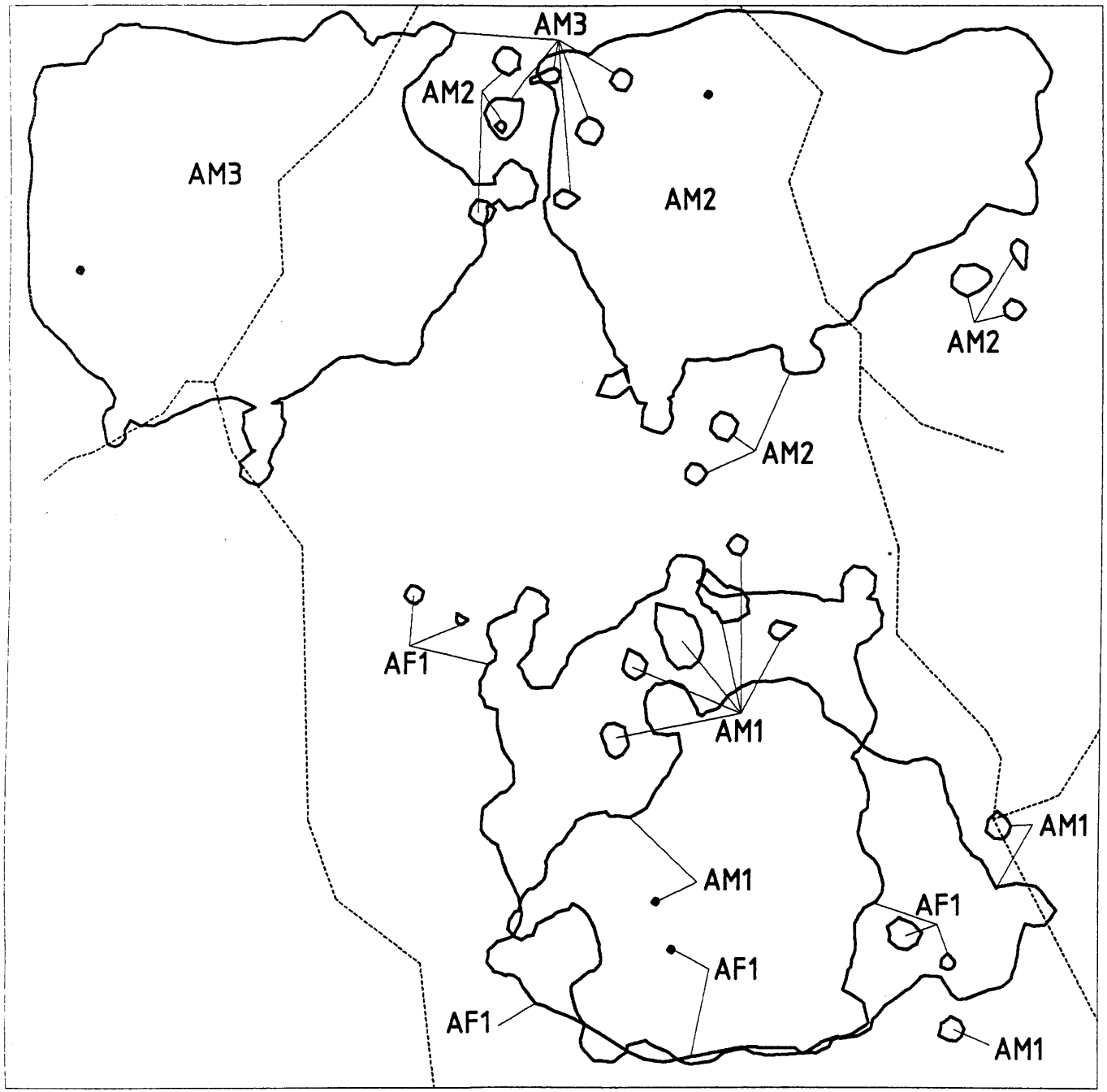
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
----------	creek
————	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 15
Eastern Yellow Robin : C2 Plot
home ranges (95% HM) before logging

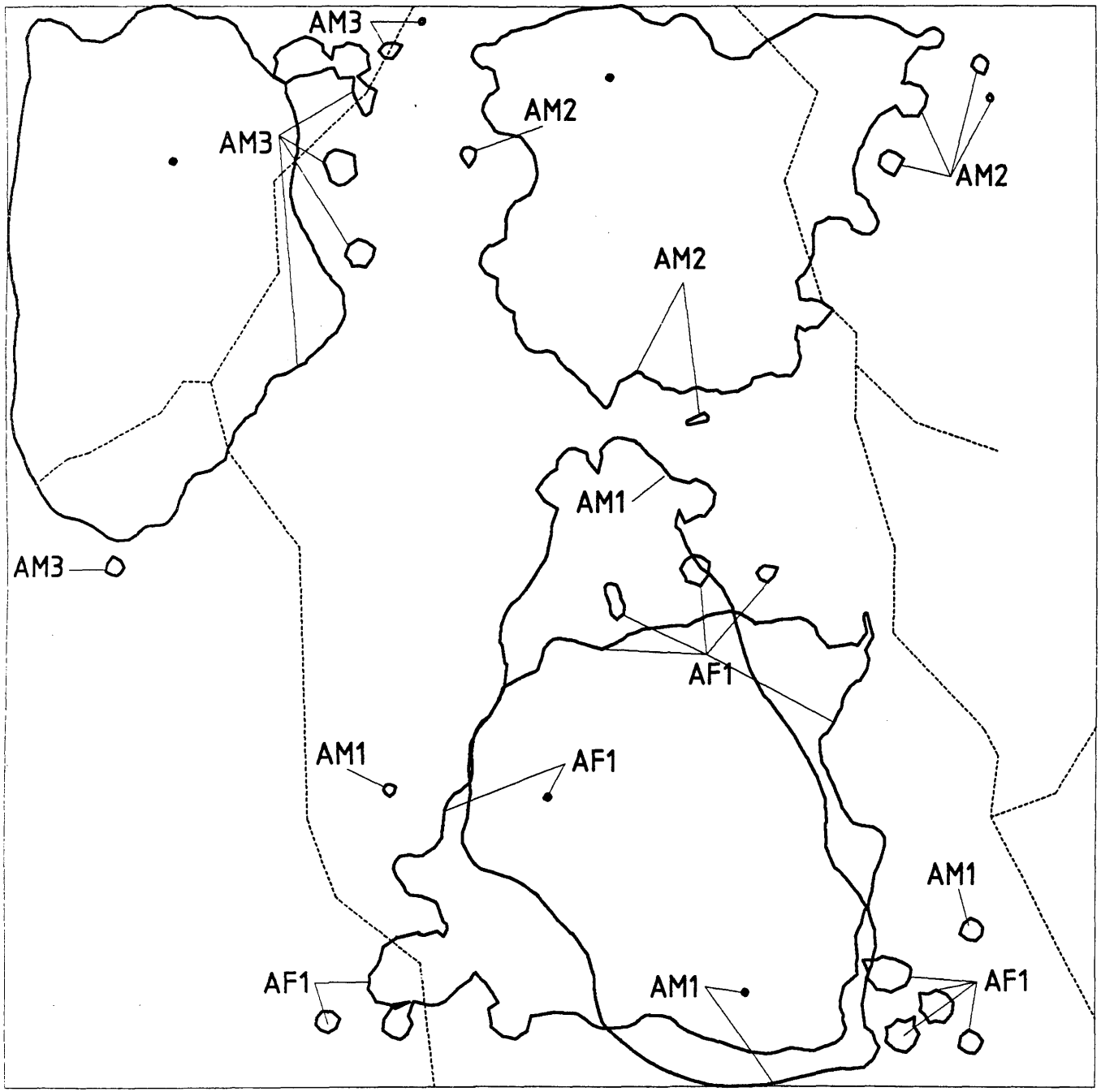
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 16
Eastern Yellow Robin : C2 Plot
home ranges (95% HM) after logging

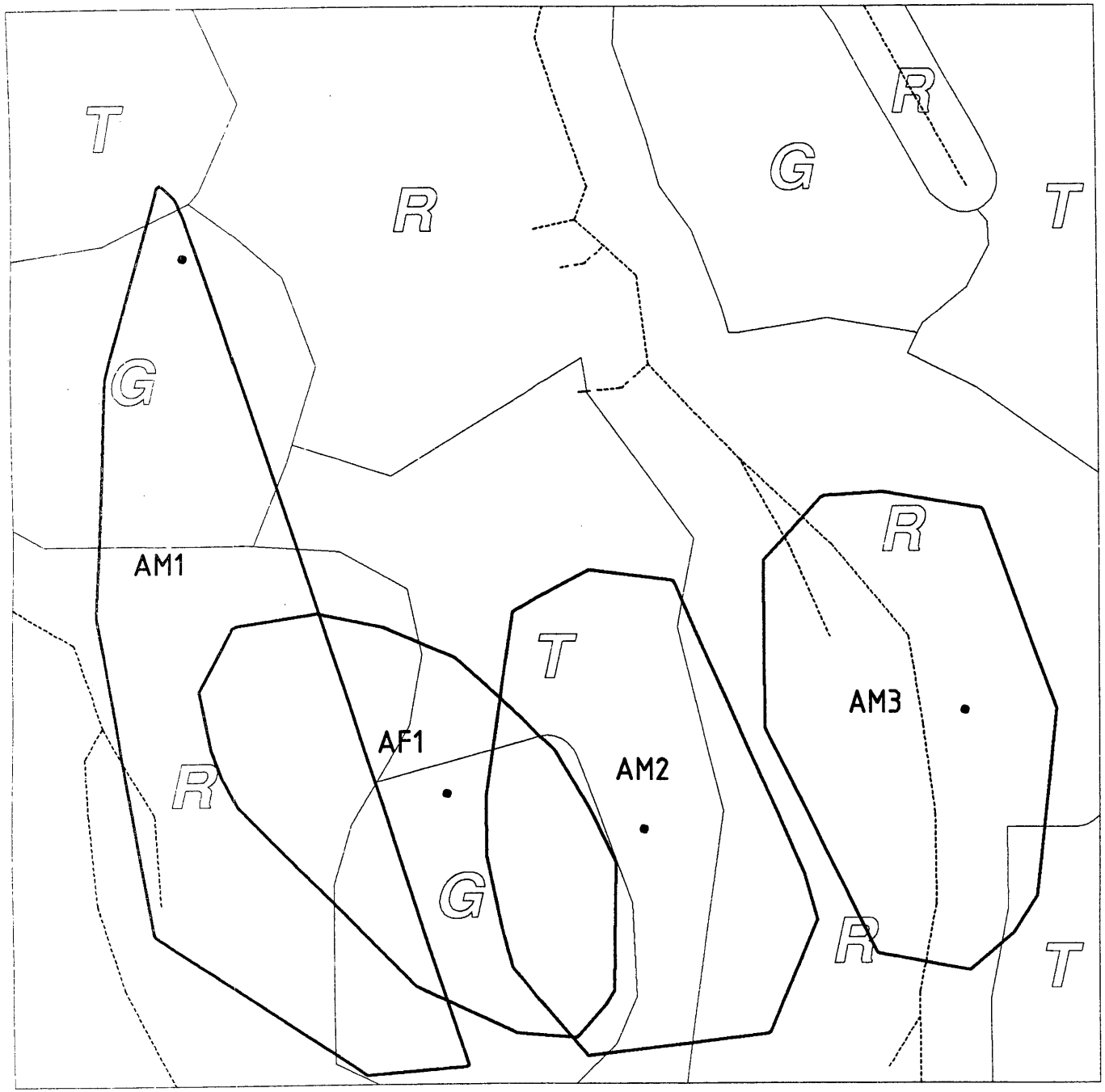
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 17
Pale-yellow Robin: E1 Plot
home ranges (95% MCP) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

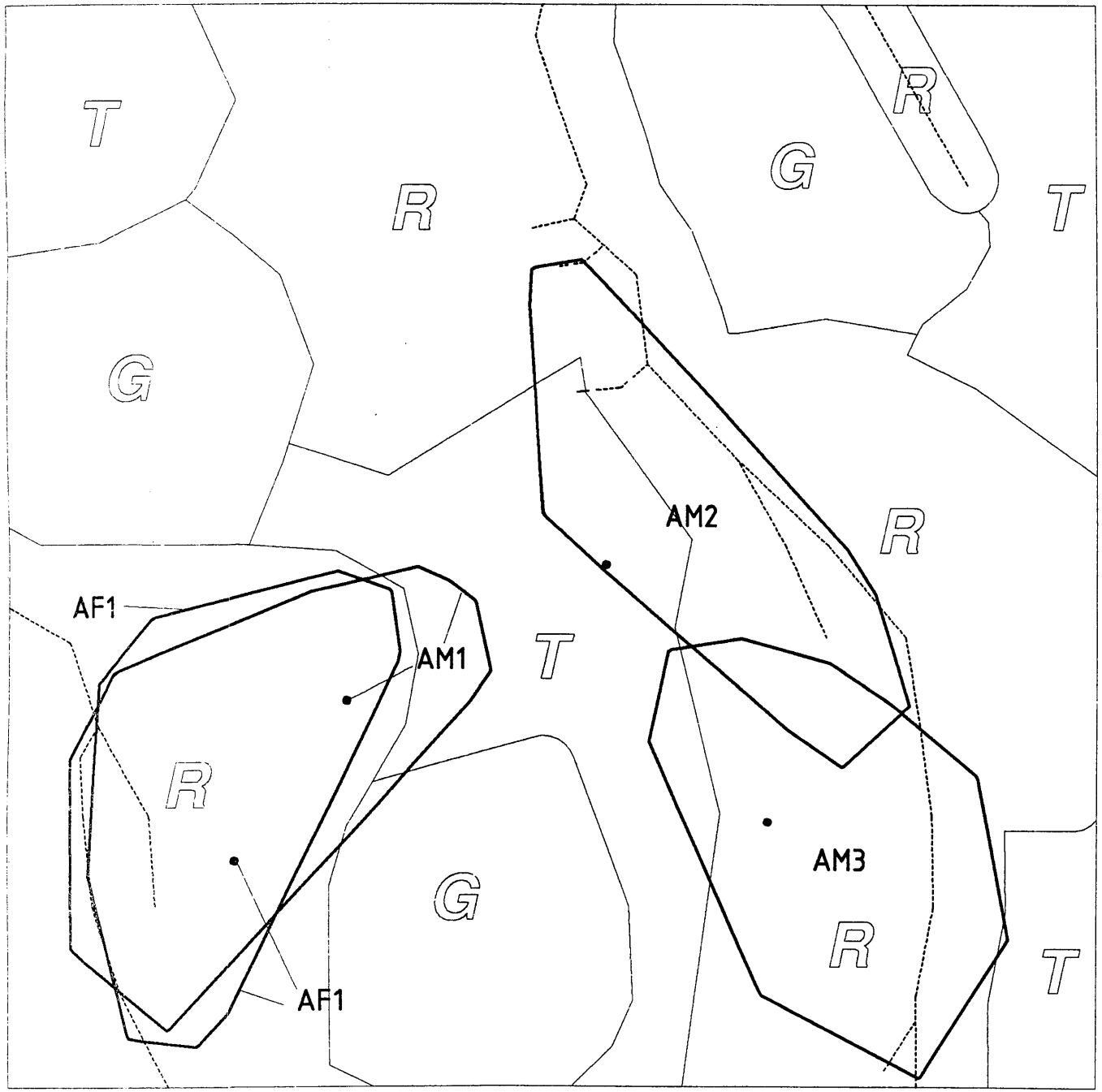
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 18
Pale-yellow Robin: E1 Plot
home ranges (95% MCP) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
----------	creek
————	home range boundary

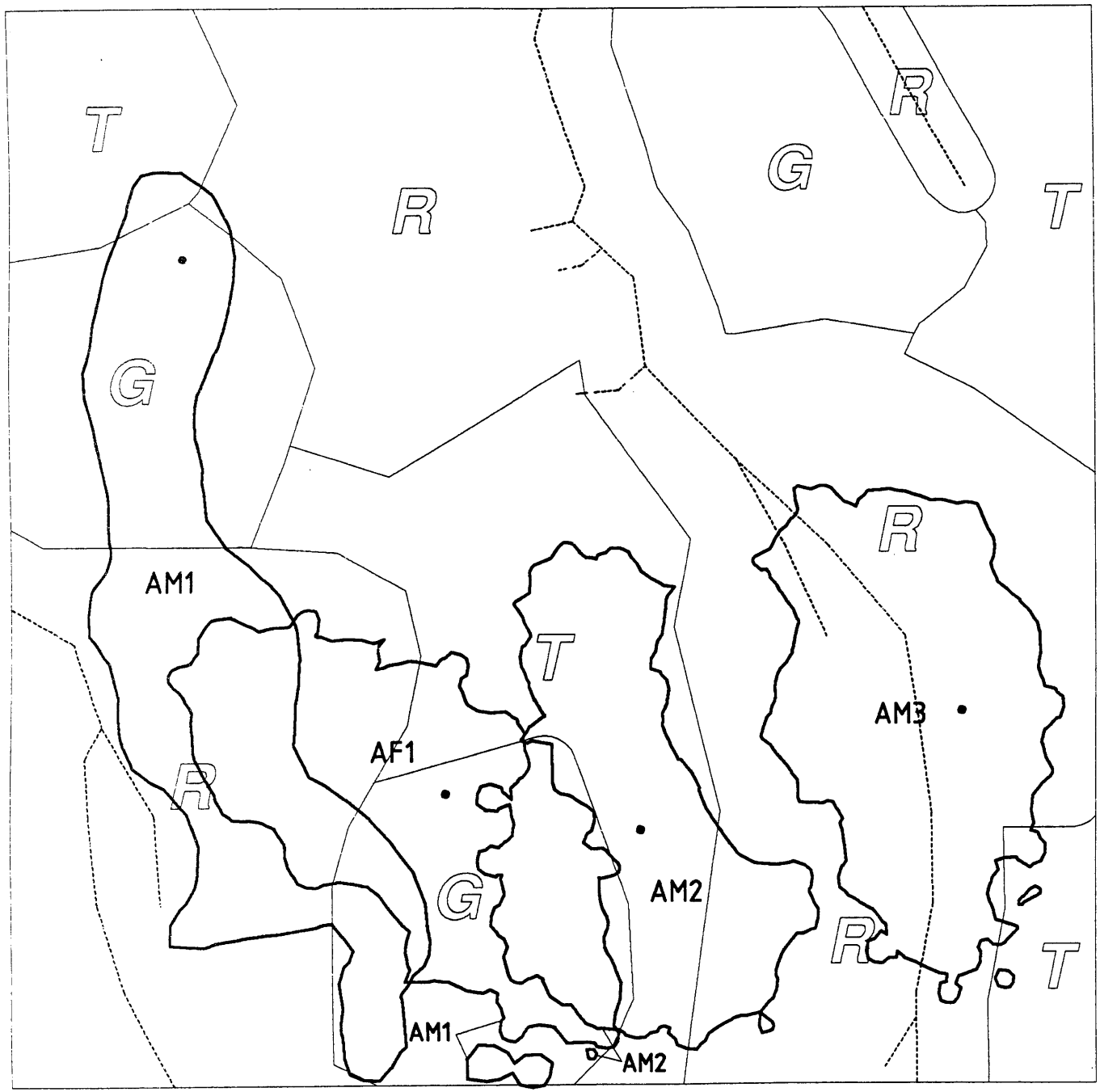
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 19

Pale-yellow Robin: E1 Plot

home ranges (95% HM) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

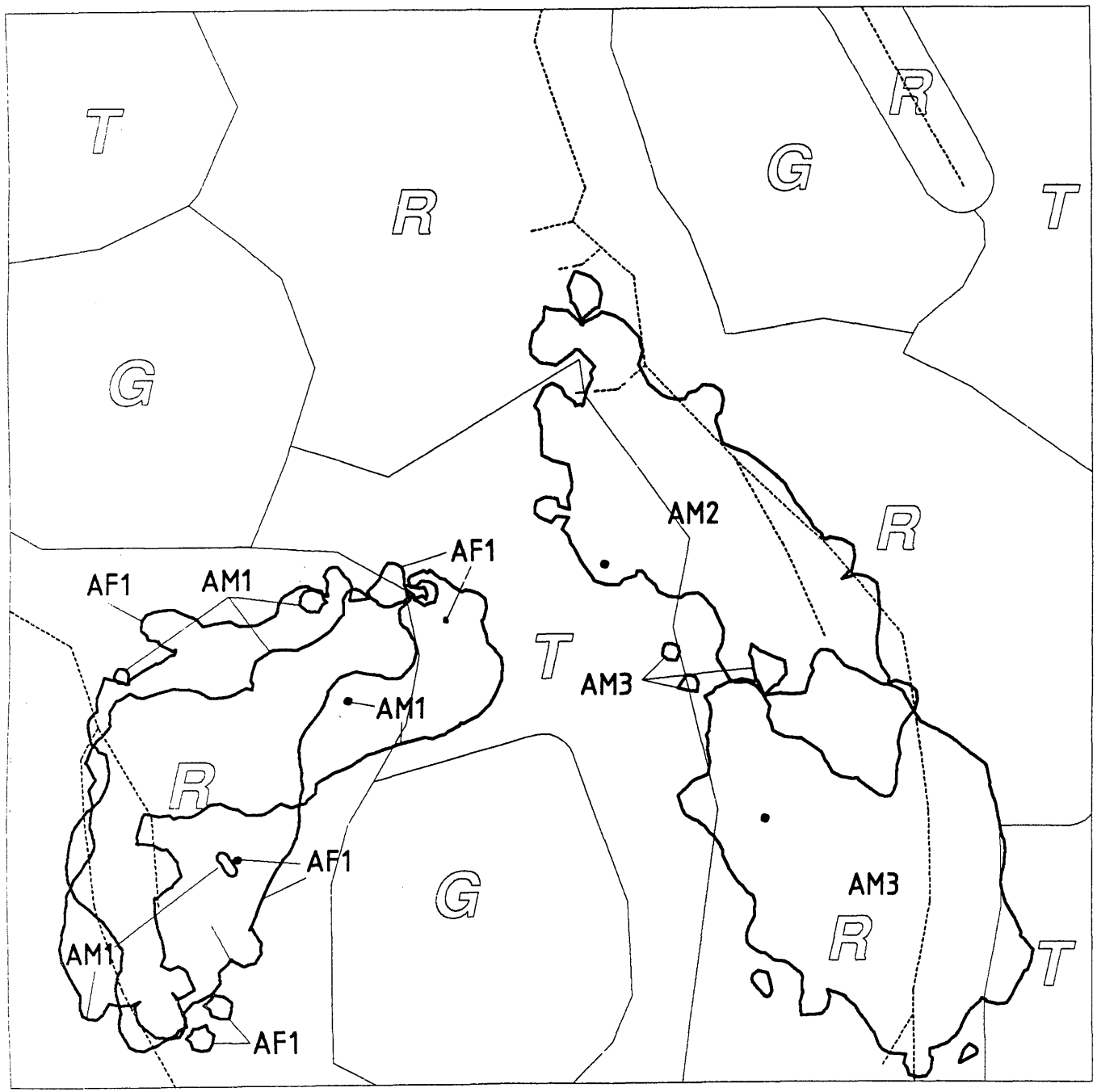
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 20
Pale-yellow Robin: E1 Plot
home ranges (95% HM) after logging

LEGEND

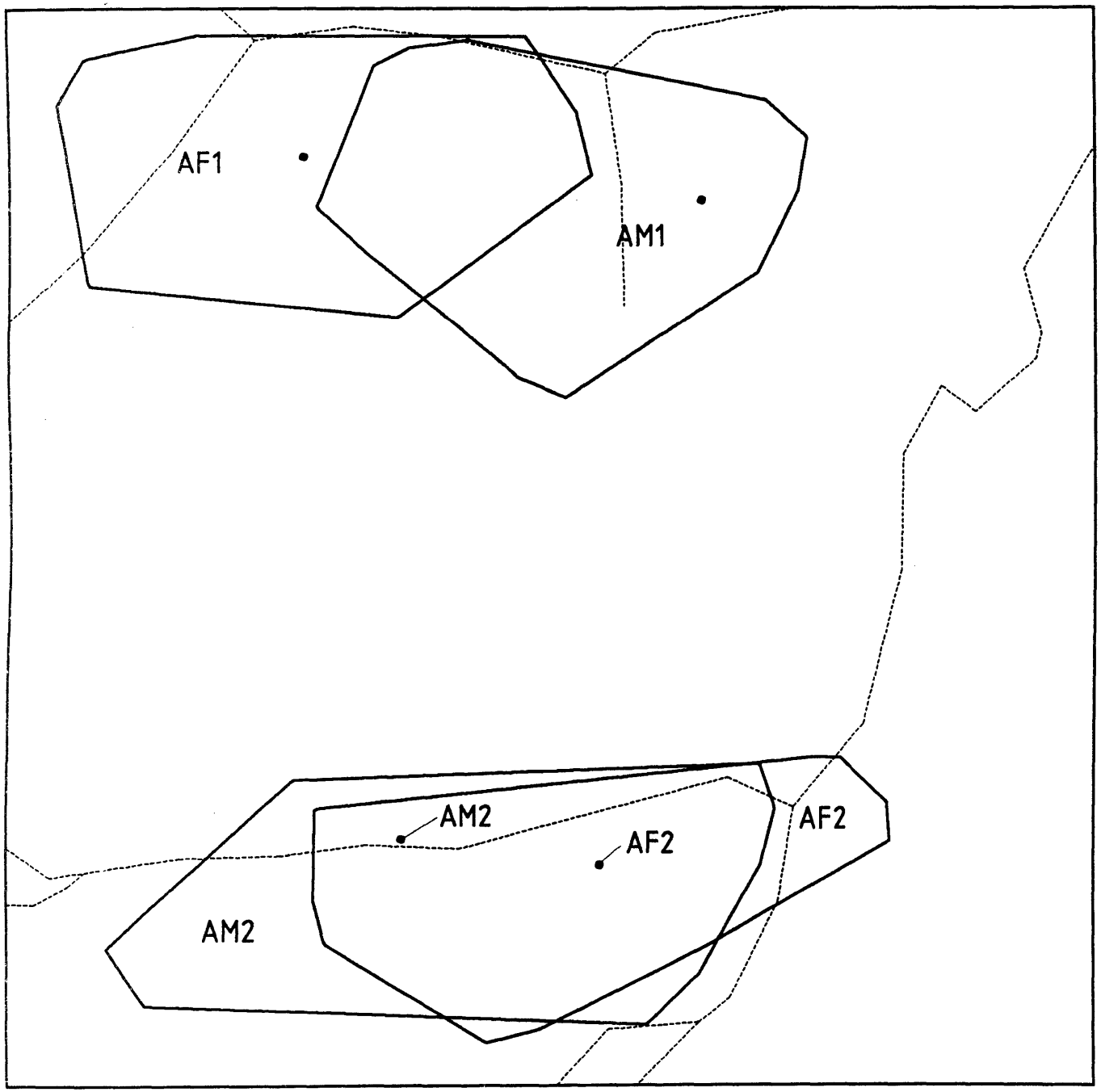
AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
-------	creek
———	home range boundary

TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 21
Pale-yellow Robin : C1 Plot
home ranges (95% MCP) before logging

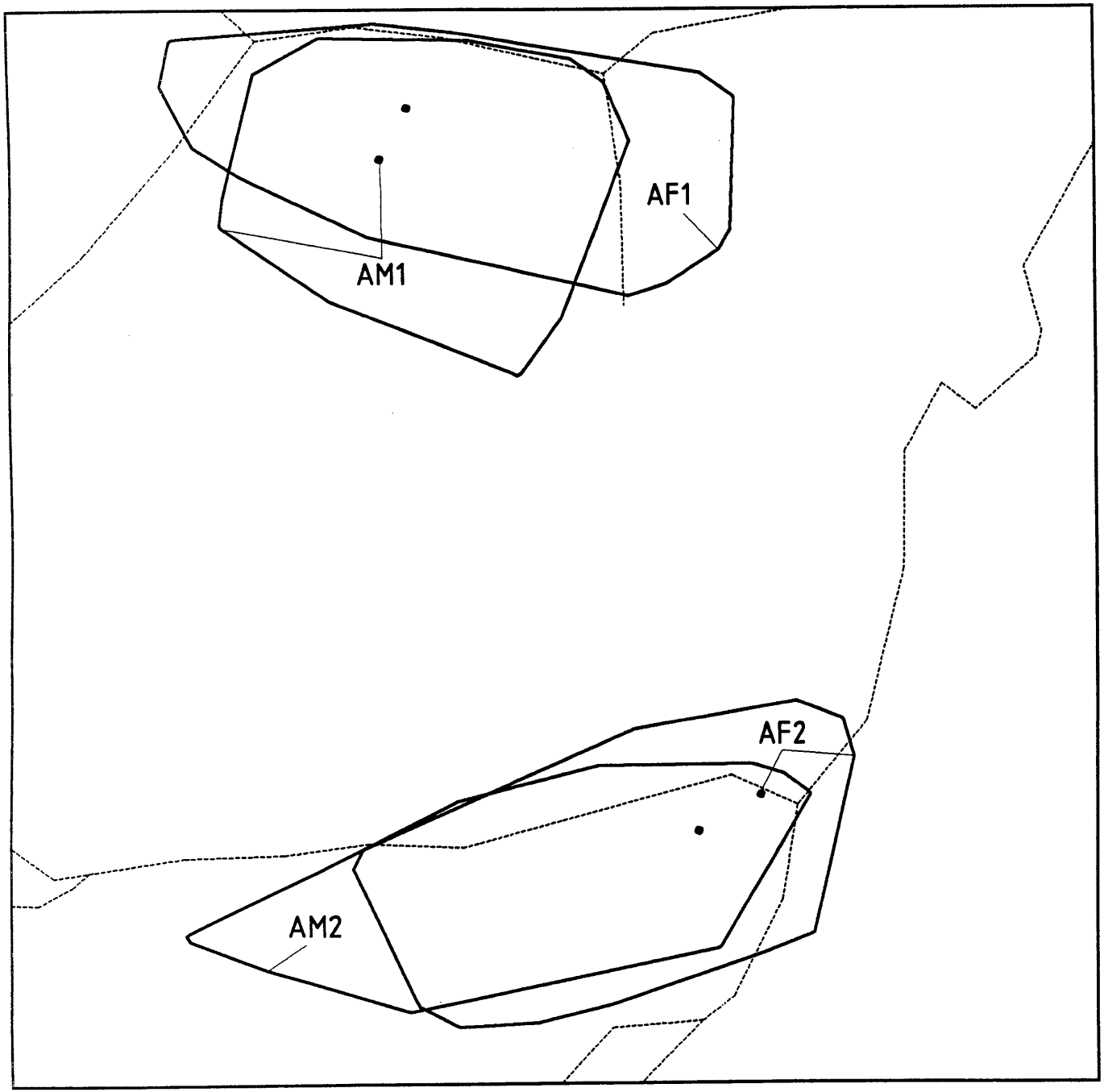
LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 22
Pale-yellow Robin : C1 Plot
home ranges (95% MCP) after logging

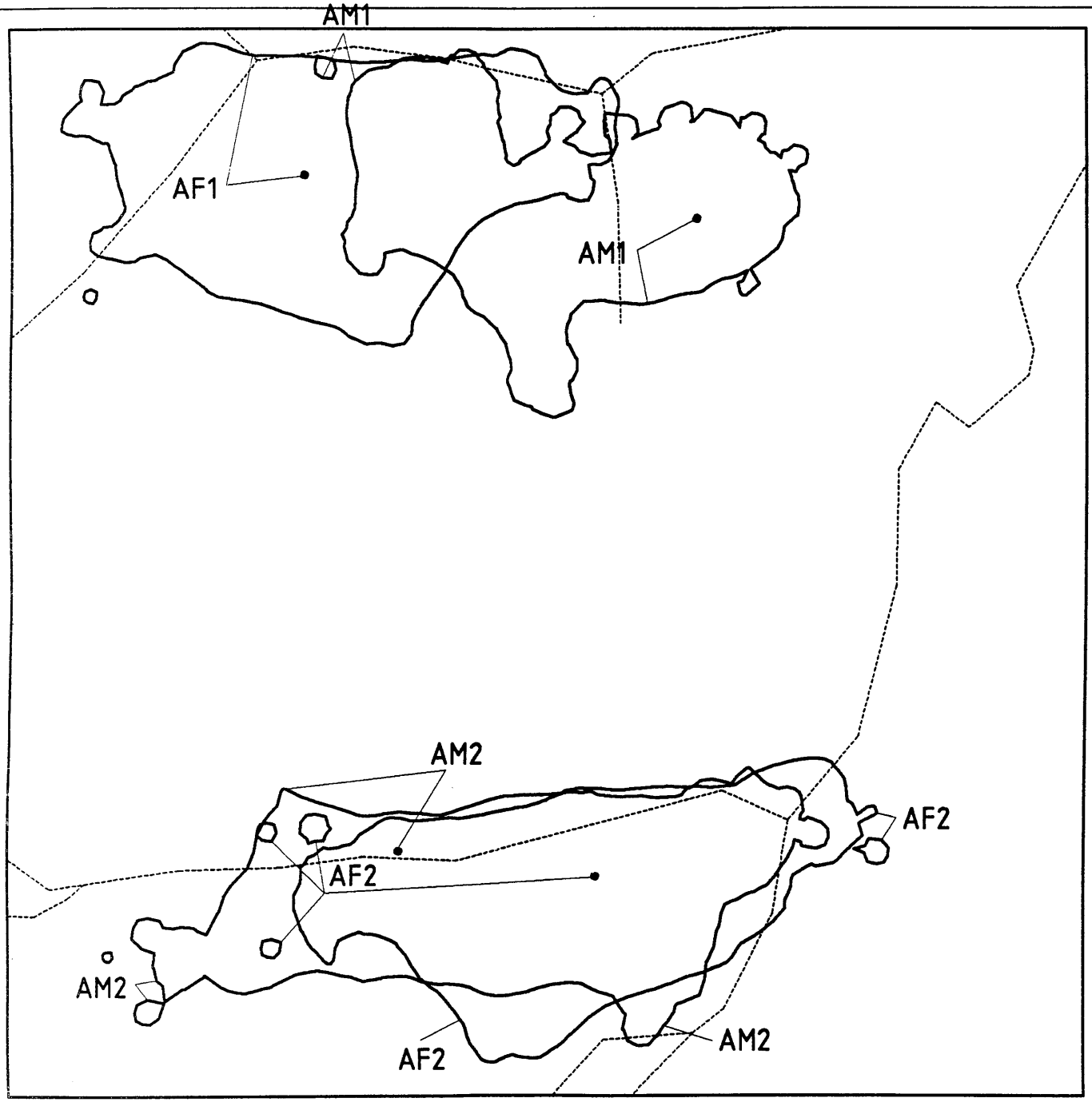
LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 23

Pale-yellow Robin : C1 Plot

home ranges (95% HM) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
———	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700

Map: 24

Pale-yellow Robin : C1 Plot

home ranges (95% HM) after logging

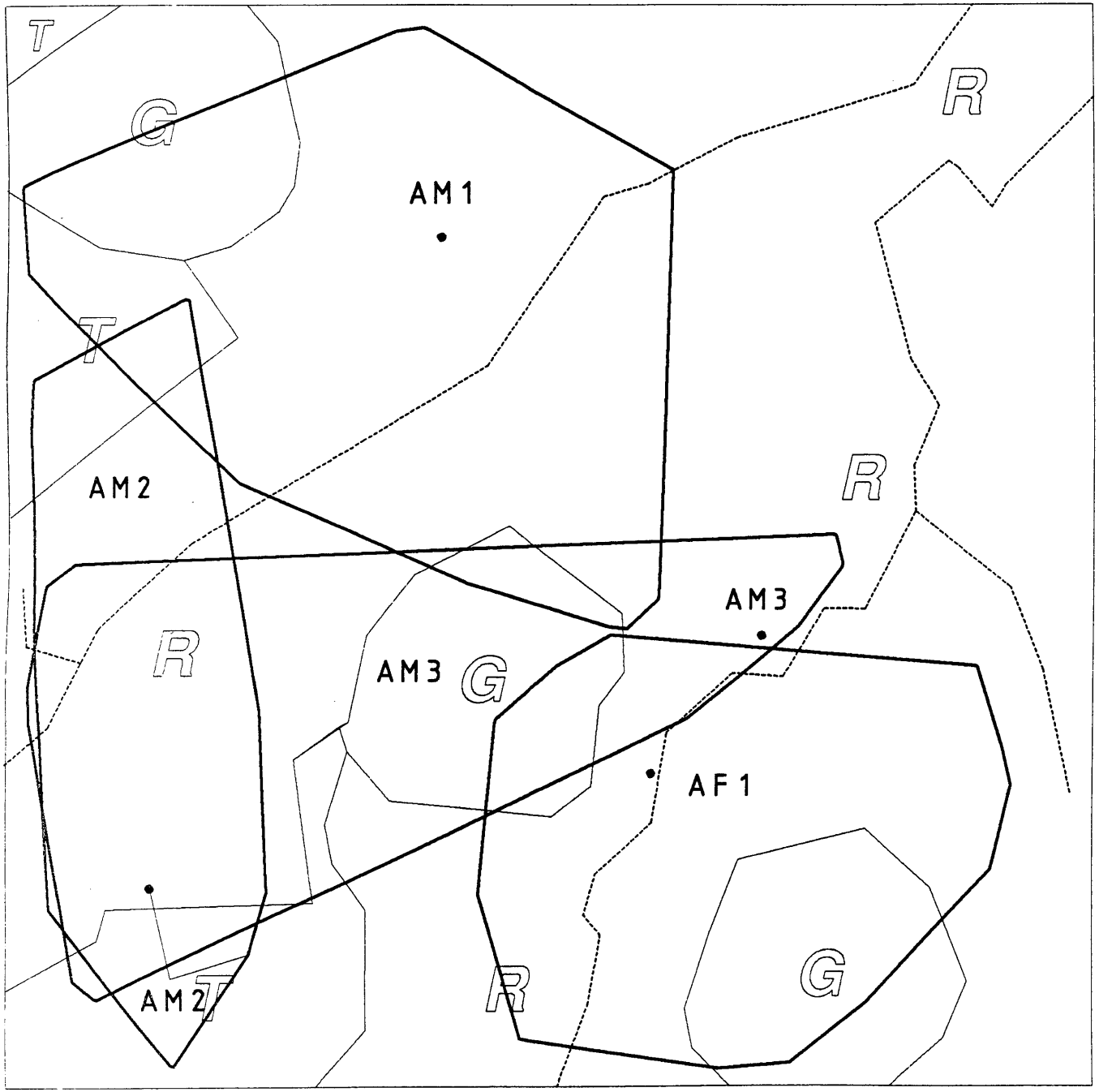
LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 25
Pale-yellow Robin : E2 Plot
home ranges (95% MCP) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
———	home range boundary

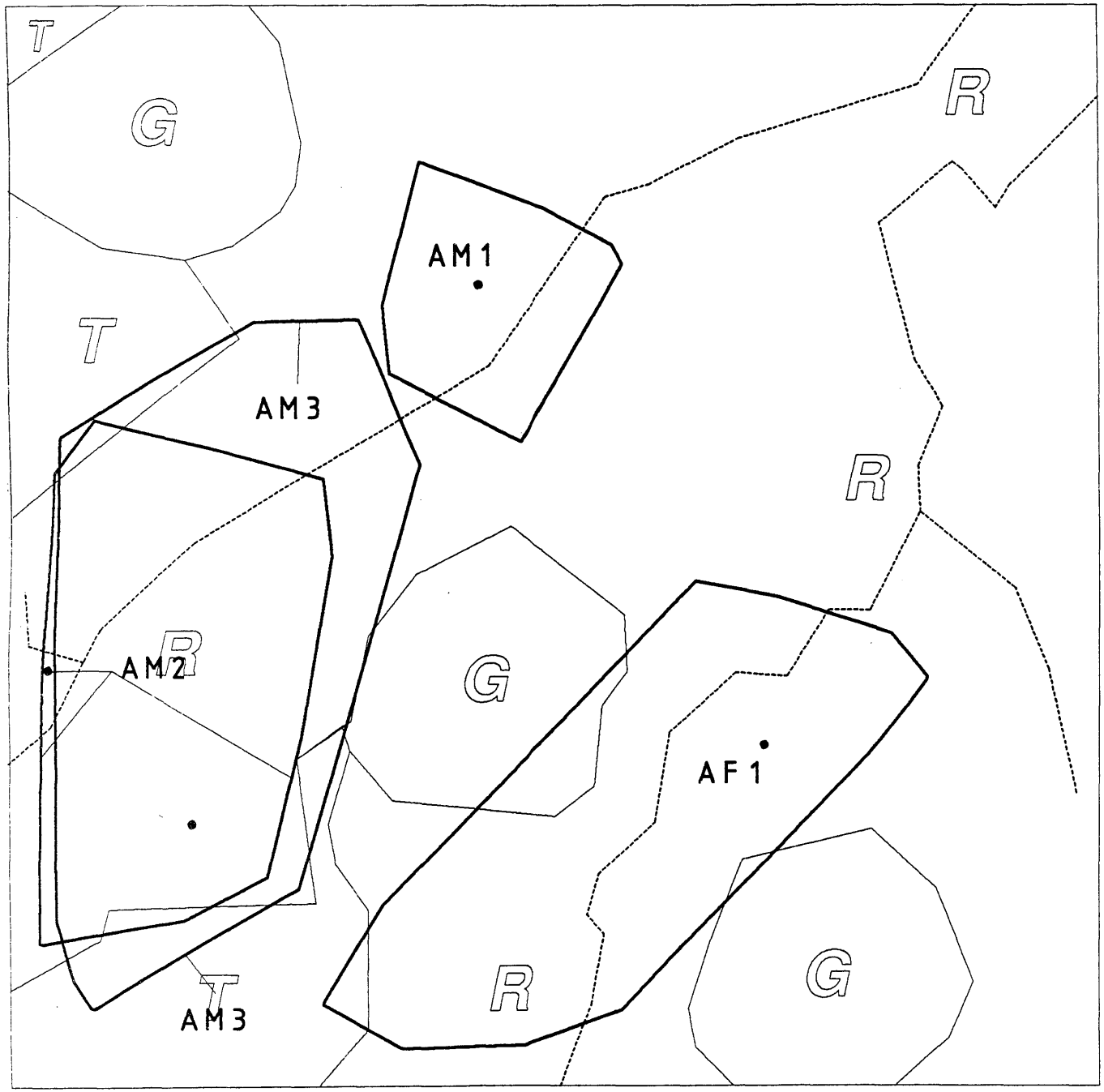
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 26
Pale-yellow Robin : E2 Plot
home ranges (95% MCP) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
-------	creek
———	home range boundary

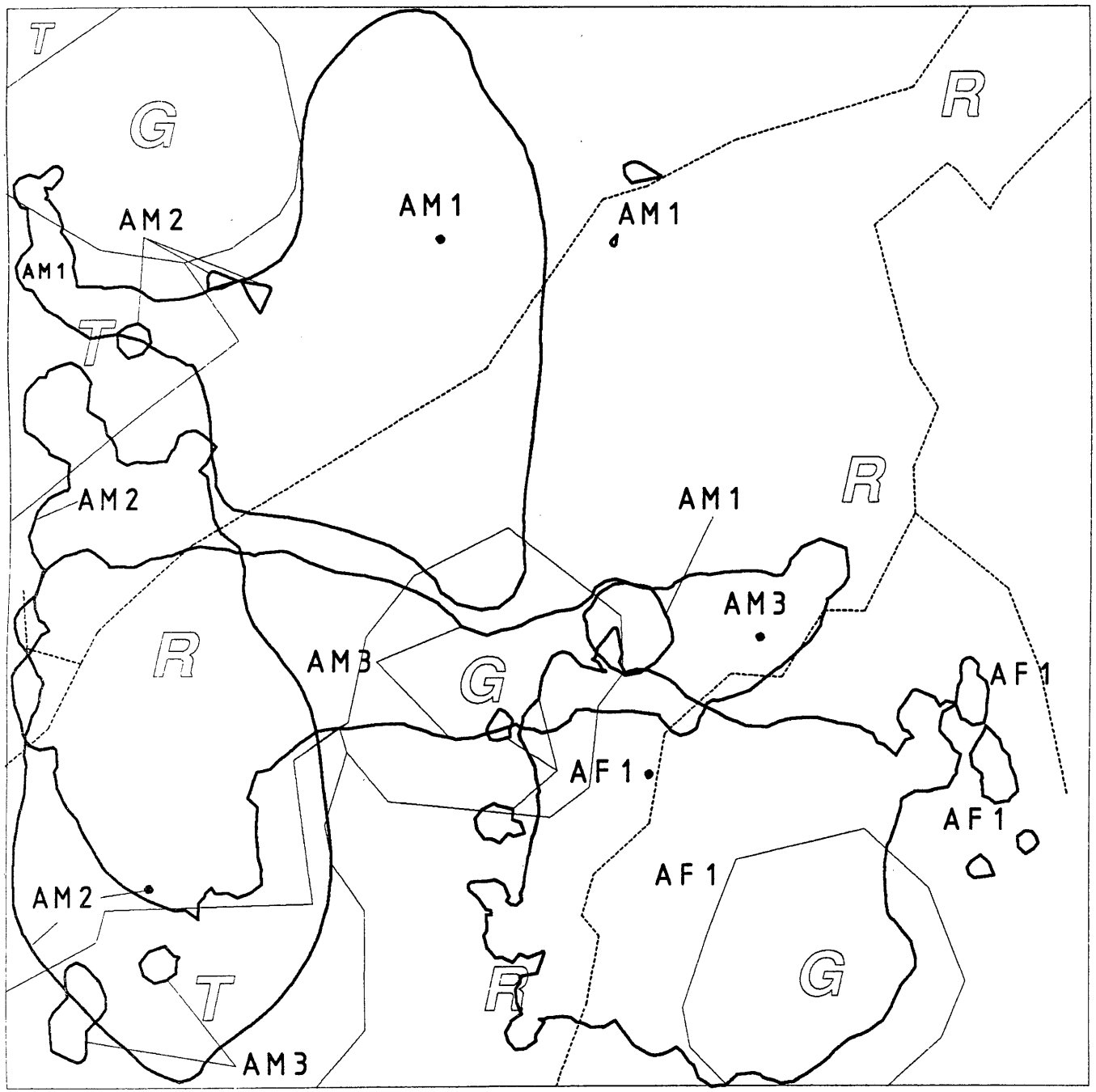
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 27
Pale-yellow Robin : E2 Plot
home ranges (95% HM) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

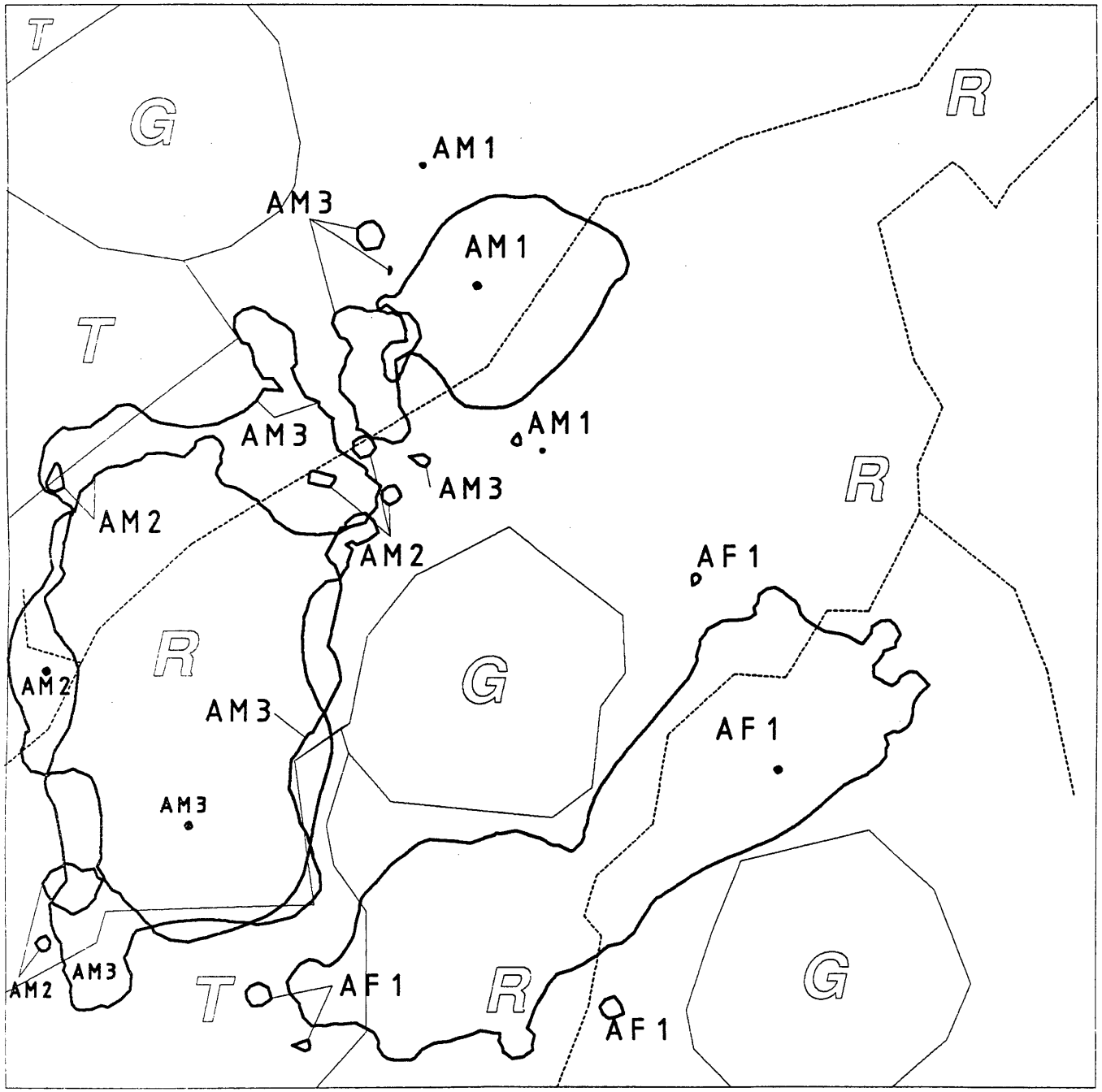
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 28

Pale-yellow Robin : E2 Plot

home ranges (95% HM) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

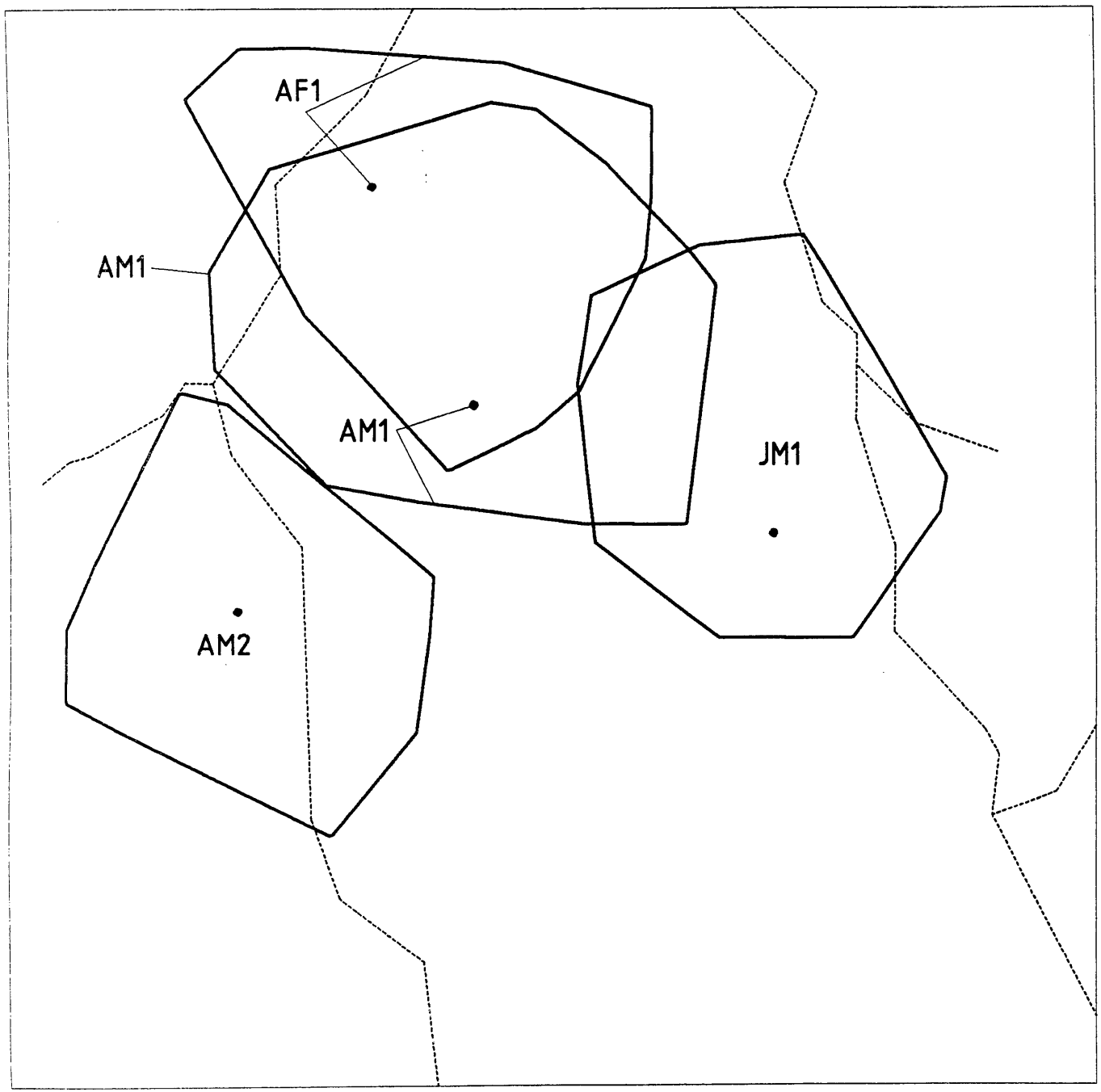
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 29
Pale-yellow Robin : C2 Plot
home ranges (95% MCP) before logging

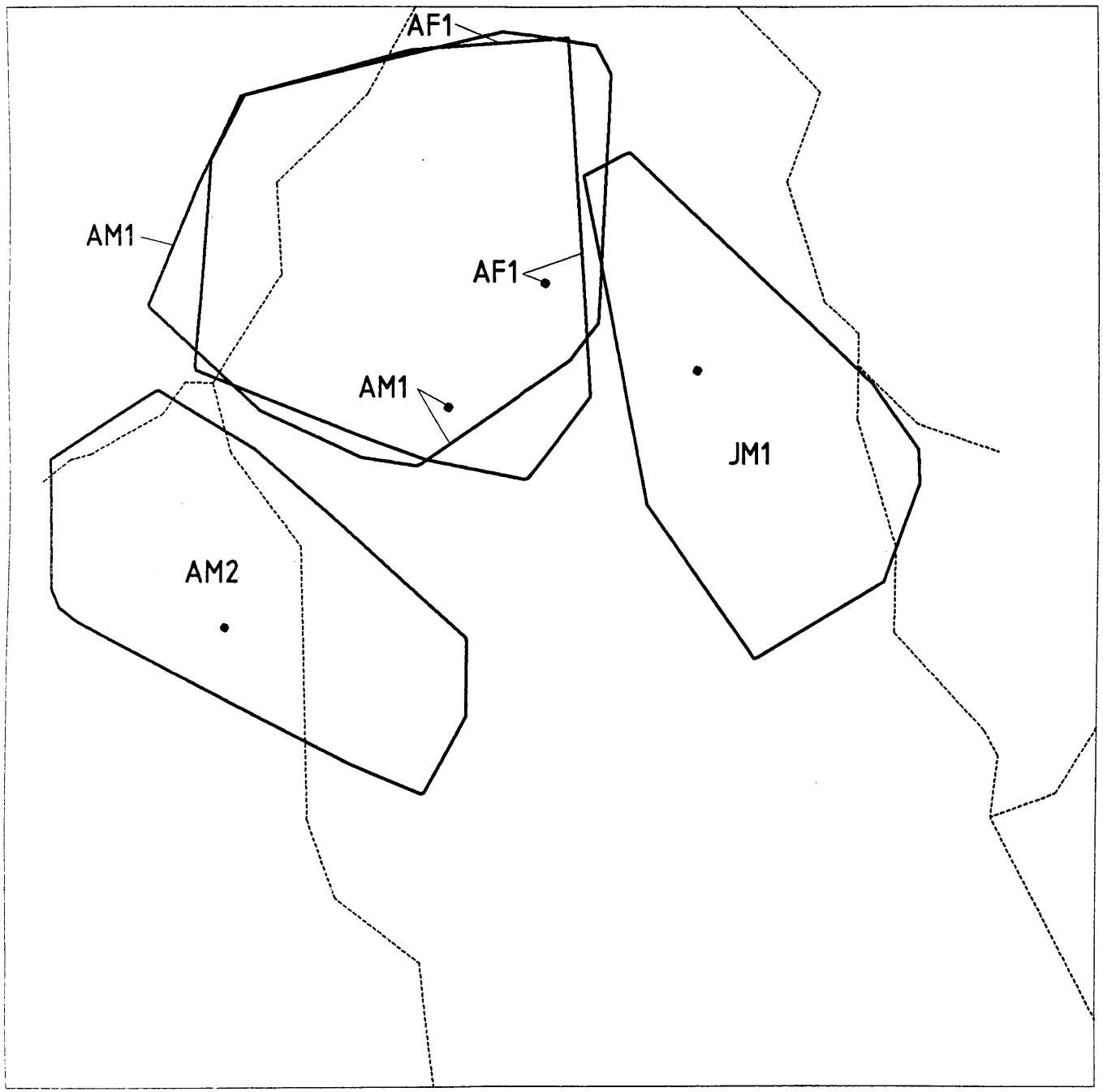
LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
JM1	juvenile male 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 30
Pale-yellow Robin : C2 Plot
home ranges (95% MCP) after logging

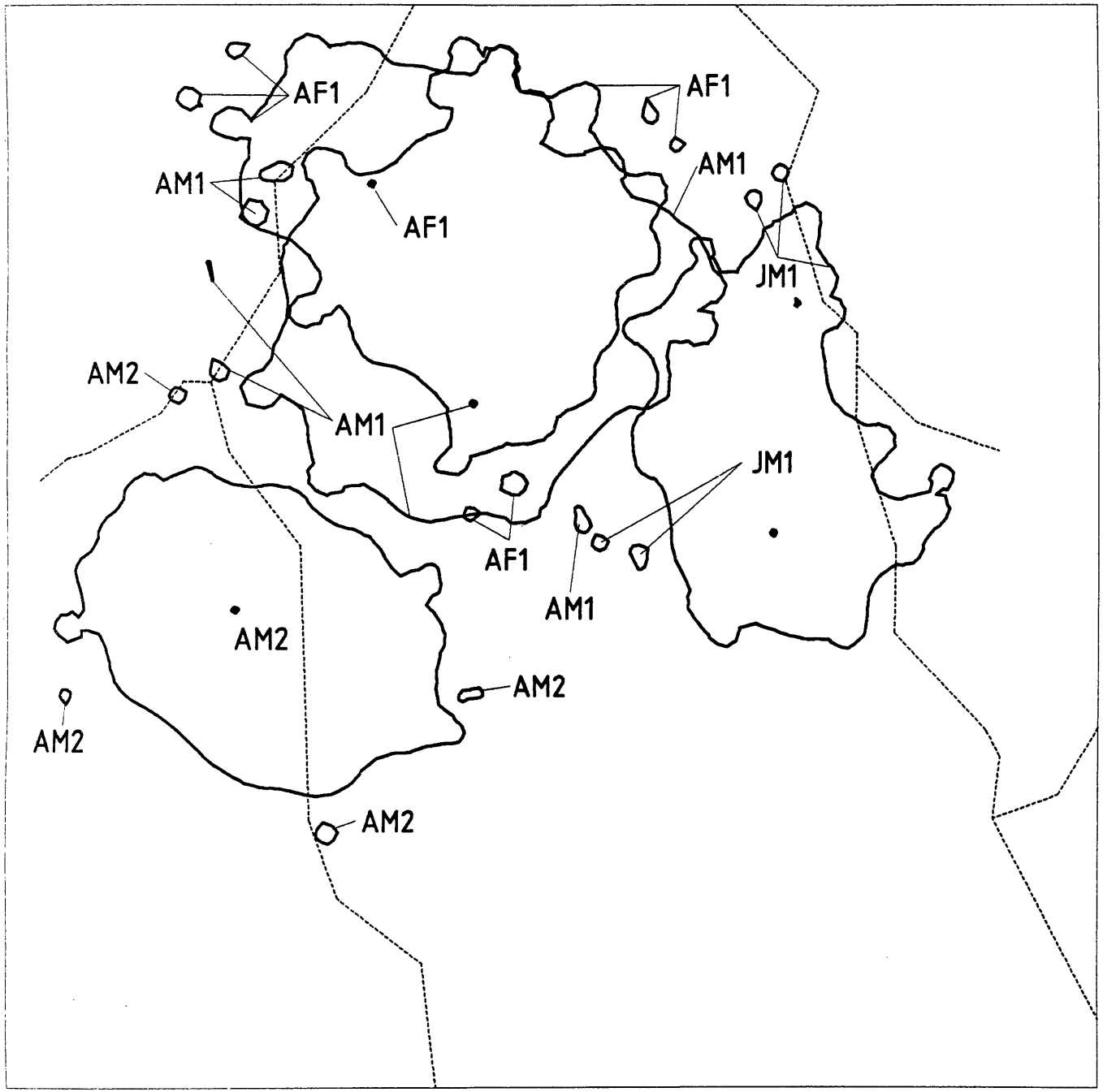
LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
JM1	juvenile male 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 31
Pale-yellow Robin : C2 Plot
home ranges (95% HM) before logging

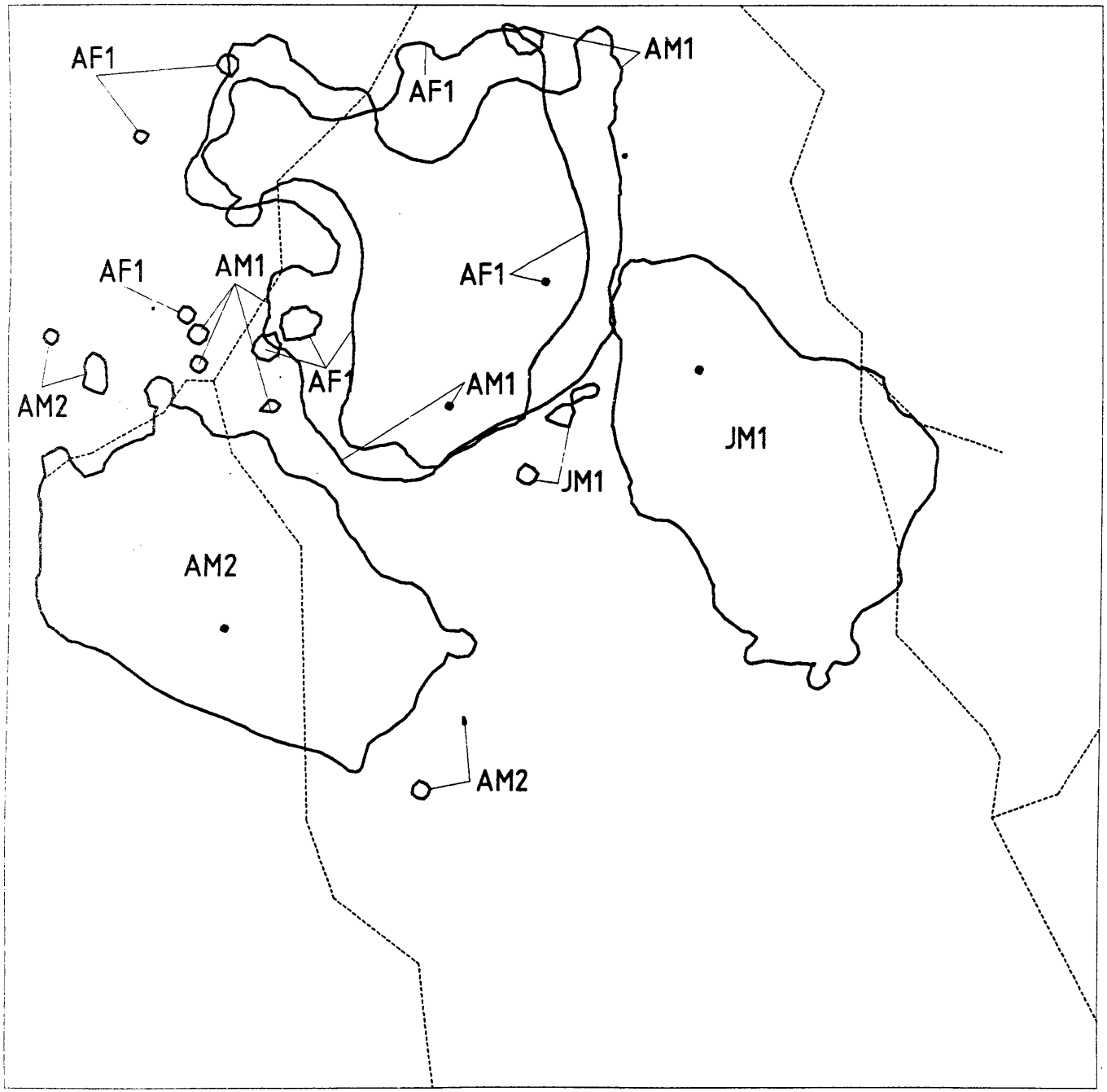
LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
JM1	juvenile male 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 32
Pale-yellow Robin : C2 Plot
home ranges (95% HM) after logging

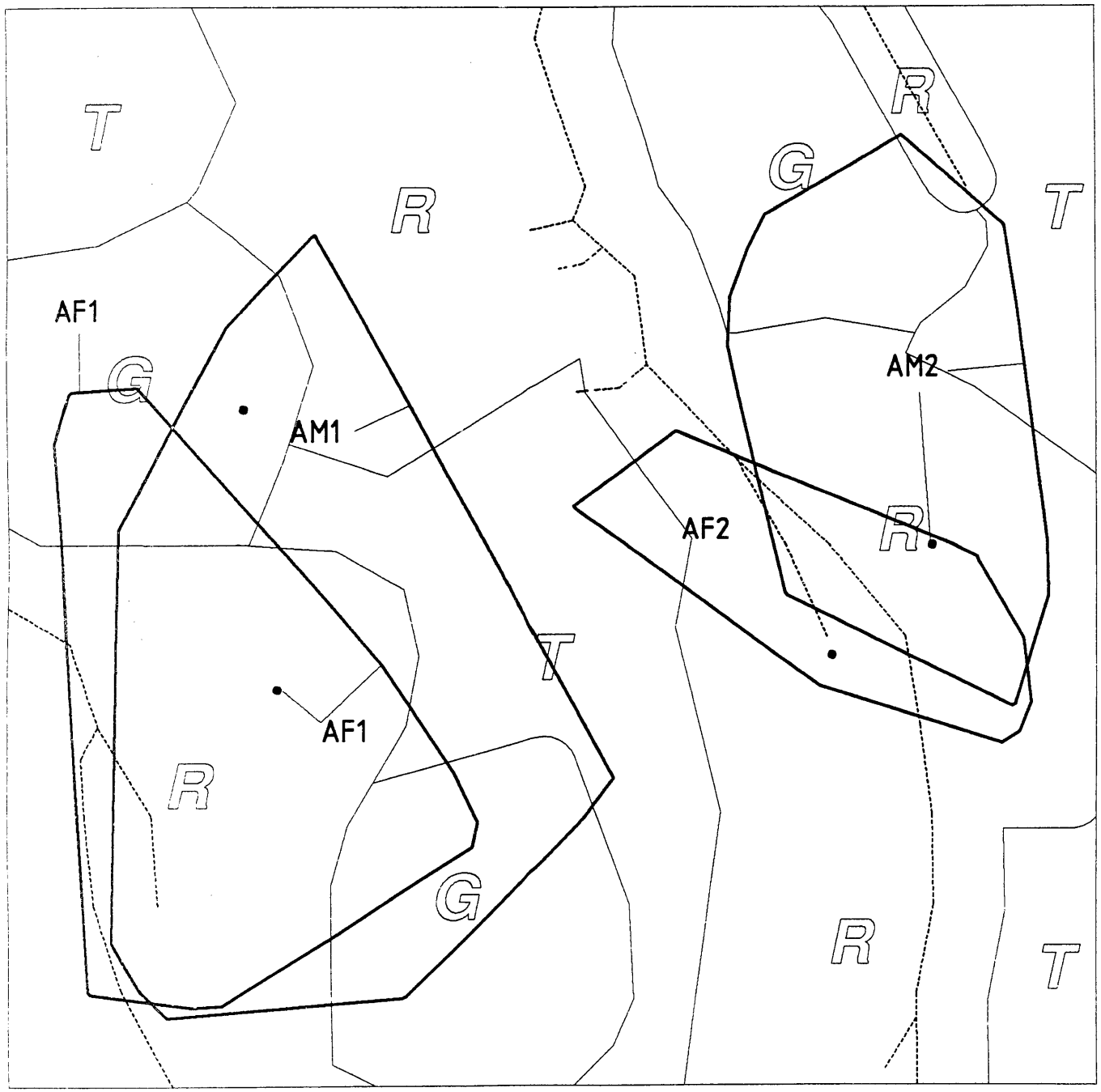
LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
JM1	juvenile male 1
•	centre of range
------	creek
———	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 33

Yellow-throated Scrubwren : E1 Plot

home ranges (95% MCP) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
----------	creek
————	home range boundary

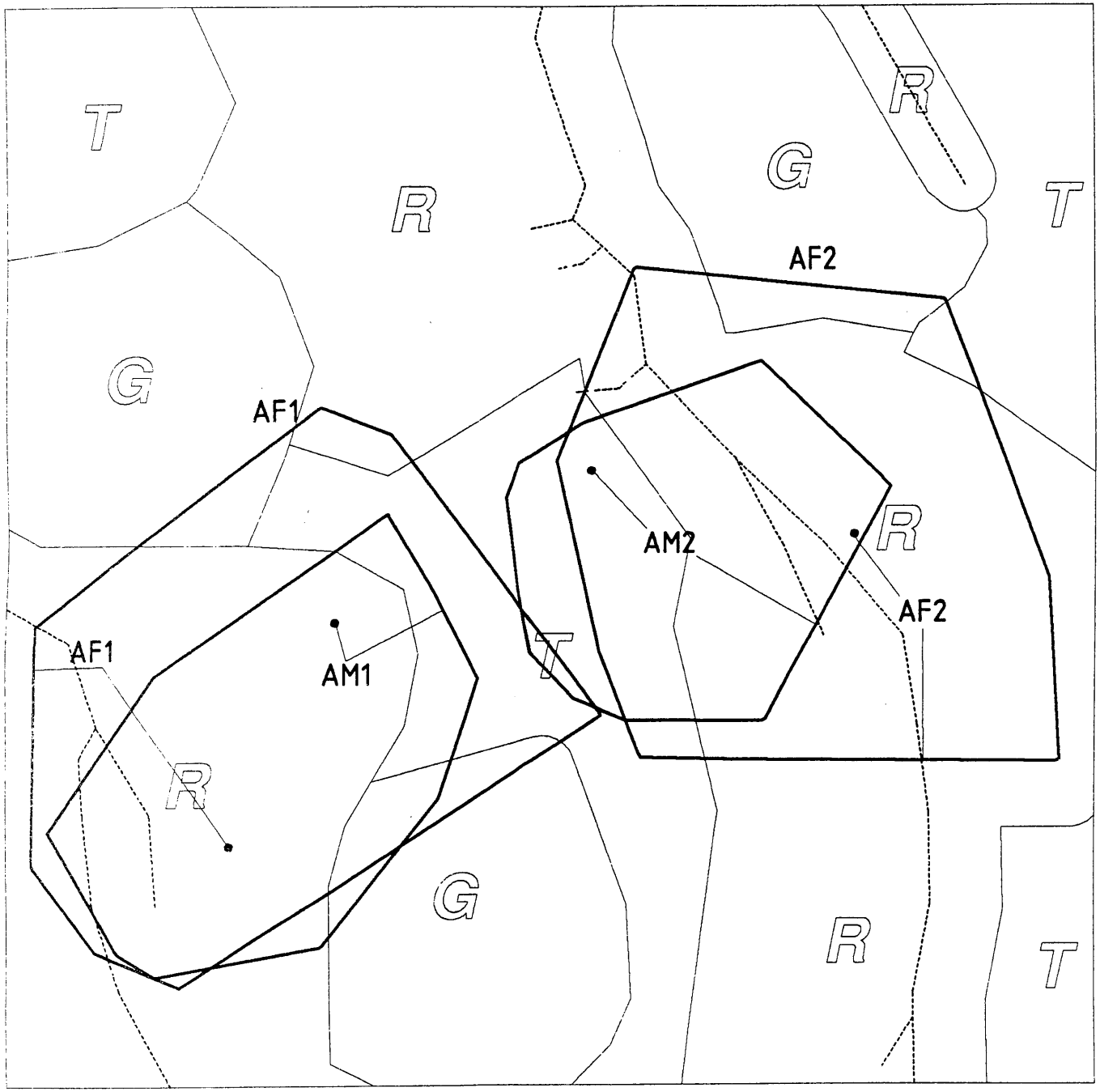
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 34

Yellow-throated Scrubwren : E1 Plot home ranges (95% MCP) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
-------	creek
———	home range boundary

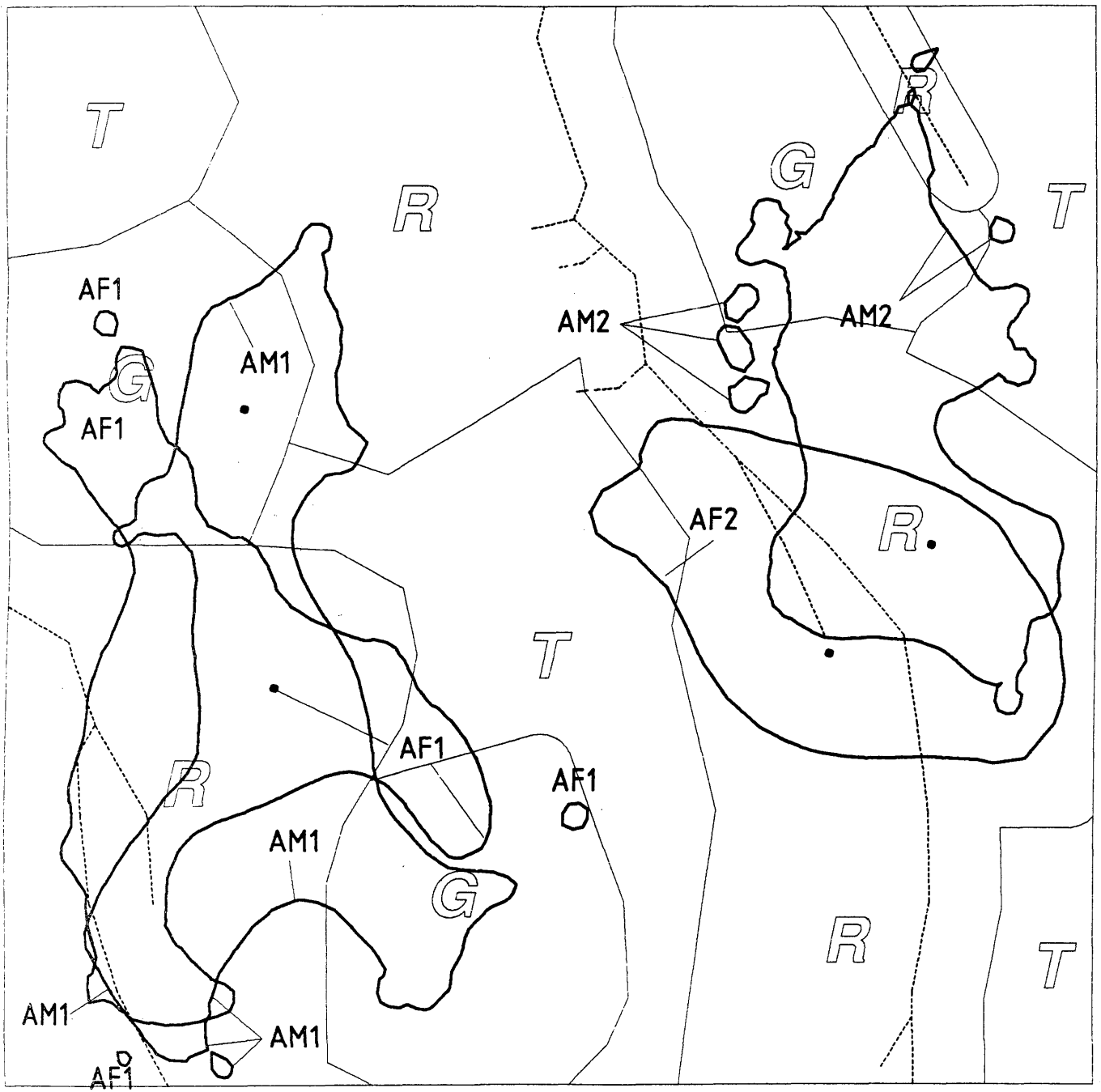
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 35

Yellow-throated Scrubwren : E1 Plot home ranges (95% HM) before logging

LEGEND

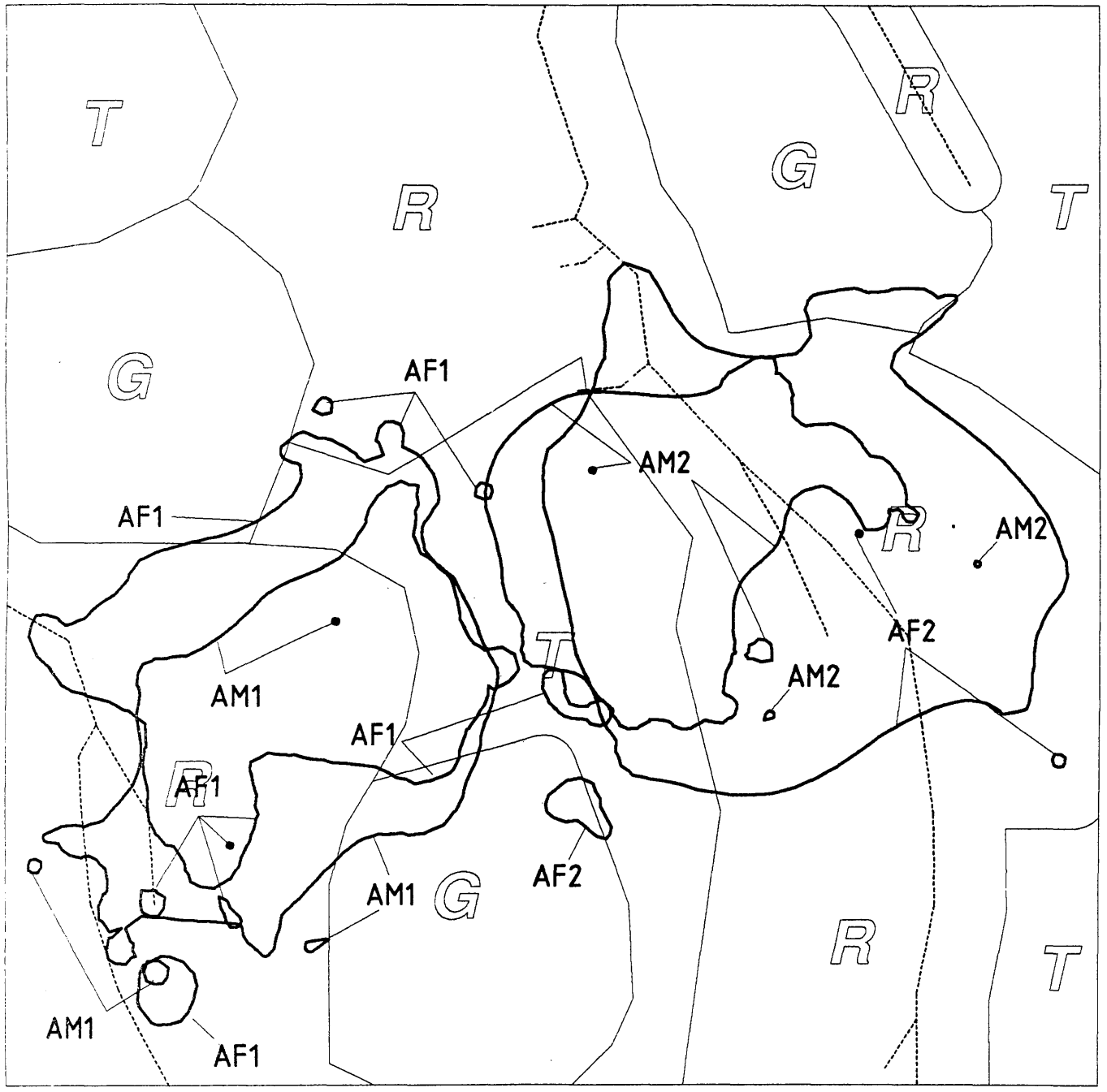
AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
----------	creek
———	home range boundary

TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 36

Yellow-throated Scrubwren : E1 Plot home ranges (95% HM) after logging

LEGEND

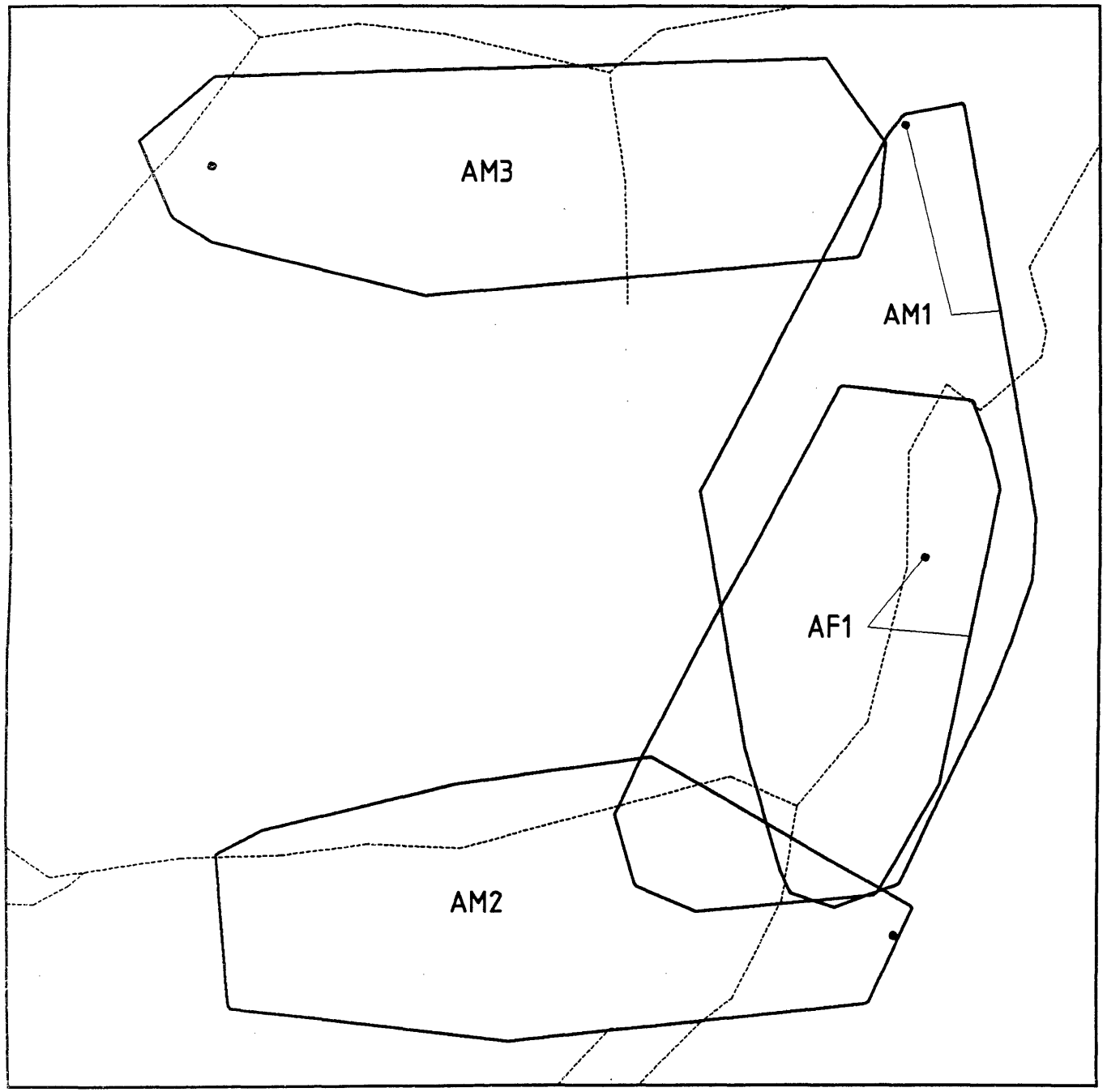
AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
———	home range boundary

TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 37

Yellow-throated Scrubwren : C1 Plot

home ranges (95% MCP) before logging

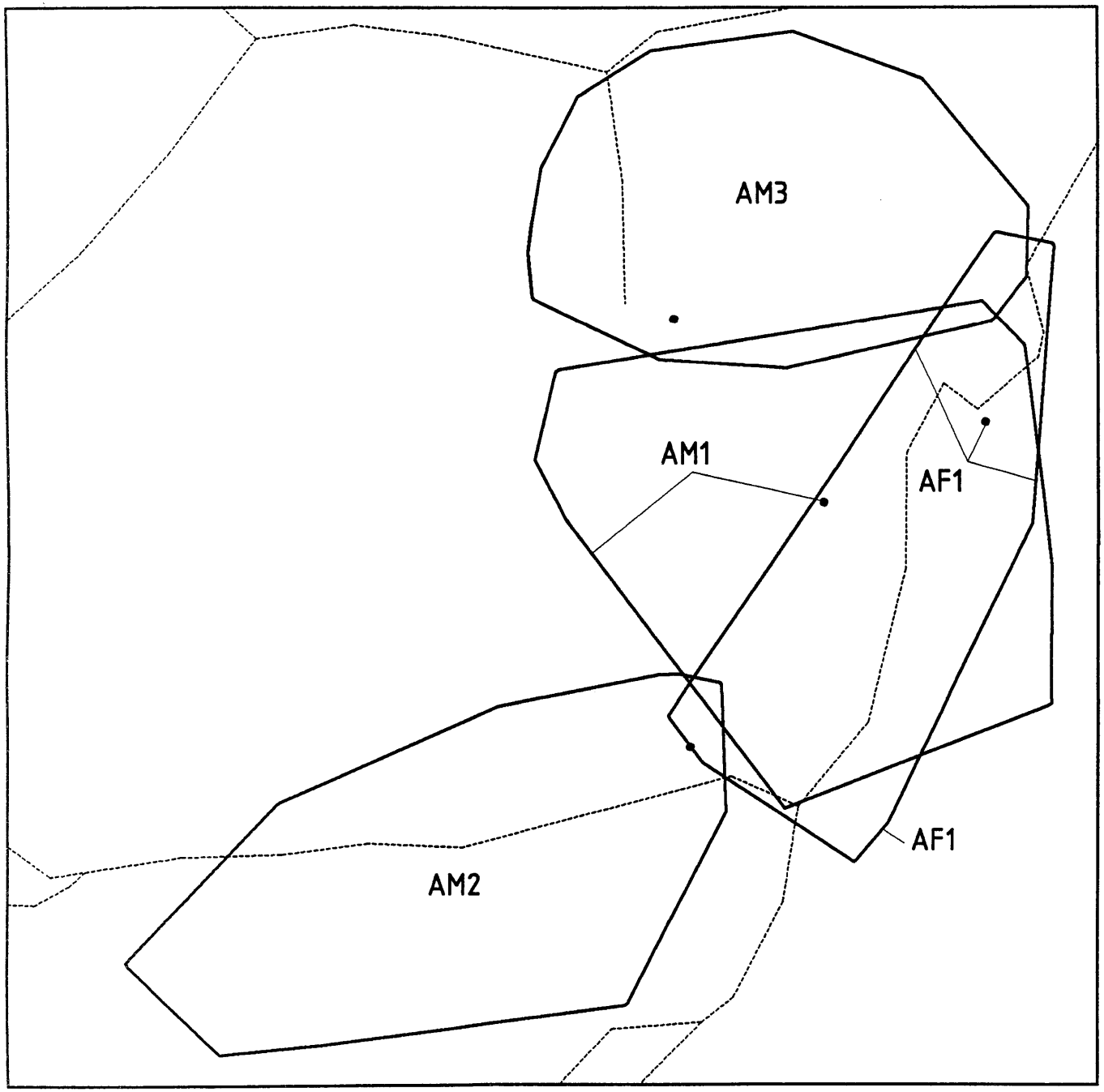
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 38

Yellow-throated Scrubwren : C1 Plot
home ranges (95% MCP) after logging

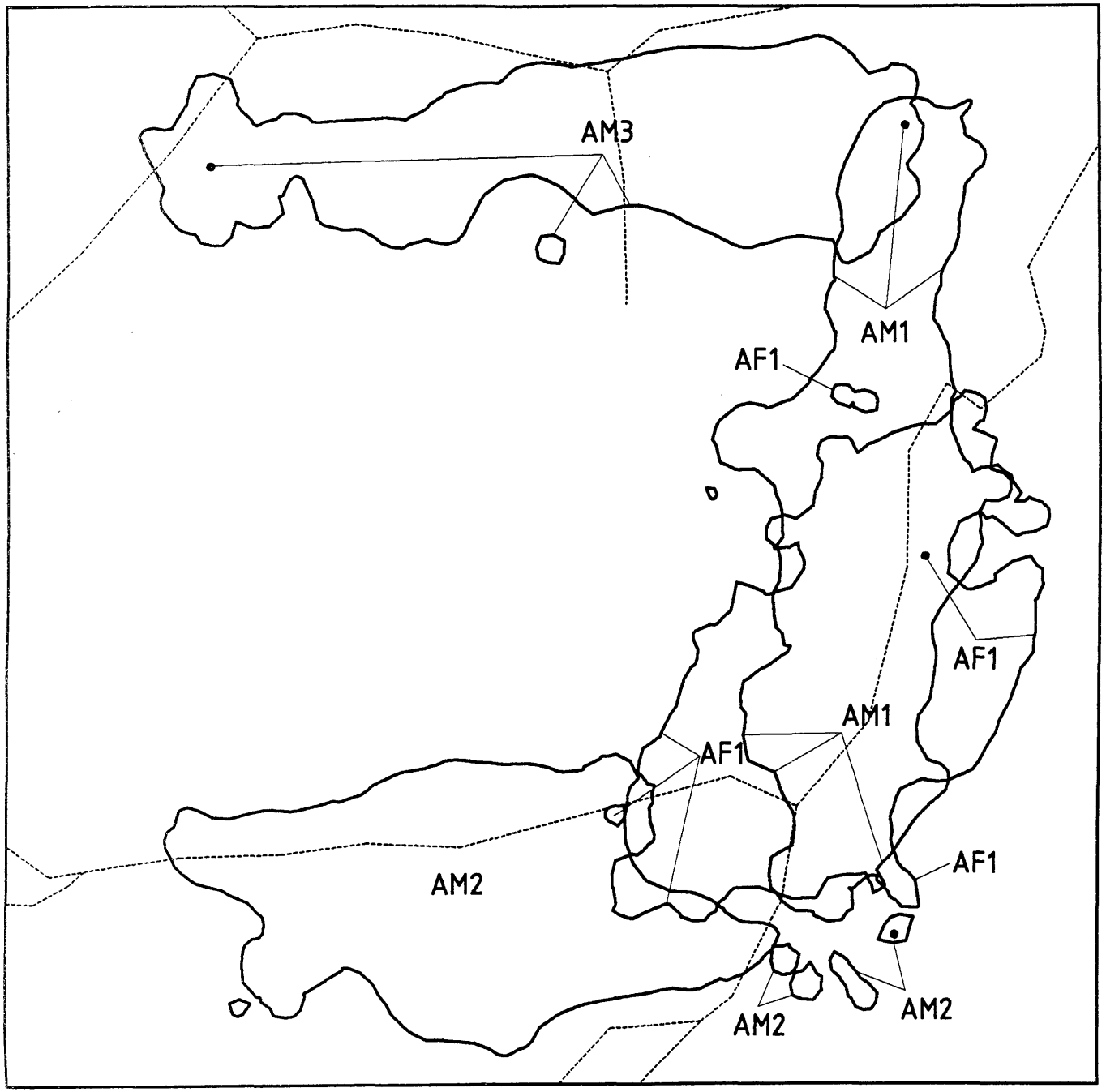
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
----------	creek
————	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 39

Yellow-throated Scrubwren : C1 Plot home ranges (95% HM) before logging

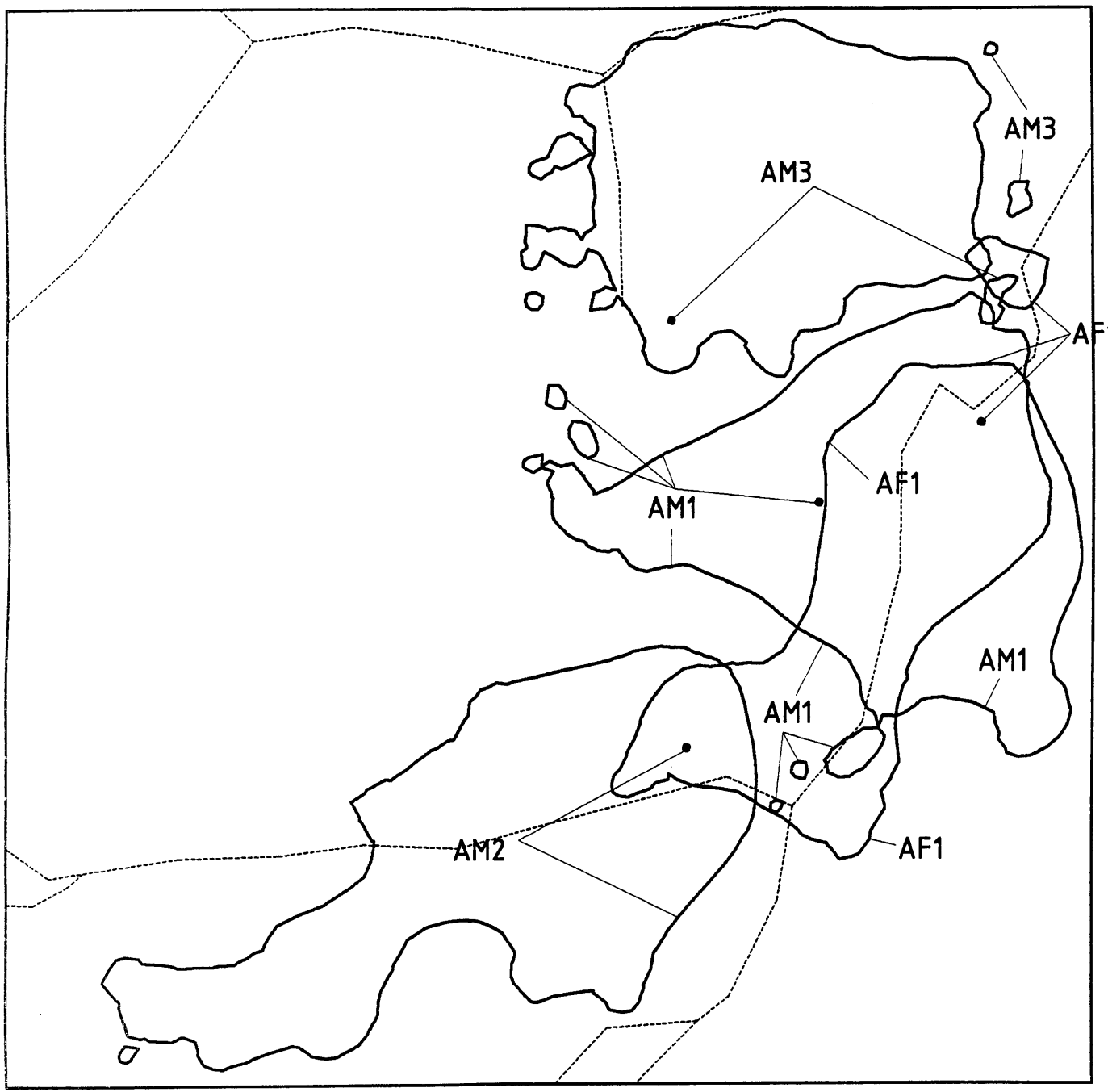
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 40

Yellow-throated Scrubwren : C1 Plot home ranges (95% HM) after logging

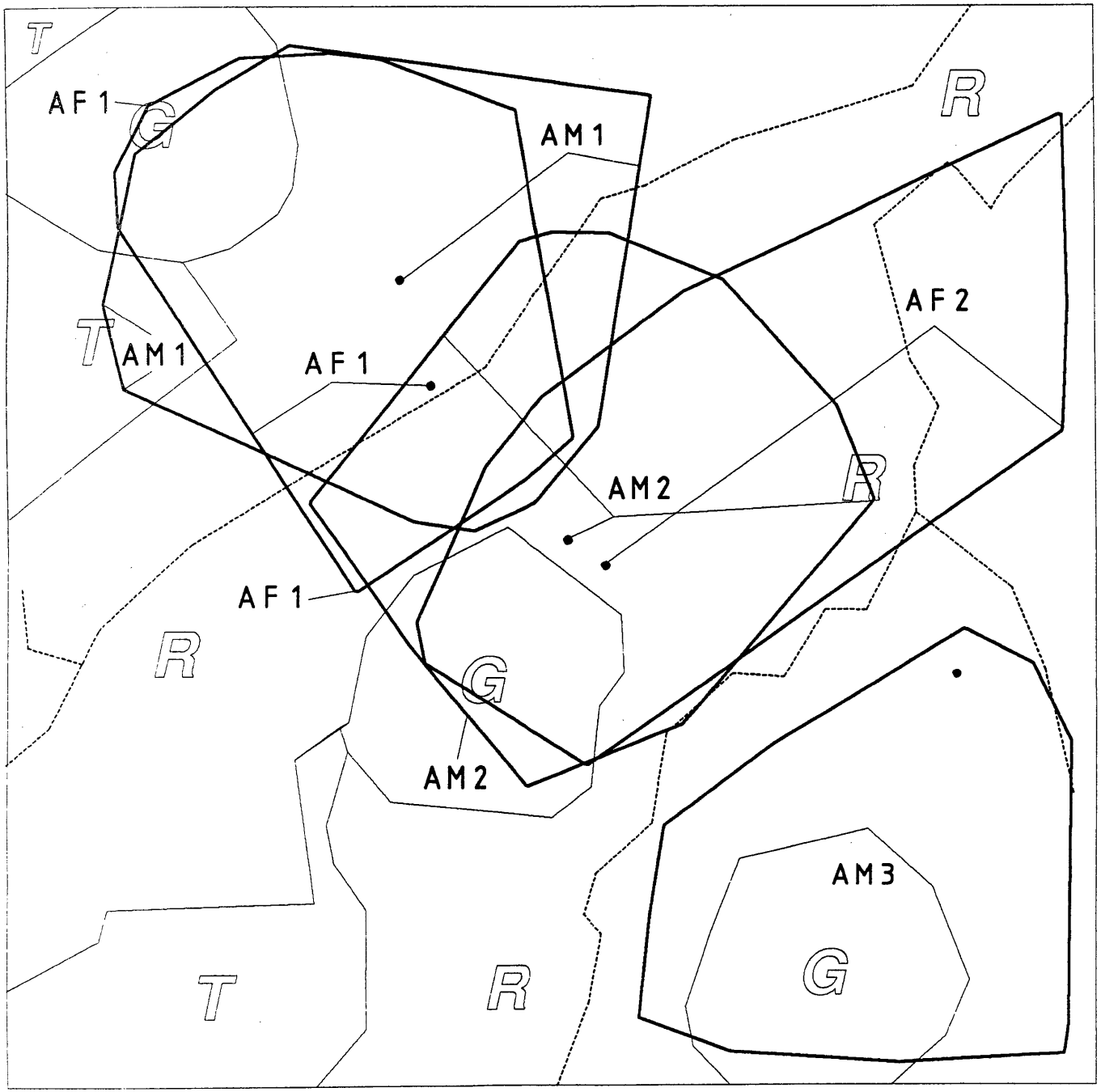
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 41

Yellow-throated Scrubwren : E2 Plot

home ranges (95% MCP) before logging

LEGEND

AM 1	adult male 1
AM 2	adult male 2
AM 3	adult male 3
AF 1	adult female 1
AF 2	adult female 2
•	centre of range
------	creek
———	home range boundary

TREATMENT ZONES

MAGNETIC

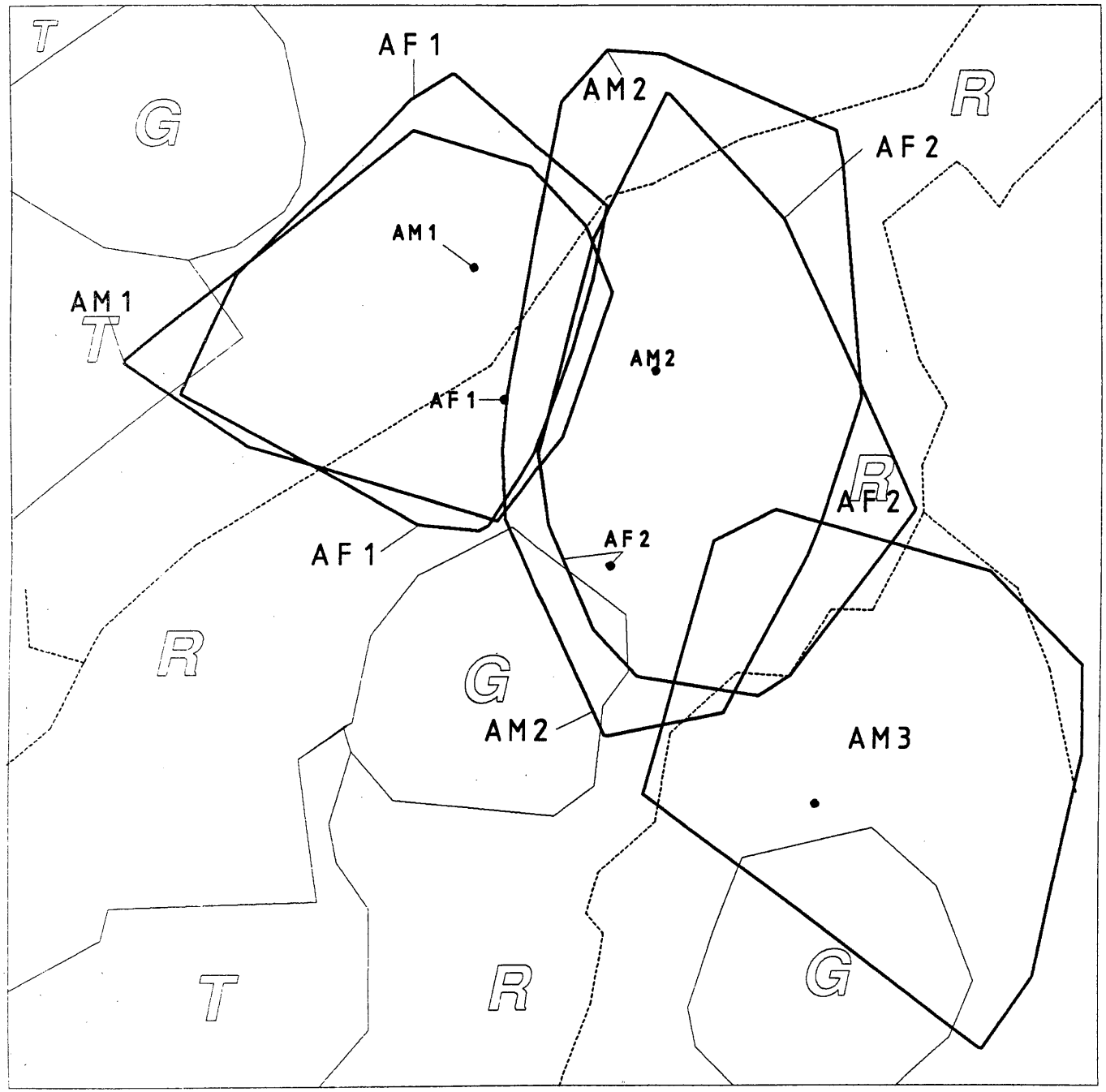
G GAPPED

T THINNED

R RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 42

Yellow-throated Scrubwren : E2 Plot home ranges (95% MCP) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
——	home range boundary

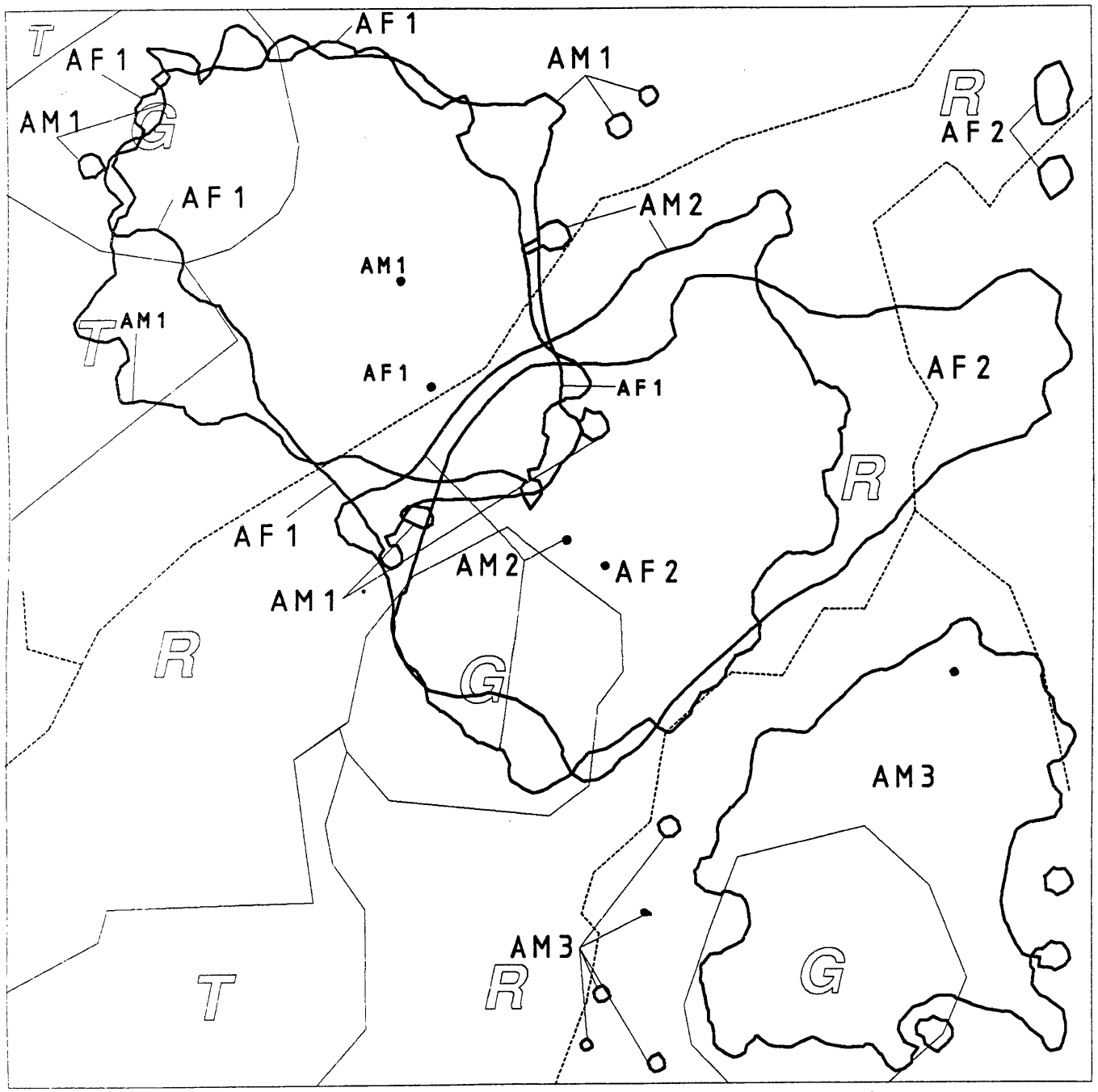
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 43

Yellow-throated Scrubwren : E2 Plot home ranges (95% HM) before logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
———	home range boundary

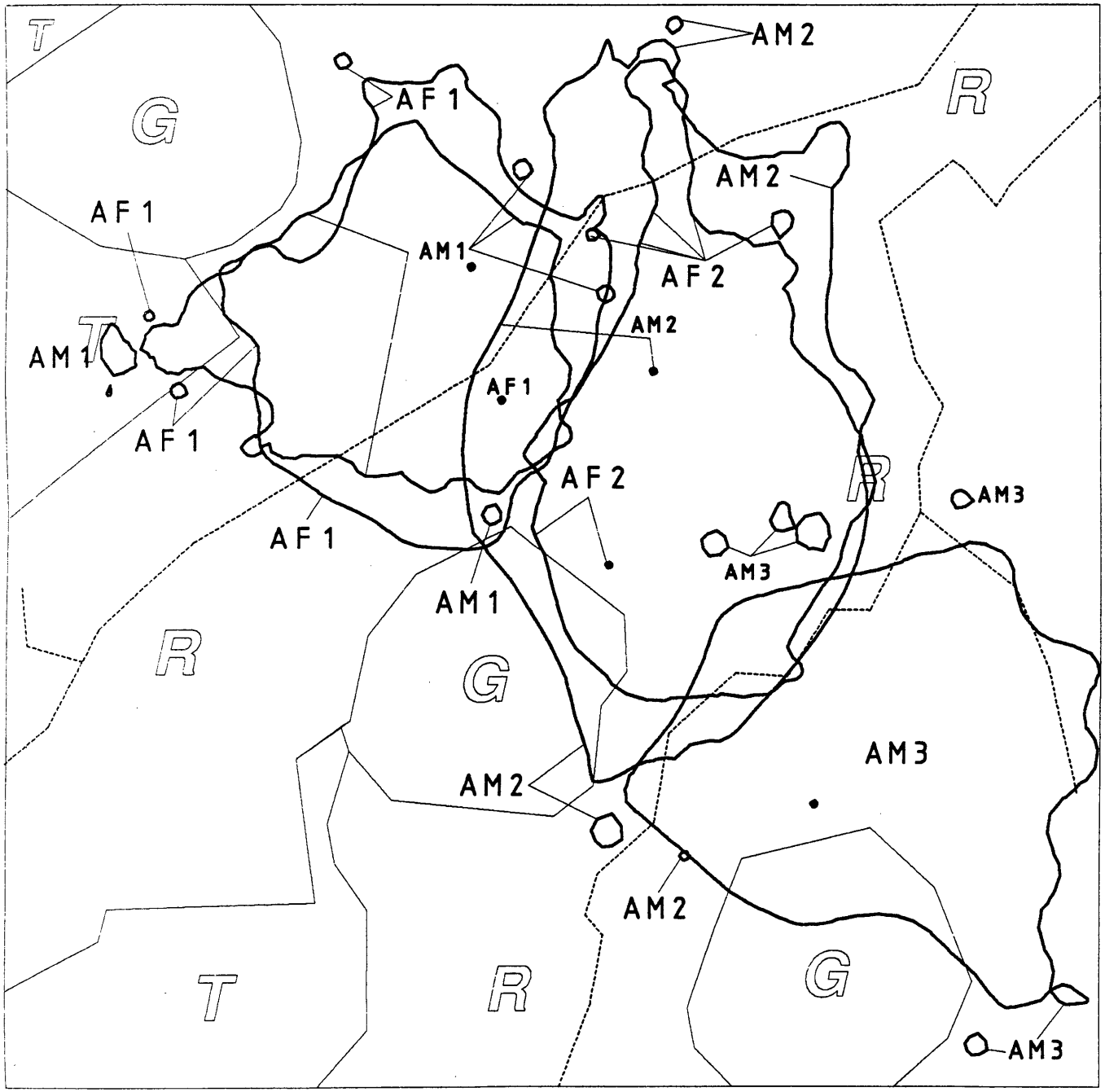
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 44

Yellow-throated Scrubwren : E2 Plot home ranges (95% HM) after logging

LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
———	home range boundary

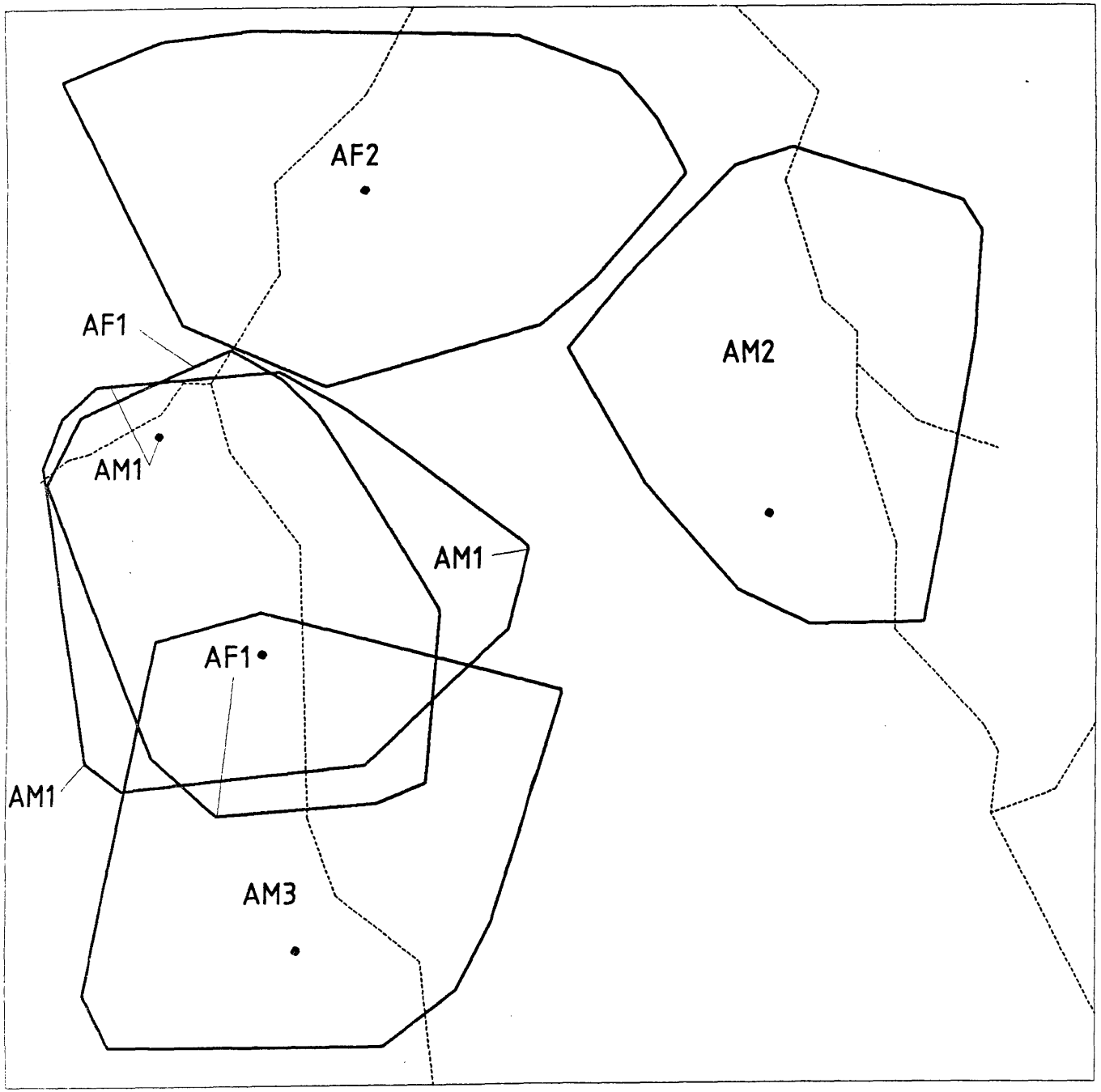
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 45

Yellow-throated Scrubwren : C2 Plot

home ranges (95% MCP) before logging

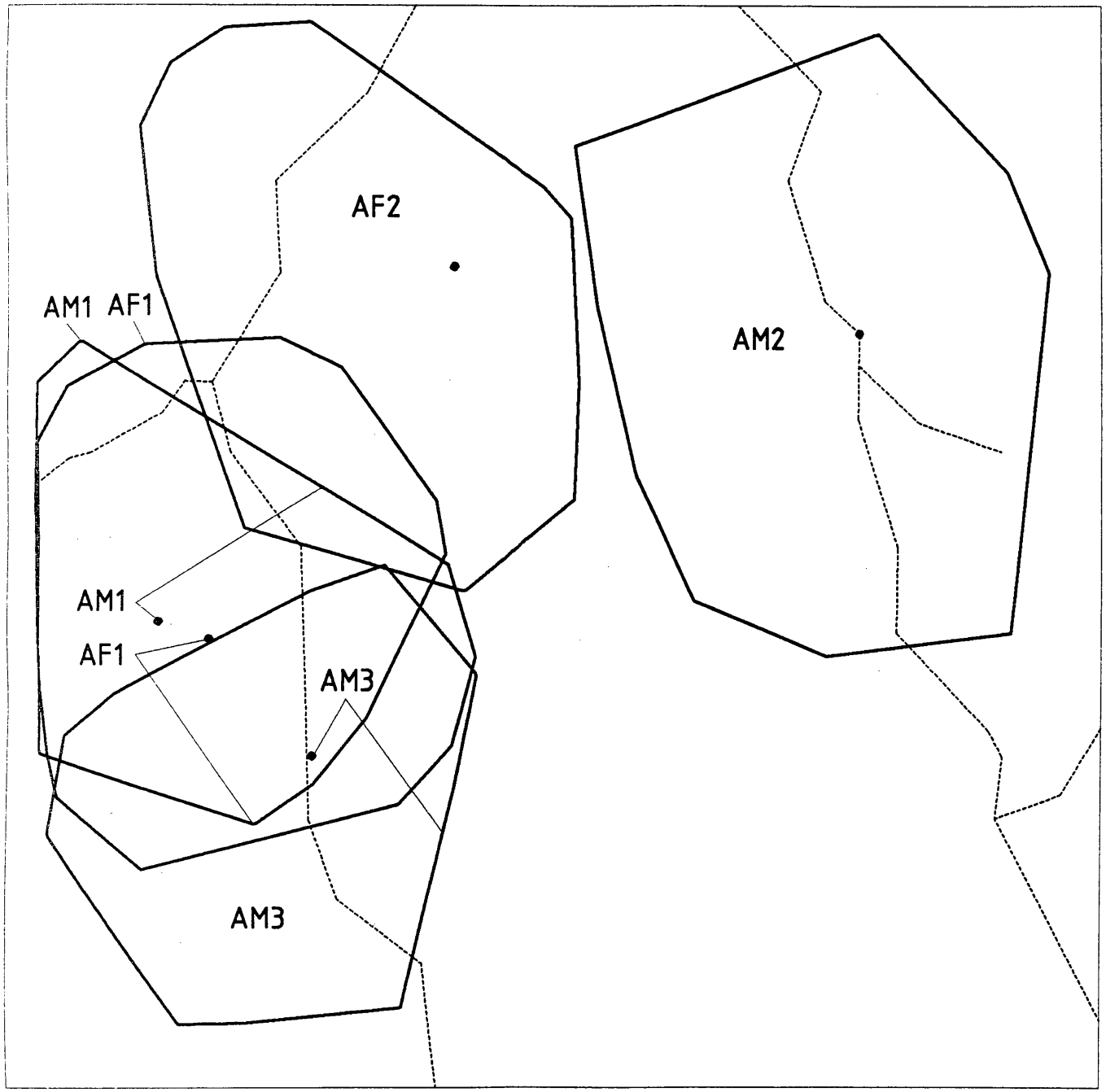
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 46

Yellow-throated Scrubwren : C2 Plot home ranges (95% MCP) after logging

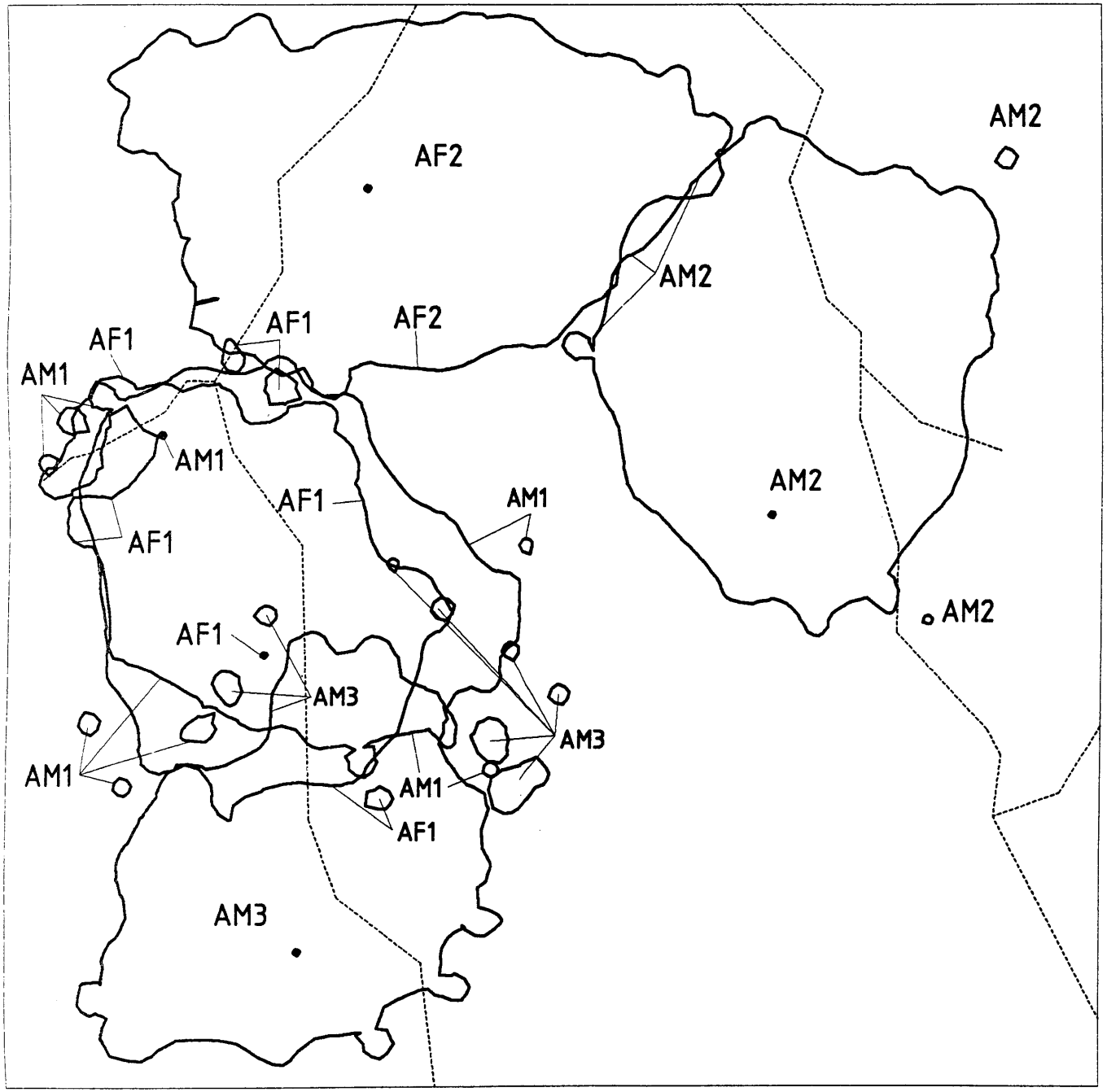
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 47

Yellow-throated Scrubwren : C2 Plot home ranges (95% HM) before logging

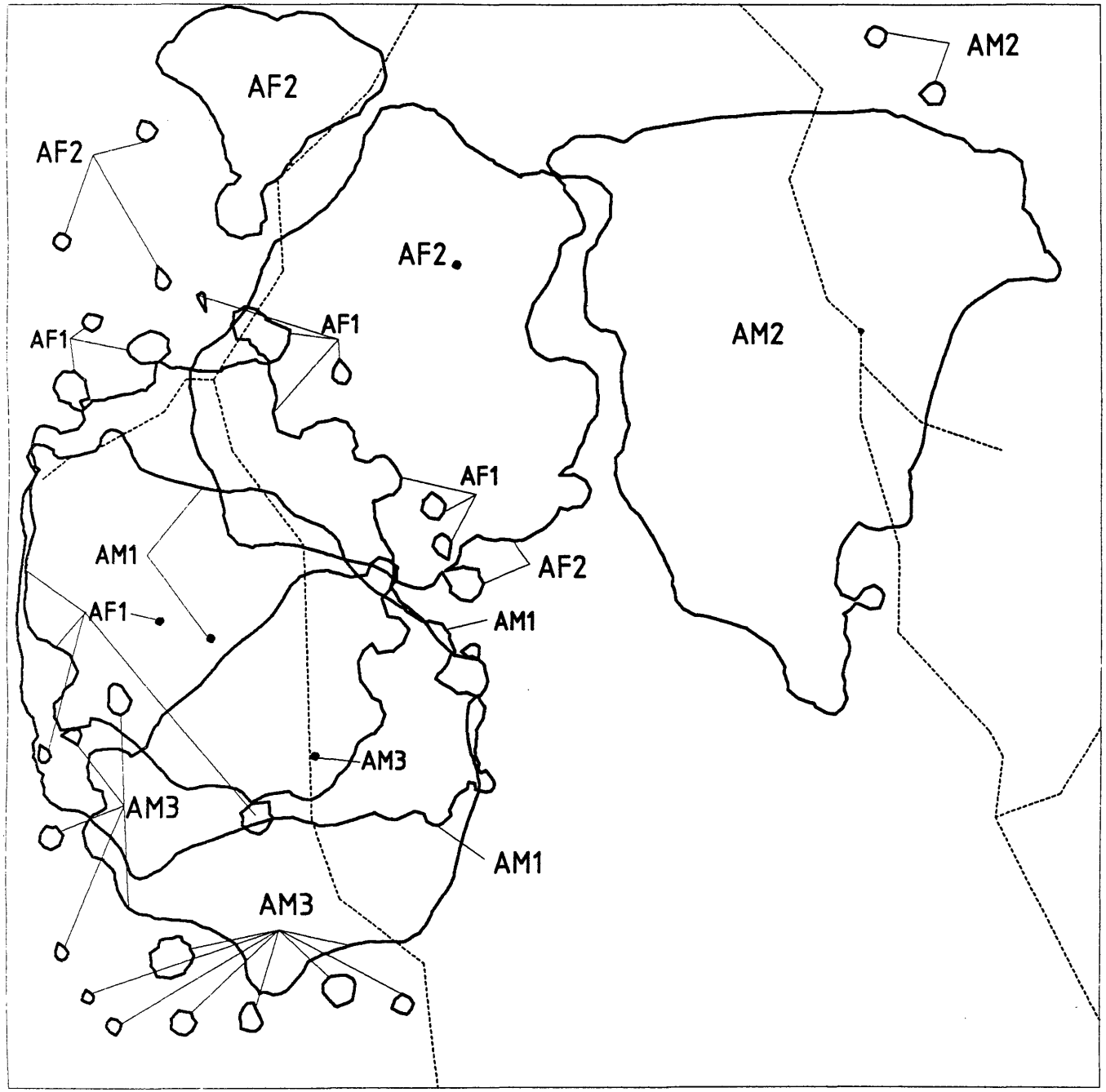
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
-------	creek
———	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 48
Yellow-throated Scrubwren : C2 Plot
home ranges (95% HM) after logging

LEGEND

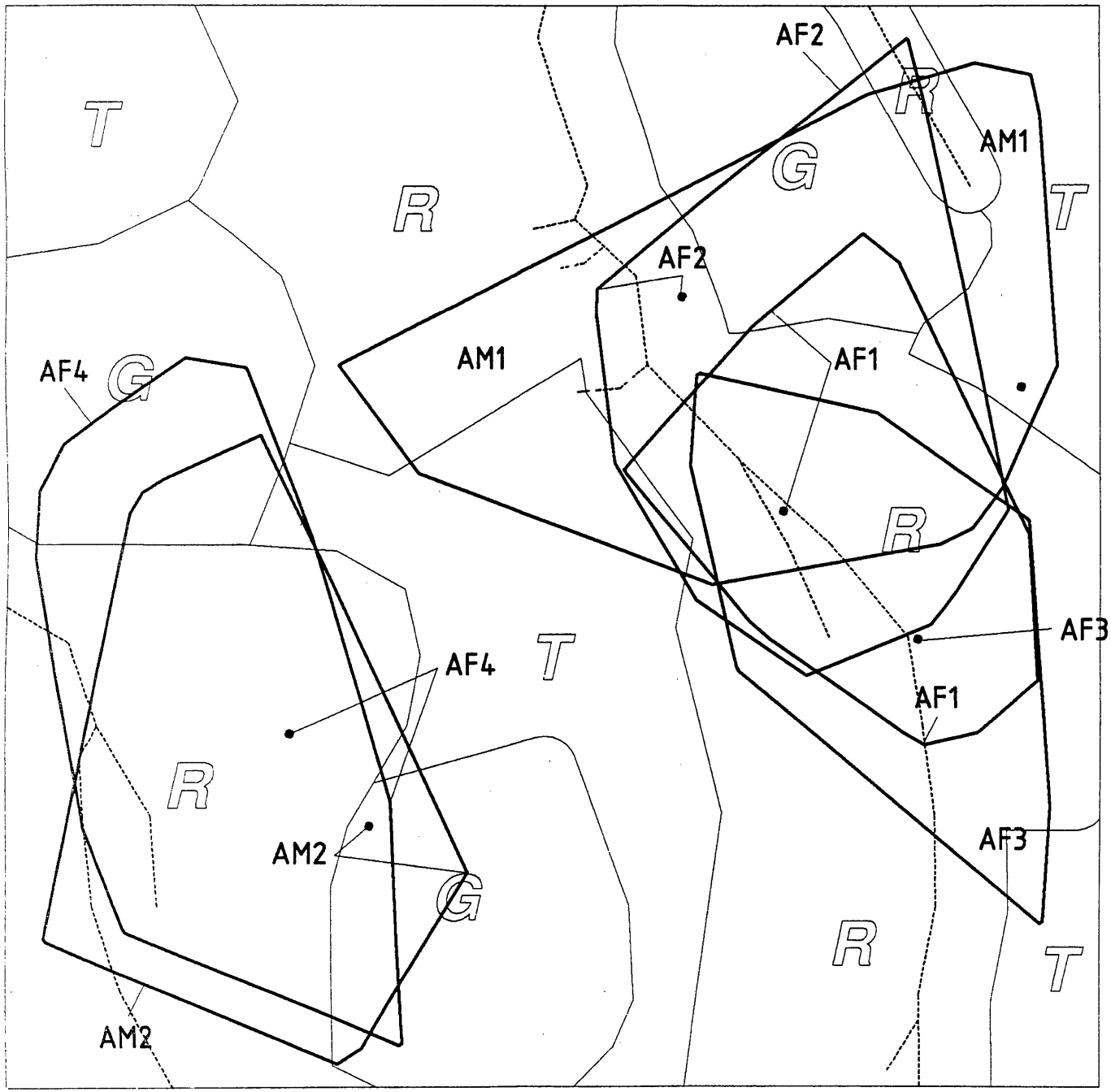
AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
——	home range boundary

MAGNETIC

AF1

0 10 20 40 100m

SCALE: 1:1700



Map: 49

White-browed Scrubwren : E1 Plot

home ranges (95% MCP) before logging

LEGEND

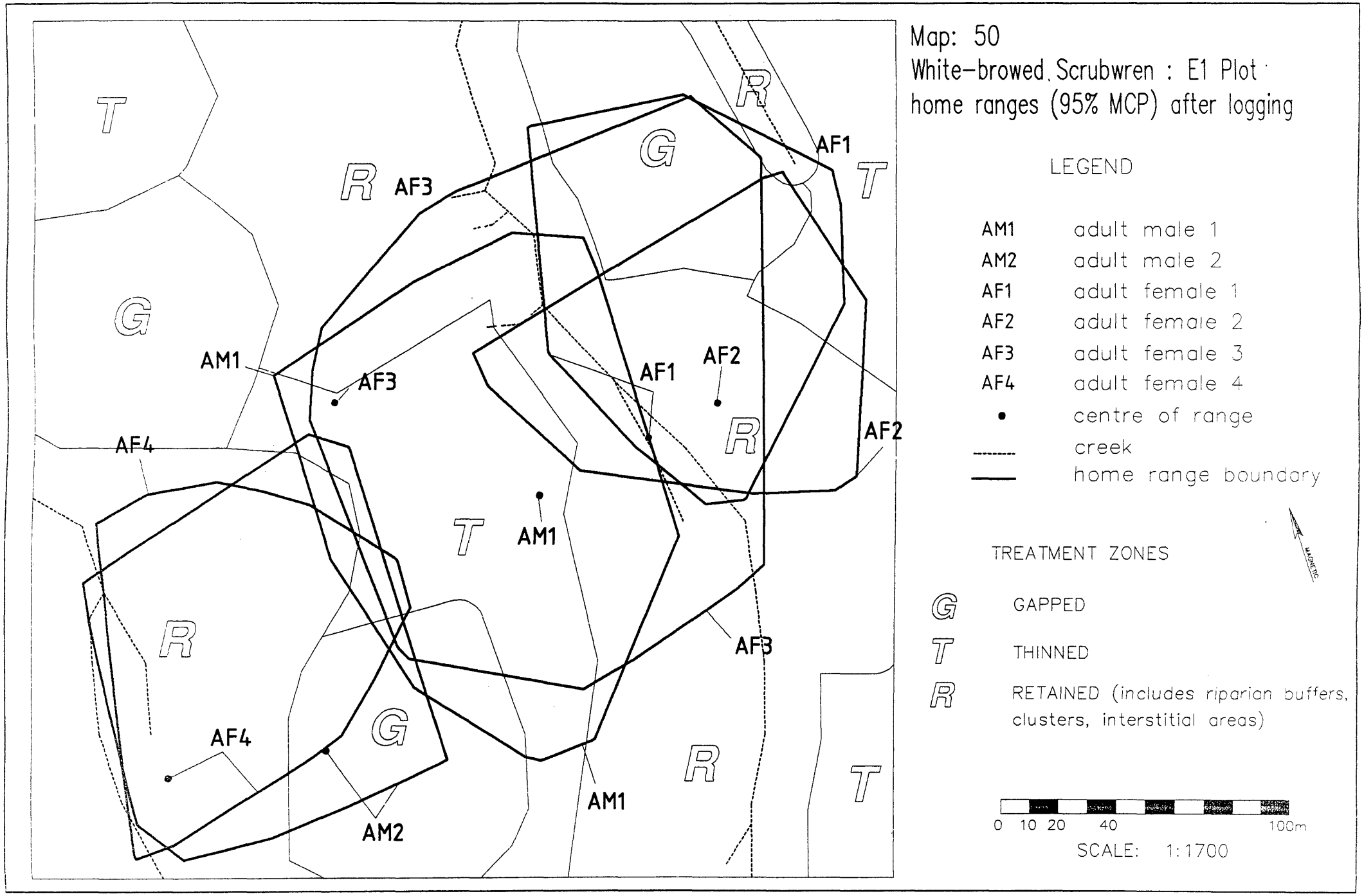
AM1	adult male 1
AM2	adult male 2
AF1	adult female 1
AF2	adult female 2
AF3	adult female 3
AF4	adult female 4
•	centre of range
------	creek
——	home range bounaary

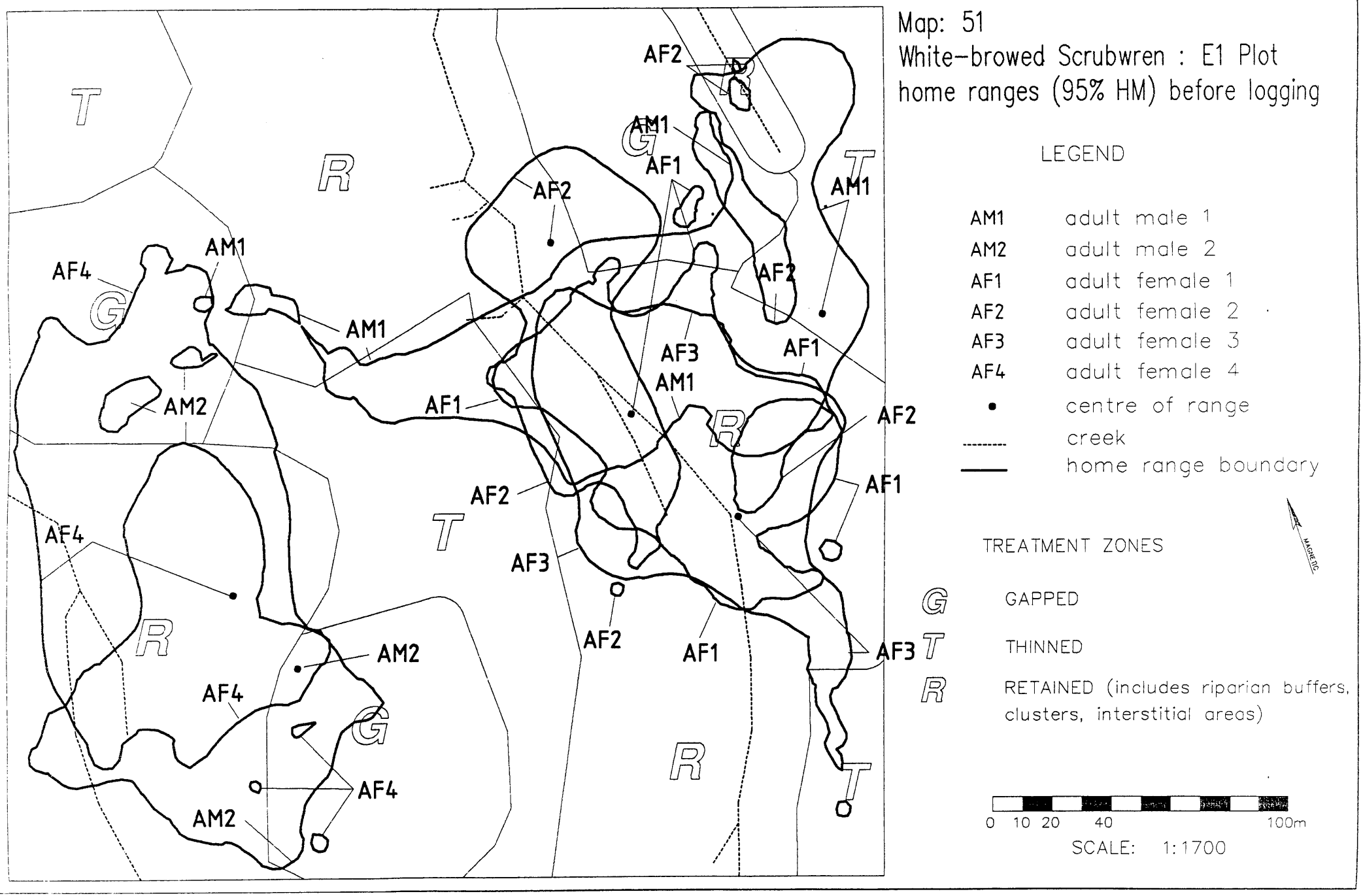
TREATMENT ZONES

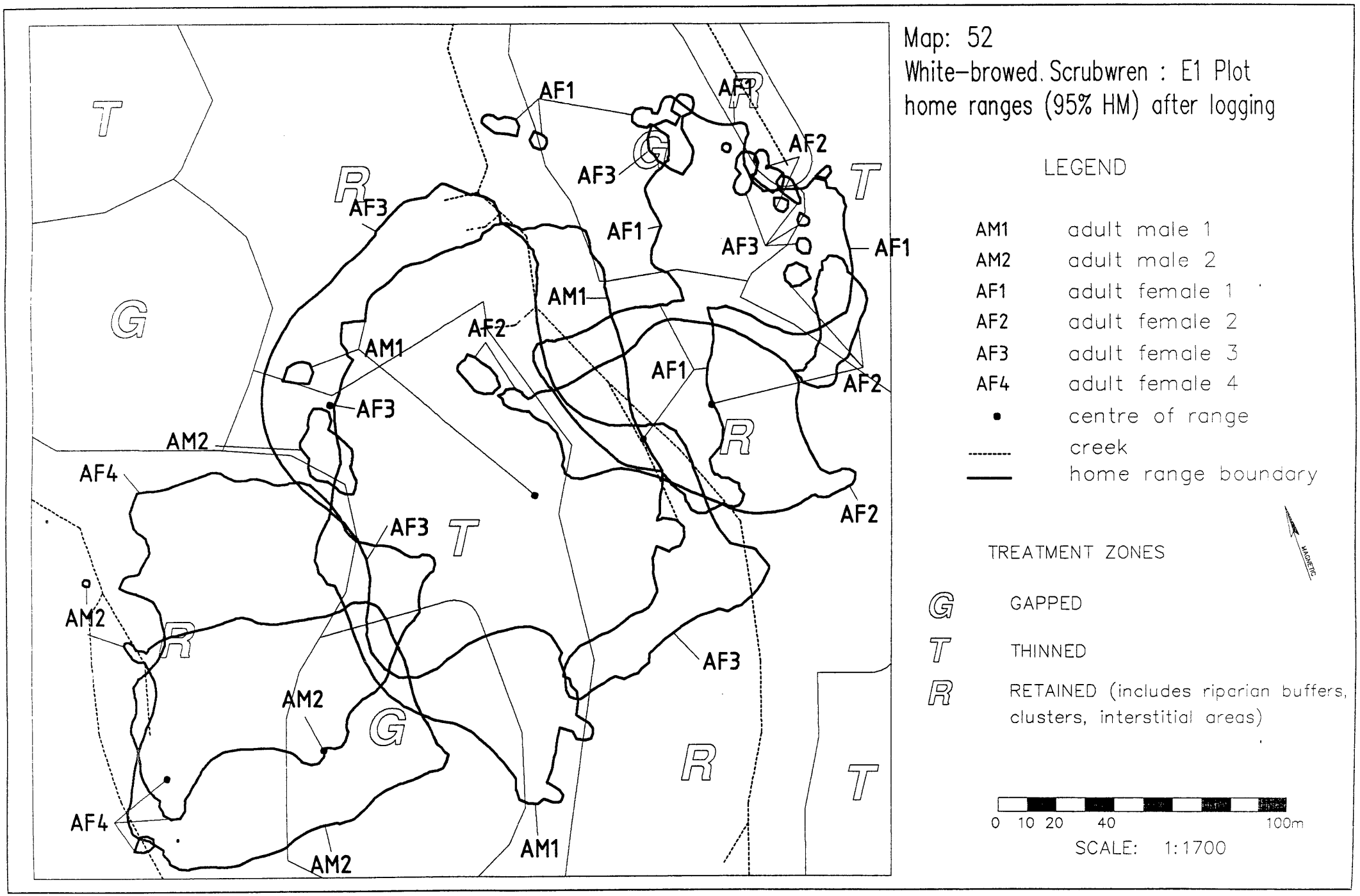
G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

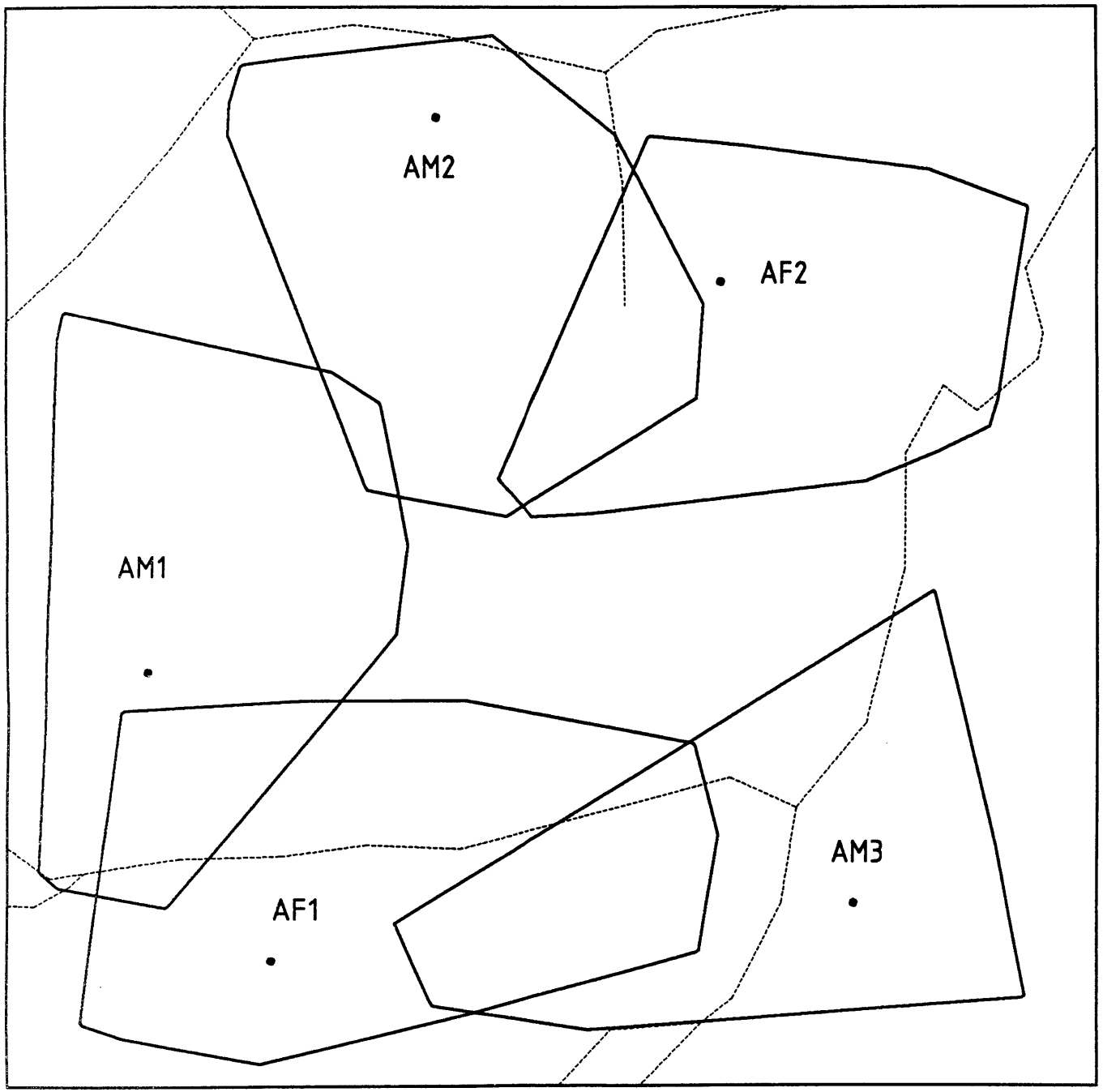
0 10 20 40 100m

SCALE: 1:1700


Map: 50
White-browed Scrubwren : E1 Plot
home ranges (95% MCP) after logging
LEGEND
AM1 adult male 1
AM2 adult male 2
AF1 adult female 1
AF2 adult female 2
AF3 adult female 3
AF4 adult female 4
centre of range
creek
home range boundary
TREATMENT ZONES
G GAPPED
T THINNED
R RETAINED (includes riparian buffers, clusters, interstitial areas)
MAGNETIC
0 10 20 40 100m
SCALE: 1:1700
T
R
G
AF1
AF3
AM1
AF2
AF4
AM2


Map: 51
White-browed Scrubwren : E1 Plot
home ranges (95% HM) before logging
LEGEND
AM1 adult male 1
AM2 adult male 2
AF1 adult female 1
AF2 adult female 2
AF3 adult female 3
AF4 adult female 4
centre of range
creek
home range boundary
TREATMENT ZONES
G GAPPED
T THINNED
R RETAINED (includes riparian buffers, clusters, interstitial areas)
MAGNETIC
0 10 20 40 100m
SCALE: 1:1700


Map: 52
White-browed. Scrubwren : E1 Plot
home ranges (95% HM) after logging
LEGEND
AM1 adult male 1
AM2 adult male 2
AF1 adult female 1
AF2 adult female 2
AF3 adult female 3
AF4 adult female 4
centre of range
creek
home range boundary
TREATMENT ZONES
G GAPPED
T THINNED
R RETAINED (includes riparian buffers, clusters, interstitial areas)
MAGNETIC
0 10 20 40 100m
SCALE: 1:1700
T
G
R
AF1
AF2
AF3
AF4
AM1
AM2



Map: 53
White-browed Scrubwren : C1 Plot
home ranges (95% MCP) before logging

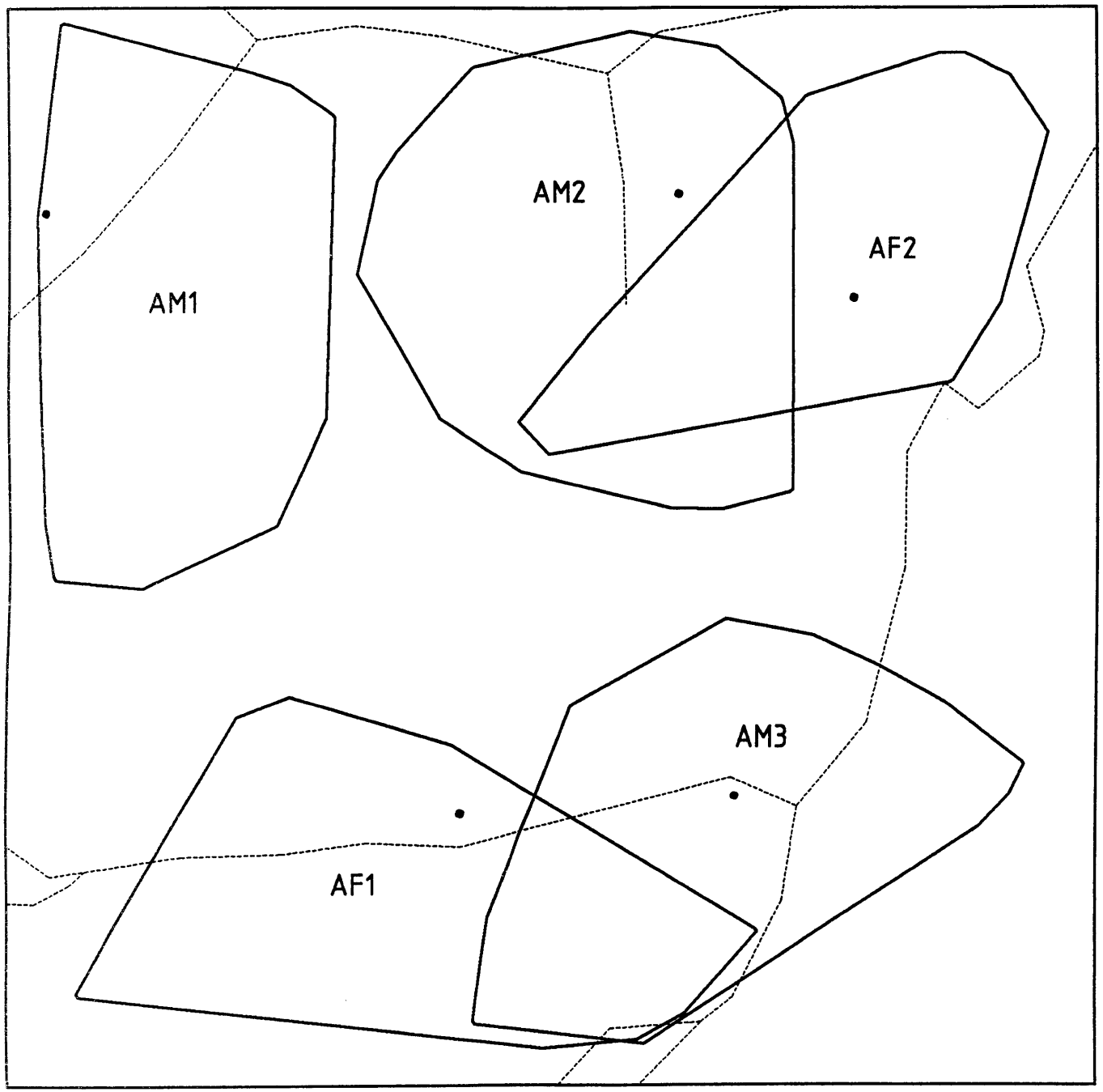
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
----------	creek
————	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 54
White-browed Scrubwren : C1 Plot
home ranges (95% MCP) after logging

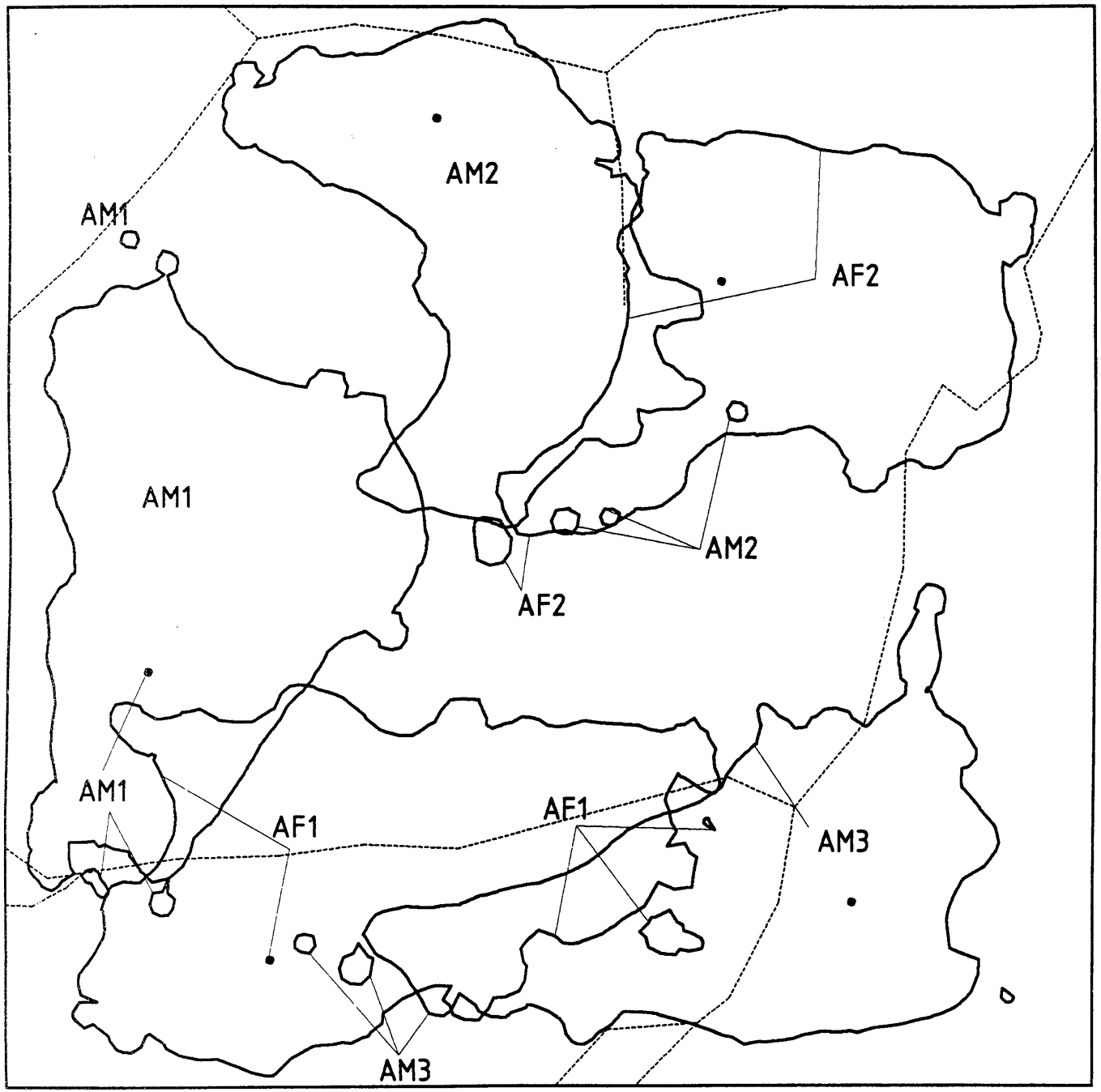
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
-------	creek
———	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 55

White-browed Scrubwren : C1 Plot

home ranges (95% HM) before logging

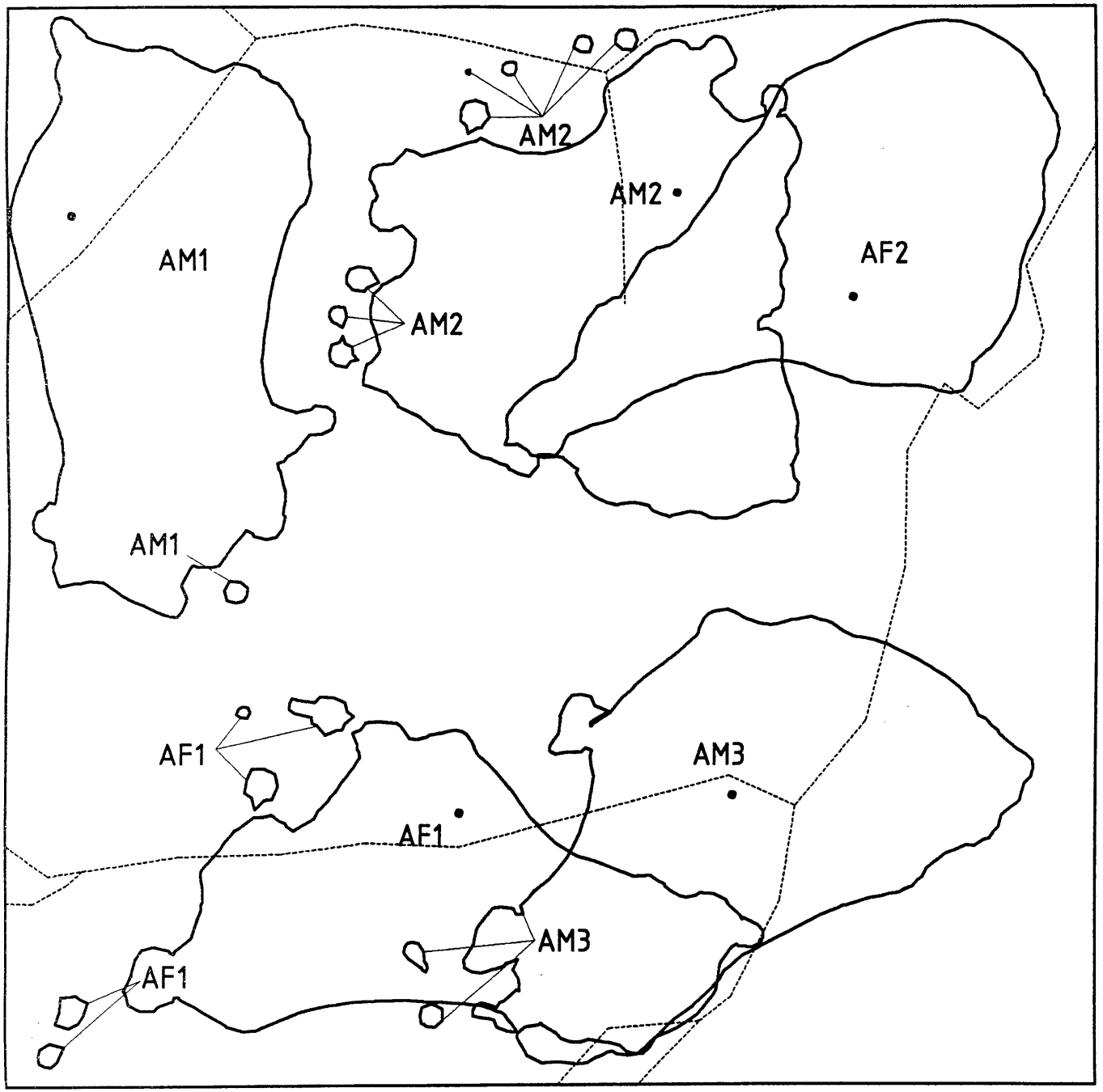
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
.....	creek
———	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 56

White-browed Scrubwren : C1 Plot home ranges (95% HM) after logging

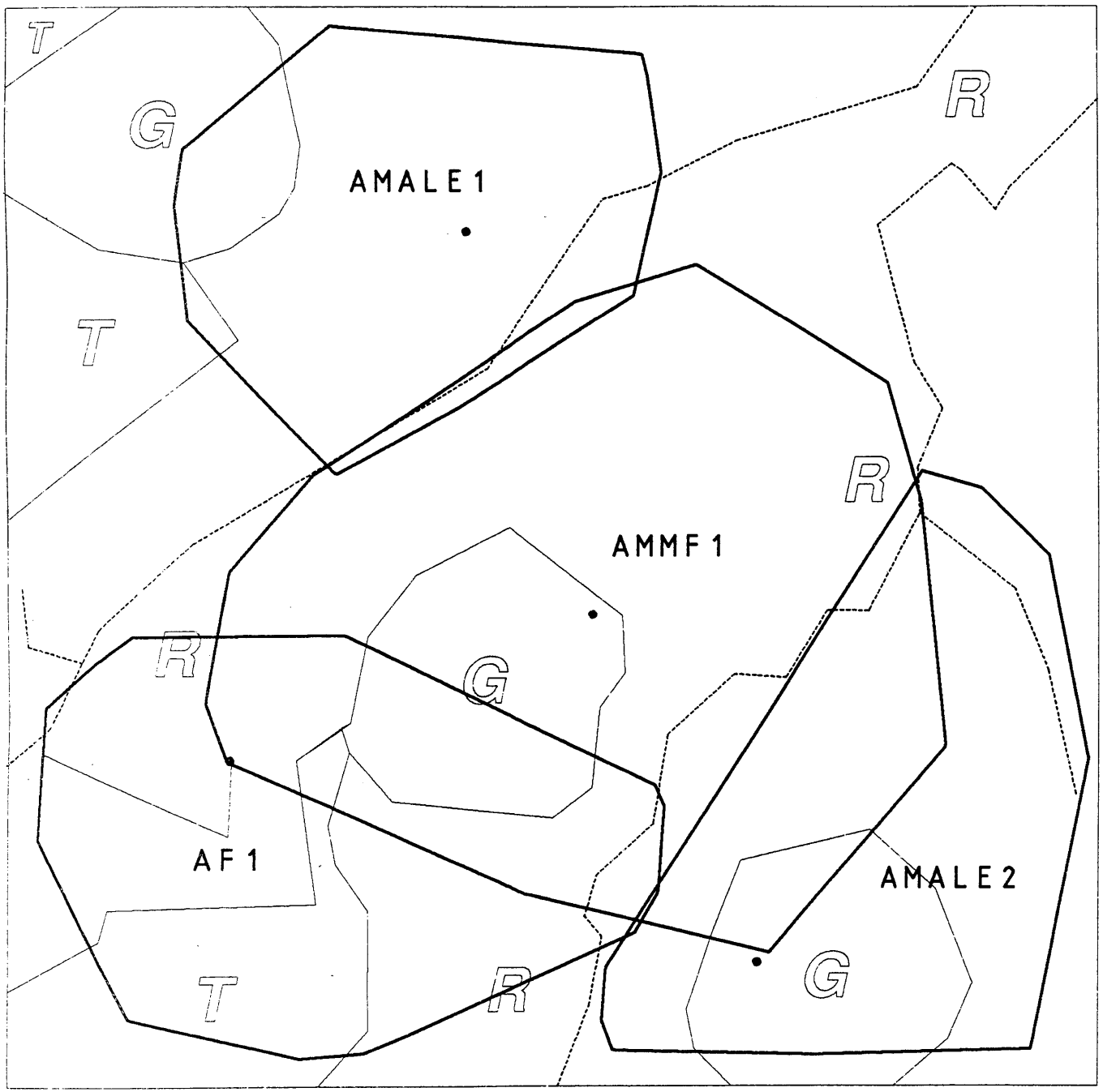
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
———	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 57

White-browed Scrubwren : E2 Plot

home ranges (95% MCP) before logging

LEGEND

AMMF1	adult group 1 (2 males, 1 female)
AMALE1	adult male 1
AMALE2	adult male 2
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

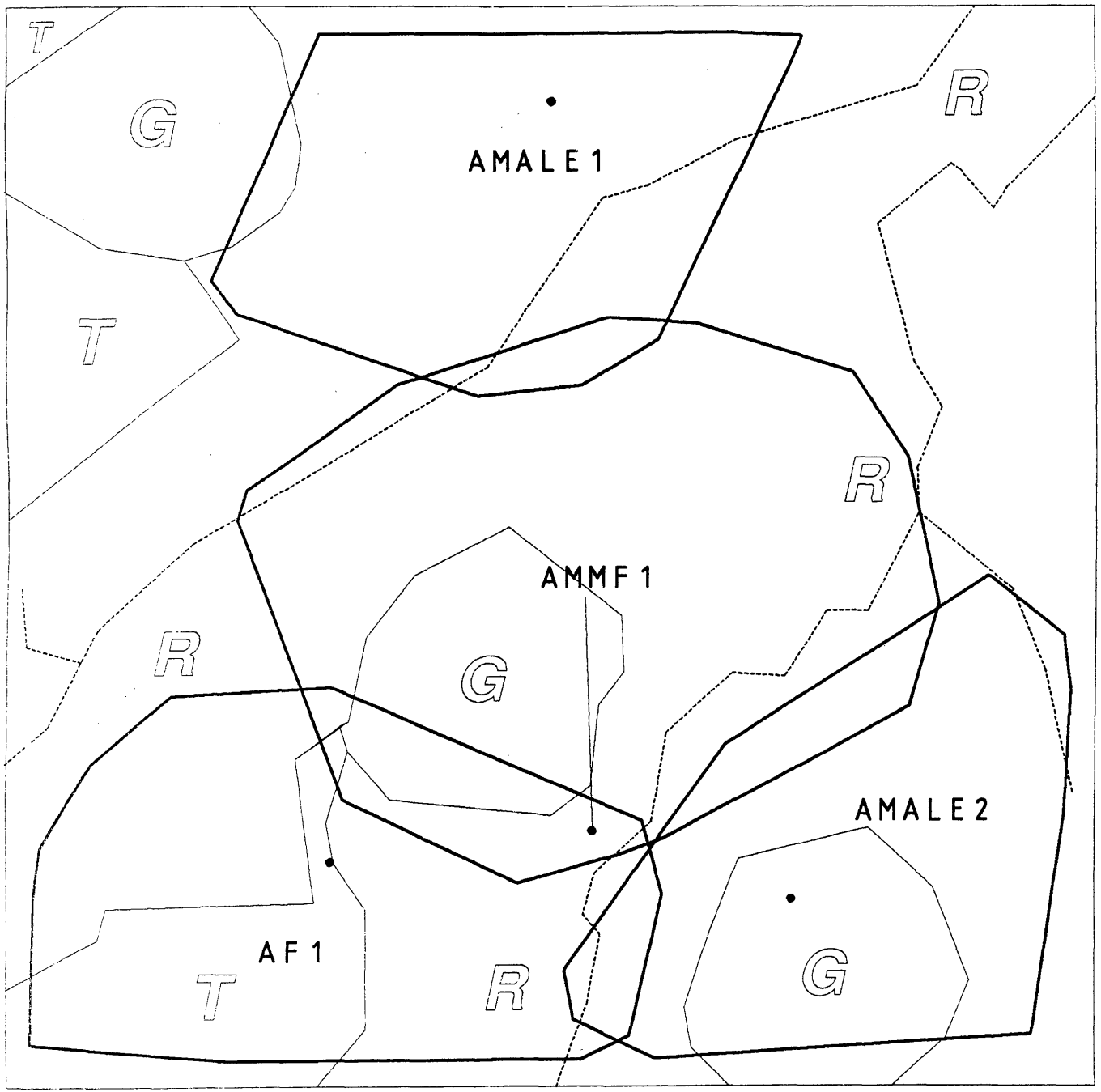
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 58
White-browed Scrubwren : E2 Plot
home ranges (95% MCP) after logging

LEGEND

AMMF1	adult group 1 (2 males,1 female)
AMALE1	adult male 1
AMALE2	adult male 2
AF1	adult female 1
•	centre of range
------	creek
———	home range boundary

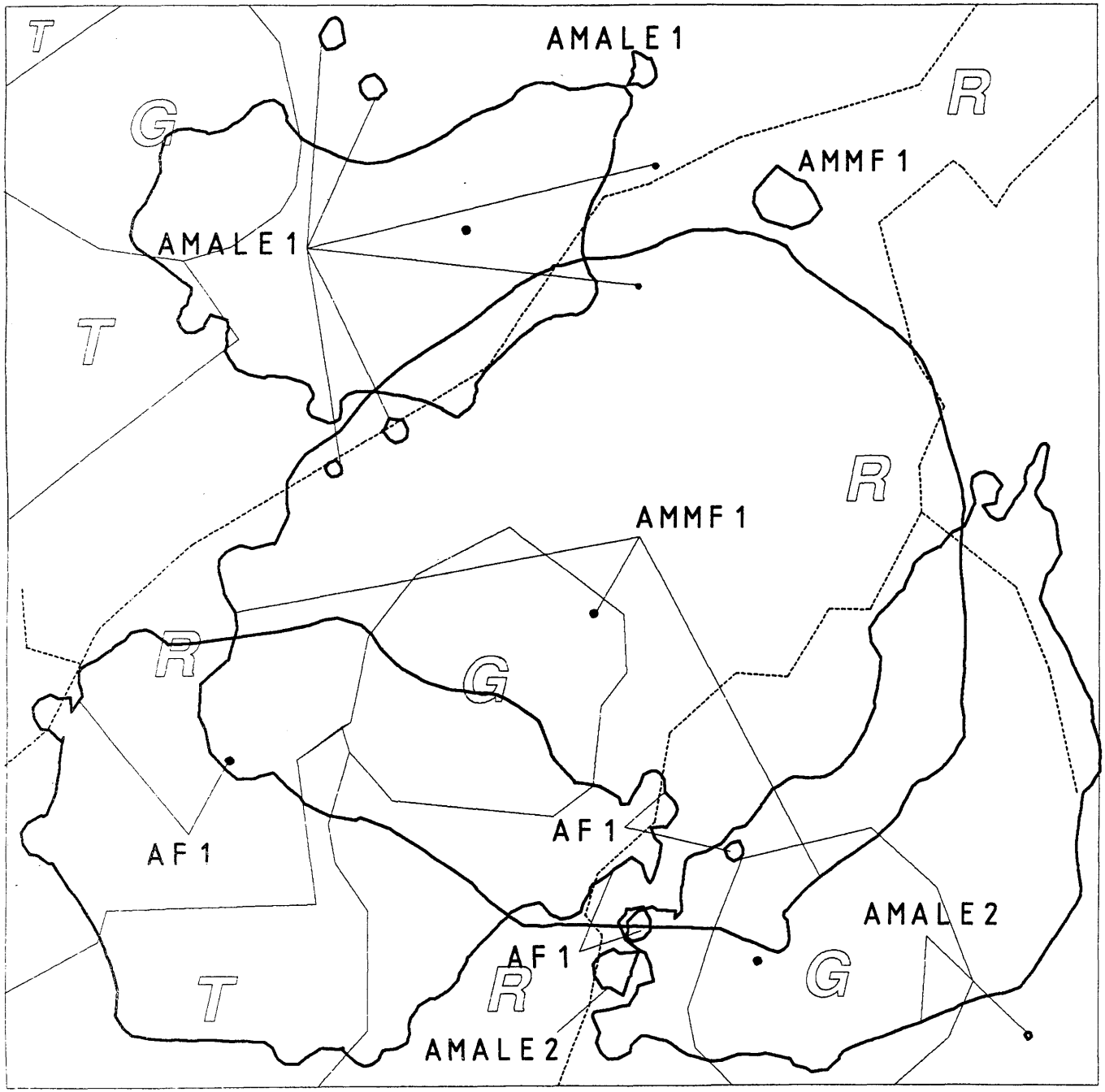
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 59
White-browed Scrubwren : E2 Plot
home ranges (95% HM) before logging

LEGEND

AMMF 1	adult group 1 (2 males,1 female)
AMALE 1	adult male 1
AMALE 2	adult male 2
AF 1	adult female 1
•	centre of range
------	creek
——	home range boundary

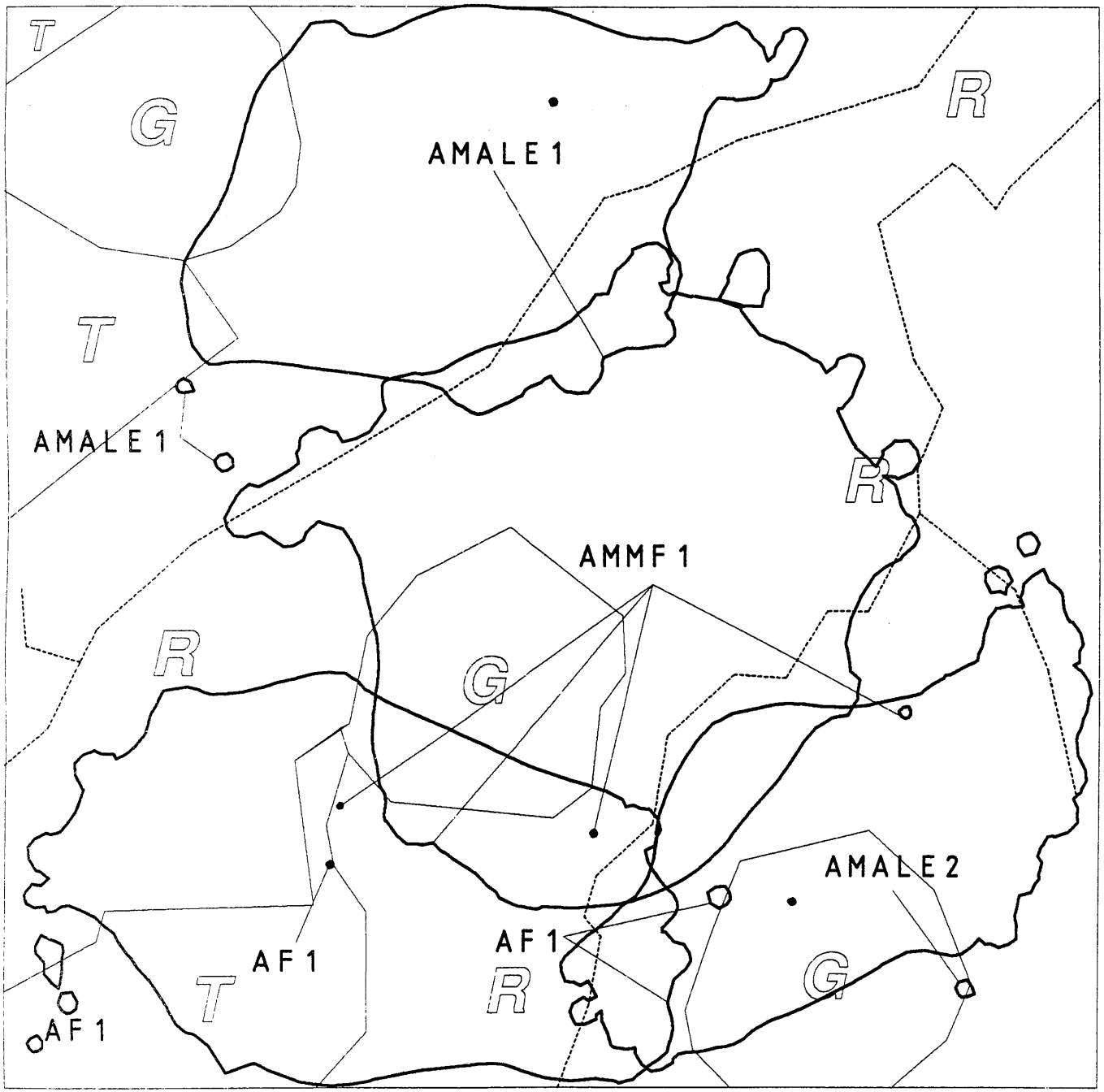
TREATMENT ZONES

MAGNETIC NORTH

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 60

White-browed Scrubwren : E2 Plot

home ranges (95% HM) after logging

LEGEND

AMMF 1	adult group 1 (2 males,1 female)
AMALE 1	adult male 1
AMALE 2	adult male 2
AF 1	adult female 1
•	centre of range
----------	creek
————	home range boundary

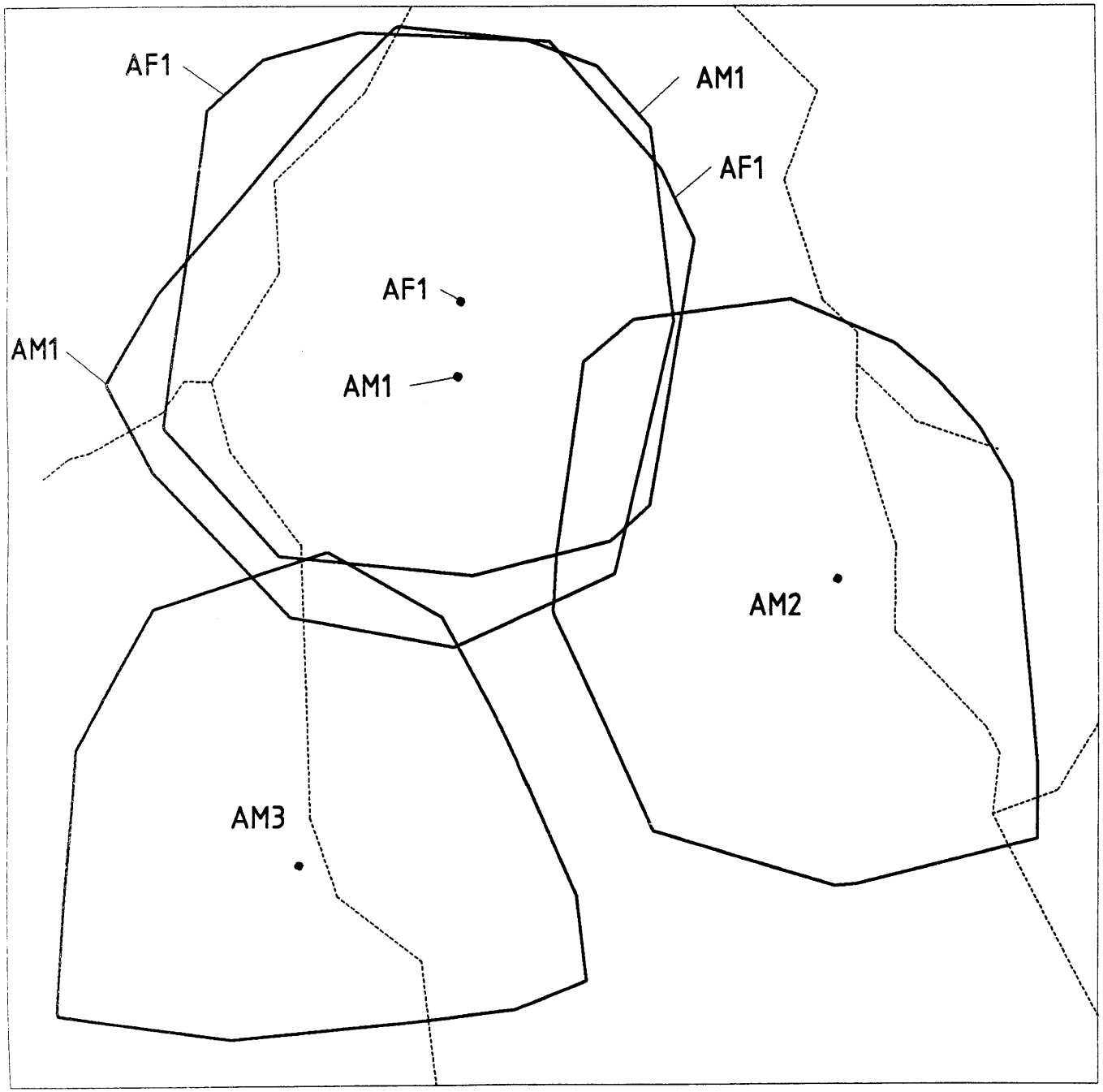
TREATMENT ZONES

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 61
White-browed Scrubwren : C2 Plot
home ranges (95% MCP) before logging

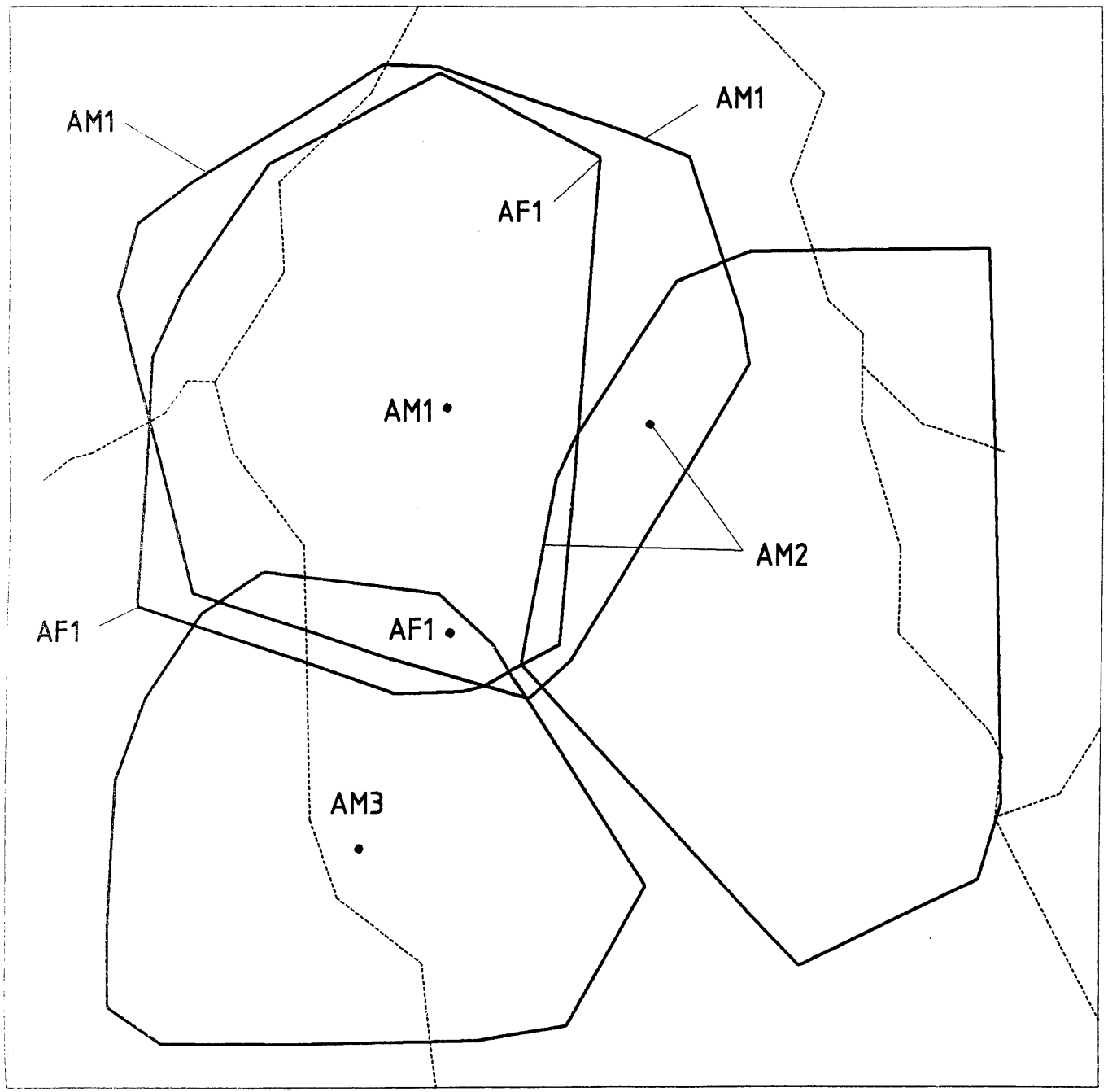
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 62
White-browed Scrubwren : C2 Plot
home ranges (95% MCP) after logging

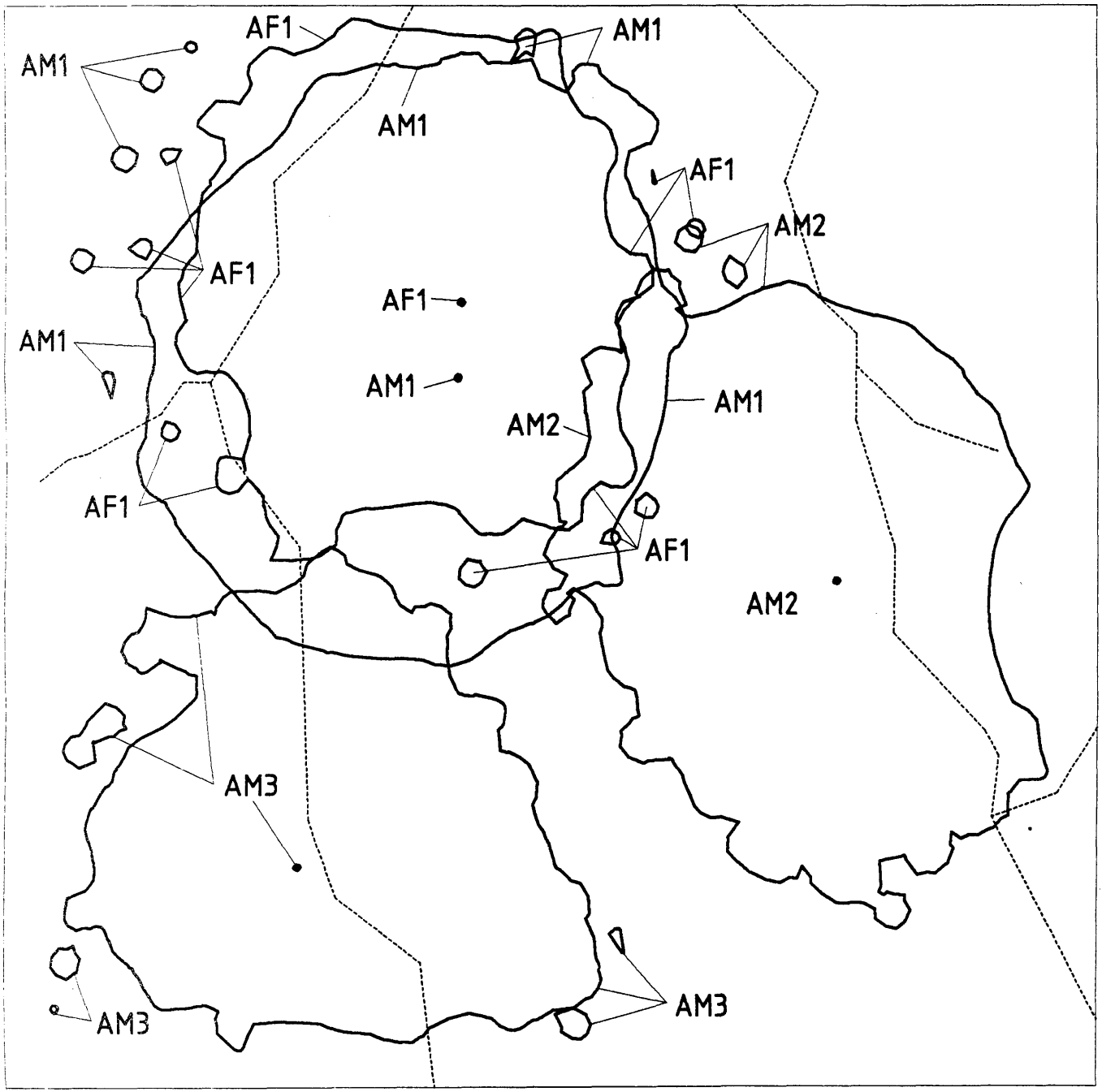
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
----	creek
——	home range bounaary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 63
White-browed Scrubwren : C2 Plot
home ranges (95% HM) before logging

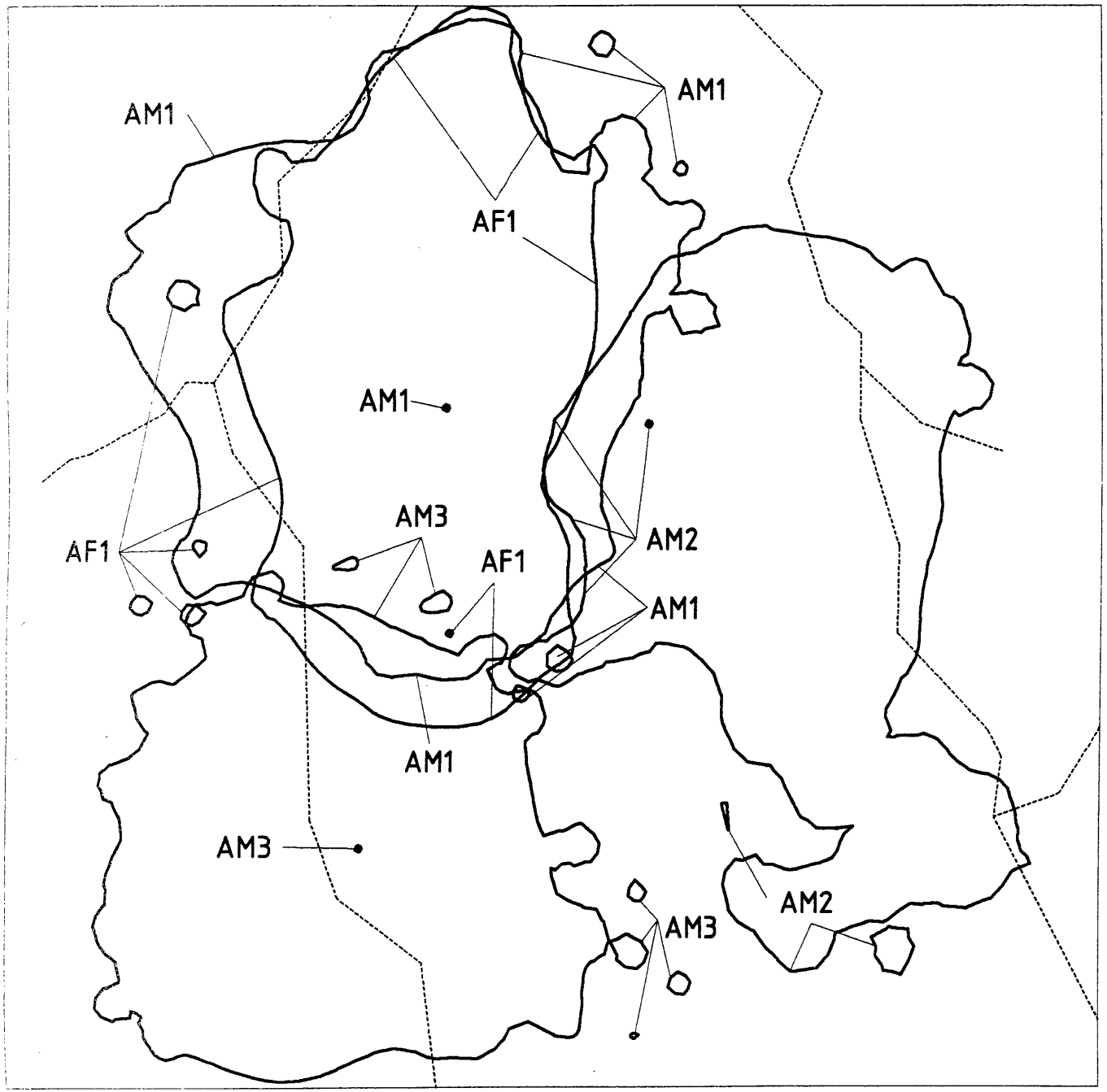
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
----	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 64
White-browed Scrubwren : C2 Plot
home ranges (95% HM) after logging

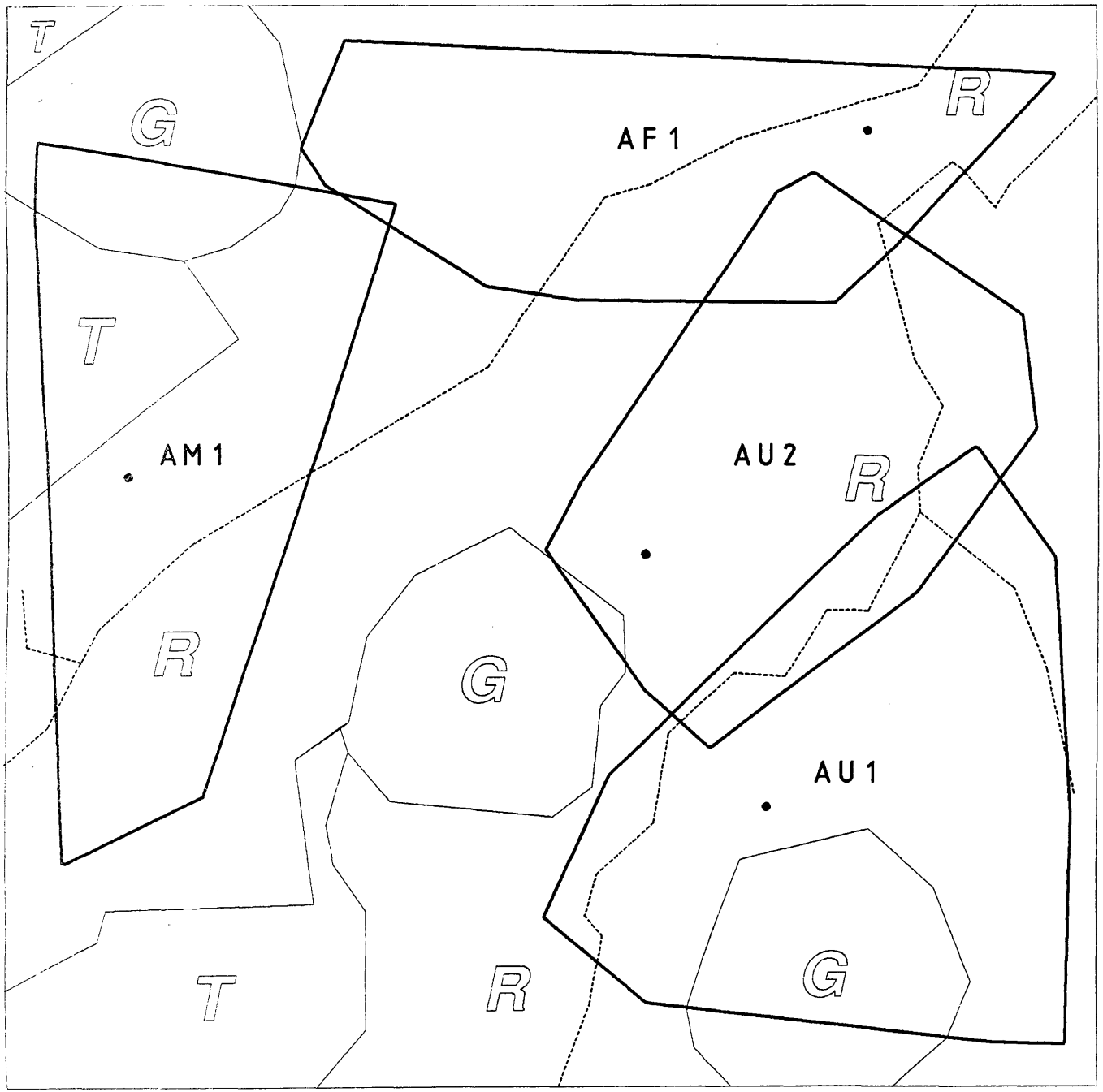
LEGEND

AM1	adult male 1
AM2	adult male 2
AM3	adult male 3
AF1	adult female 1
•	centre of range
-------	creek
———	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 65
Rufous Fantail : E2 Plot
home ranges (95% MCP) after logging

LEGEND

AM 1	adult male 1
AU 1	adult unsexed 1
AU 2	adult unsexed 2
AF 1	adult female 1
•	centre of range
------	creek
——	home range boundary

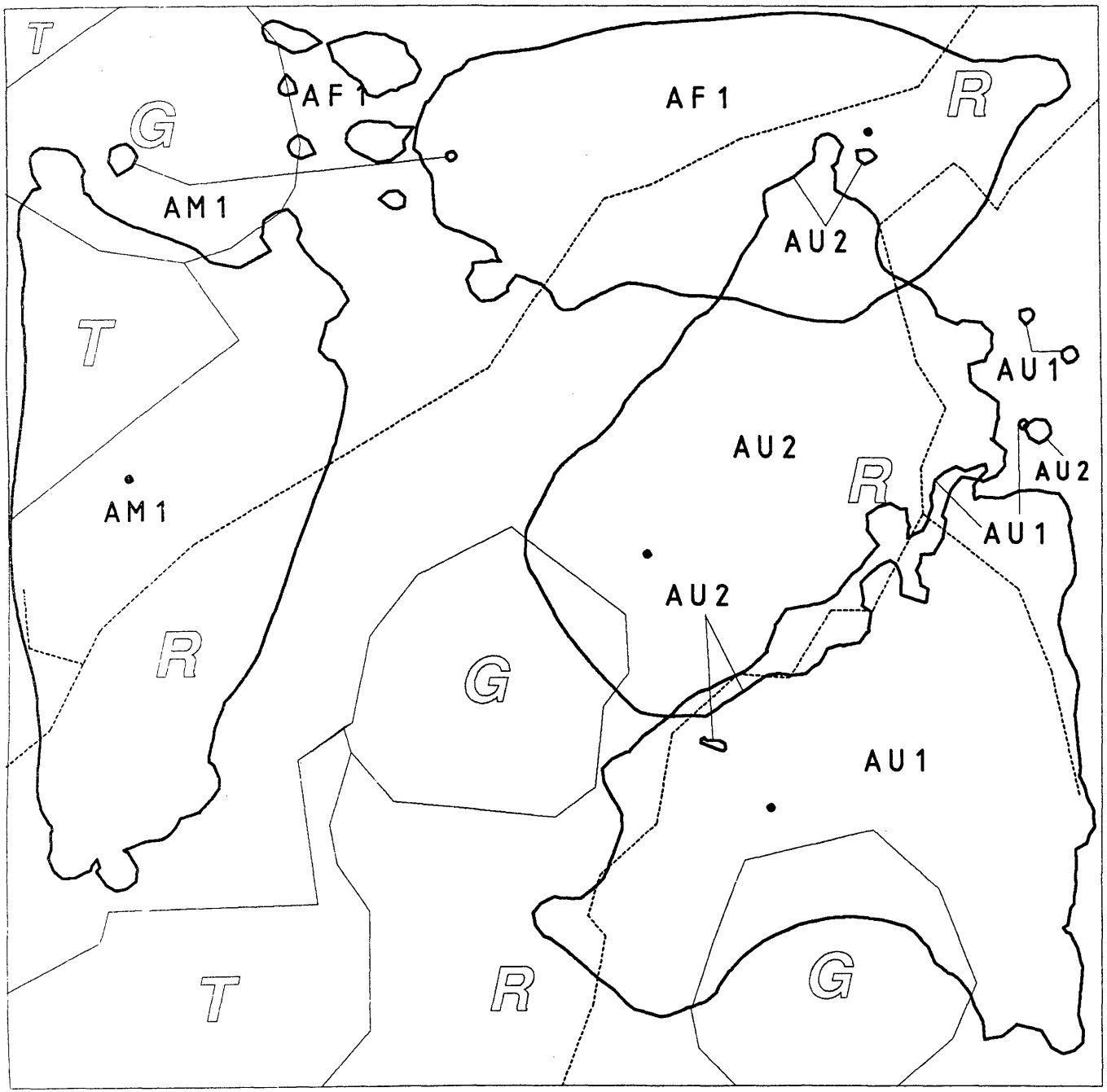
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 66
Rufous Fantail : E2 Plot
home ranges (95% HM) after logging

LEGEND

AM1	adult male 1
AU1	adult unsexed 1
AU2	adult unsexed 2
AF1	adult female 1
•	centre of range
-------	creek
———	home range boundary

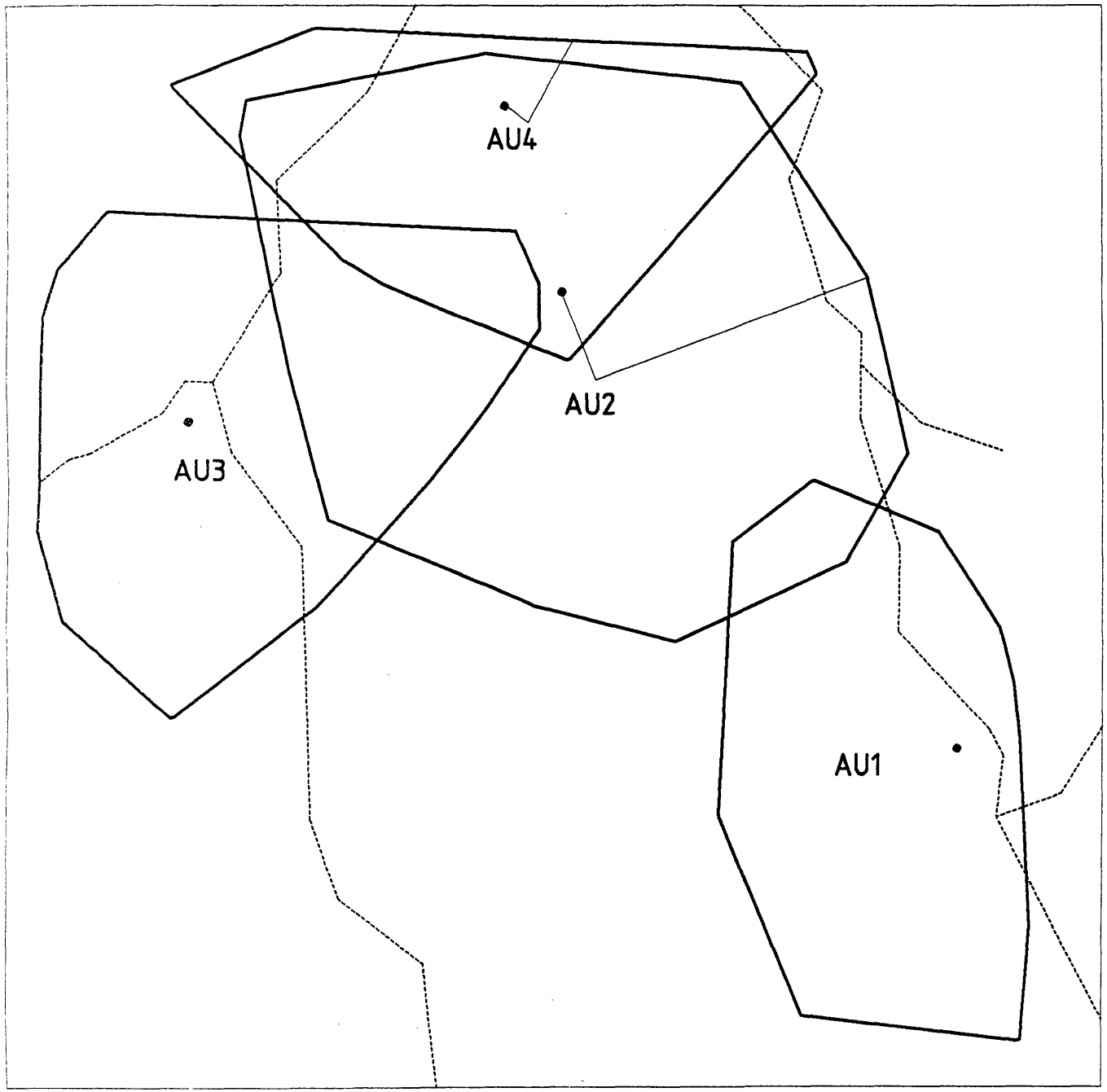
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 67
Rufous Fantail : C2 Plot
home ranges (95% MCP) after logging

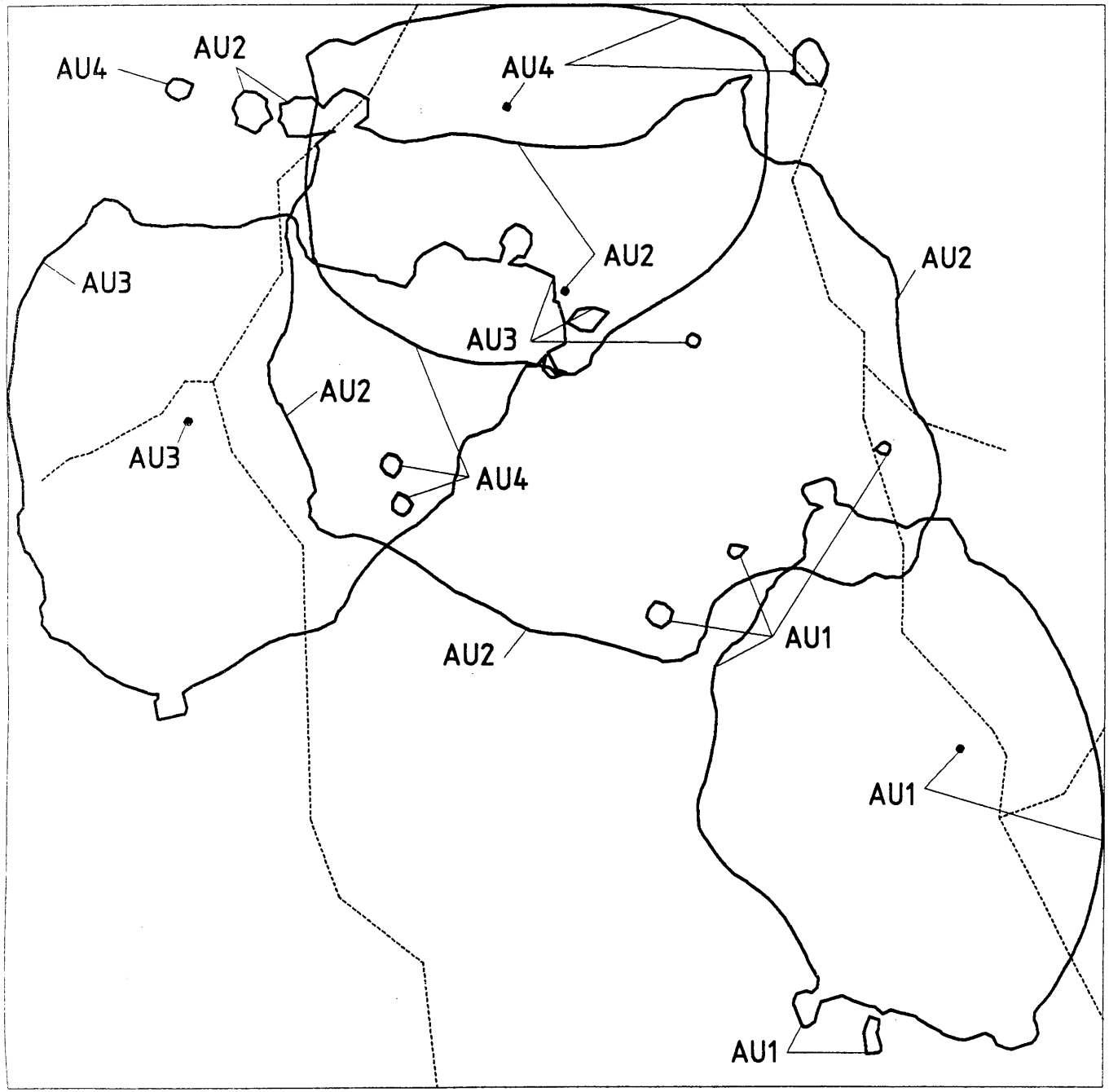
LEGEND

AU1	adult unsexed 1
AU2	adult unsexed 2
AU3	adult unsexed 3
AU4	adult unsexed 4

centre of range
creek
home range boundary

MAGNETIC

0 10 20 40 100m
SCALE: 1:1700



Map: 68
Rufous Fantail : C2 Plot
home ranges (95% HM) after logging

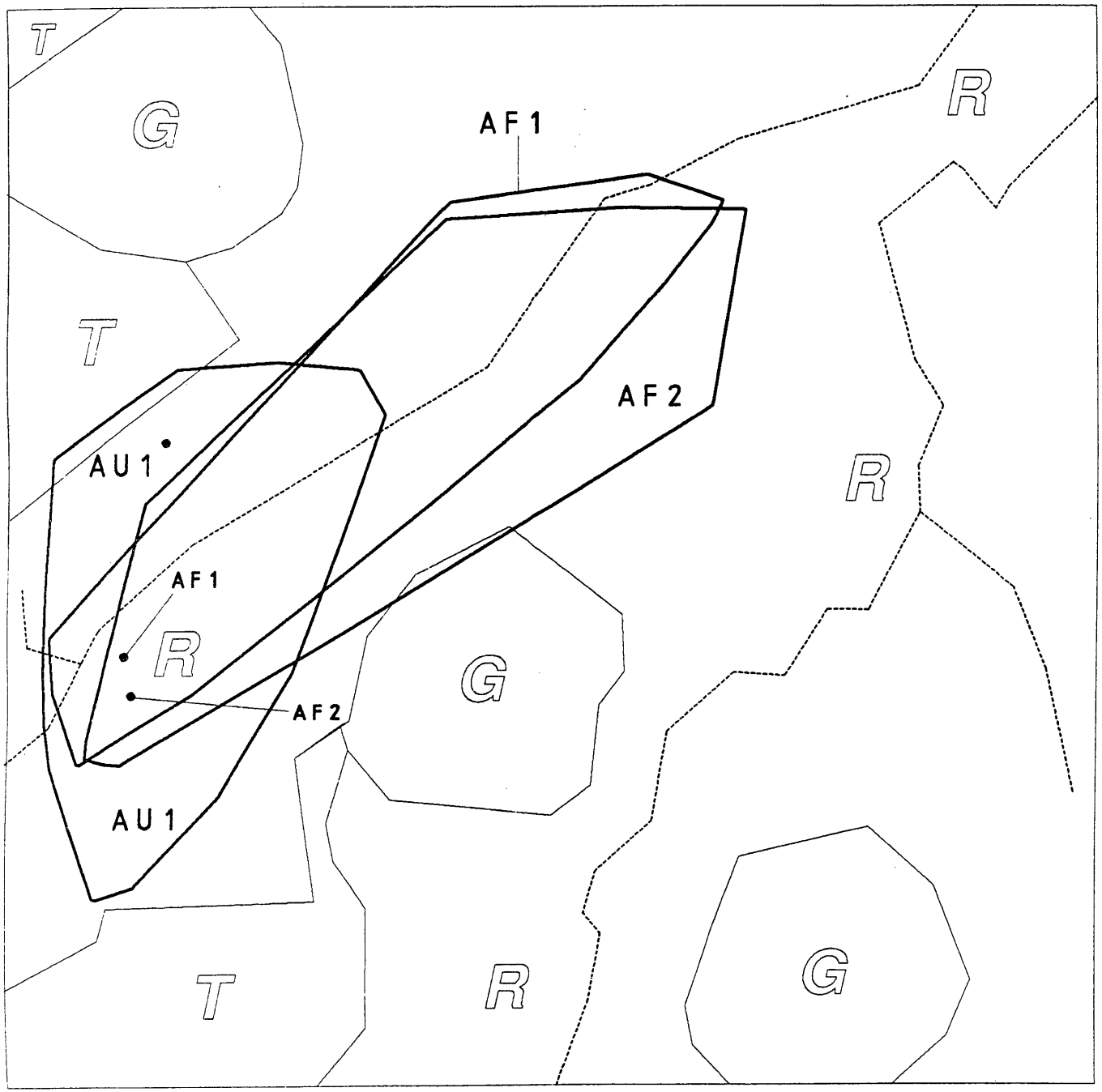
LEGEND

AU1	adult unsexed 1
AU2	adult unsexed 2
AU3	adult unsexed 3
AU4	adult unsexed 4
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700



Map: 69
Spectacled Monarch : E2 Plot
home ranges (95% MCP) after logging

LEGEND

AU 1	adult unsexed 1
AF 1	adult female 1
AF 2	adult female 2
•-	centre of range
------	creek
———	home range boundary

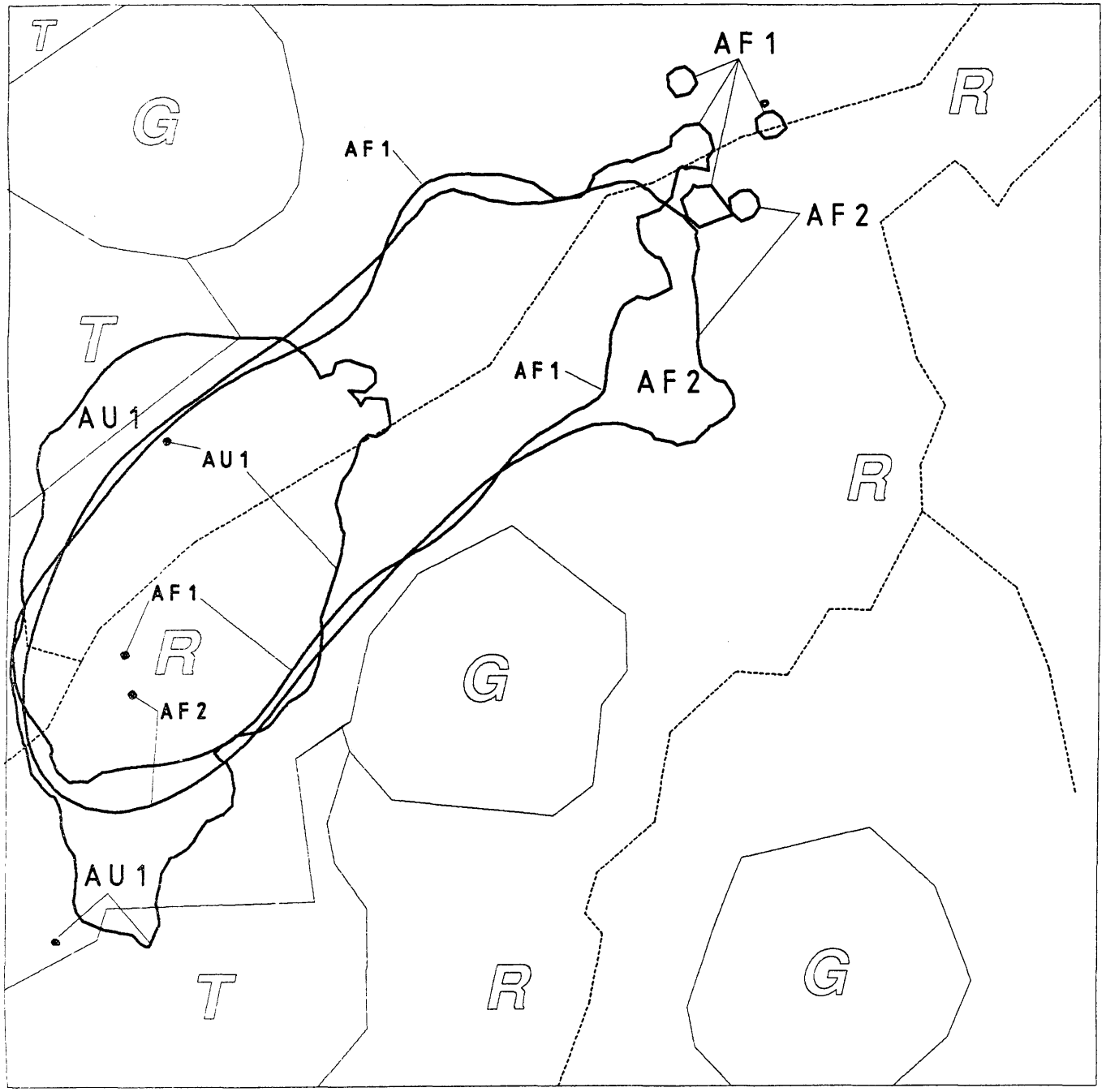
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

SCALE: 1:1700



Map: 70
Spectacled Monarch: E2 Plot
home ranges (95% HM) after logging

LEGEND

AU 1	adult unsexed 1
AF 1	adult female 1
AF 2	adult female 2
•	centre of range
------	creek
——	home range boundary

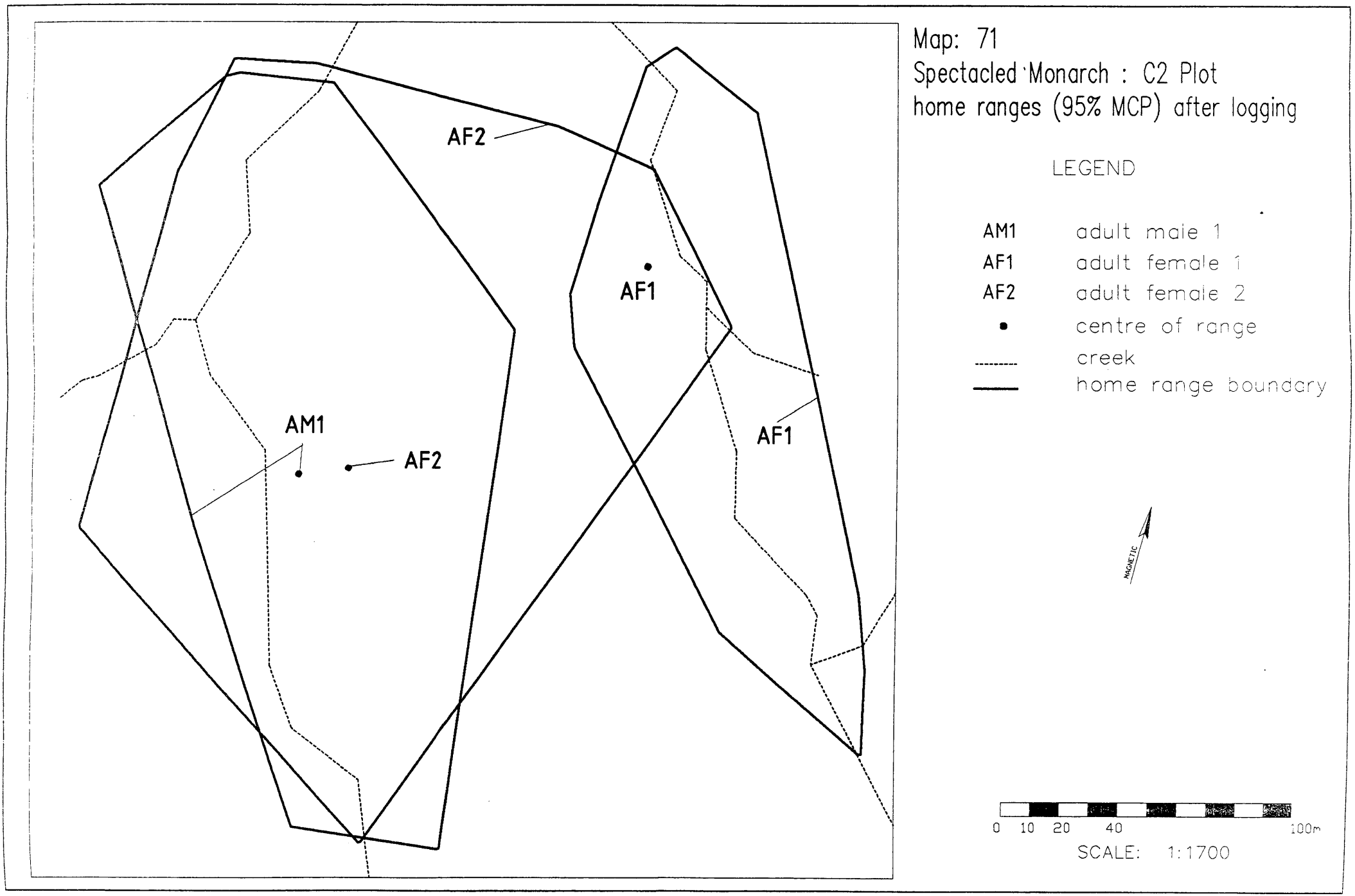
TREATMENT ZONES

MAGNETIC

G	GAPPED
T	THINNED
R	RETAINED (includes riparian buffers, clusters, interstitial areas)

0 10 20 40 100m

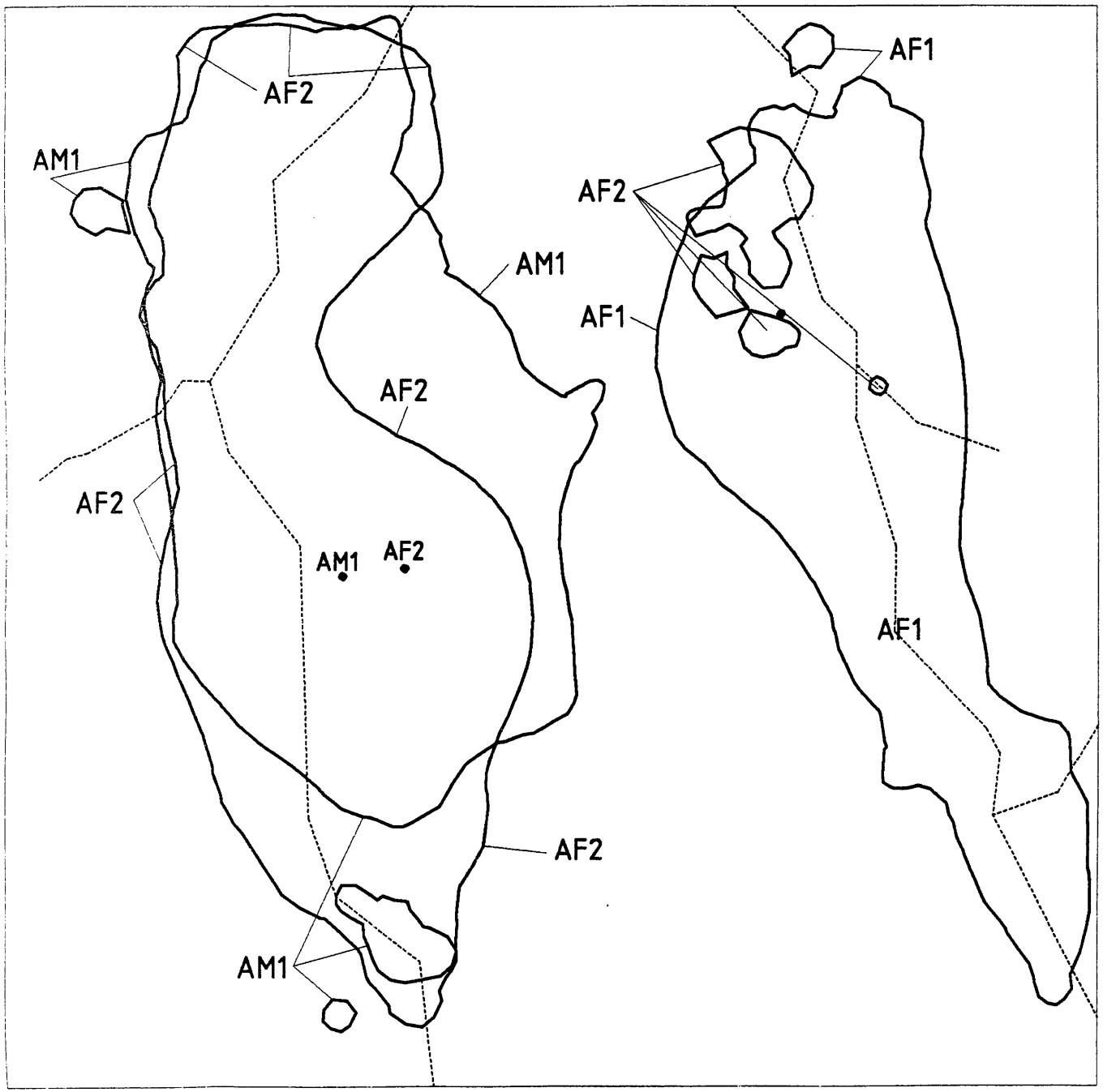
SCALE: 1:1700



Map: 71
Spectacled Monarch : C2 Plot
home ranges (95% MCP) after logging

LEGEND

AM1	adult male 1
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
——	home range boundary



Map: 72
Spectacled Monarch : C2 Plot
home ranges (95% HM) after logging

LEGEND

AM1	adult male 1
AF1	adult female 1
AF2	adult female 2
•	centre of range
------	creek
——	home range boundary

MAGNETIC

0 10 20 40 100m

SCALE: 1:1700