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GUIDELINES TO MANAGEMENT PRINCIPLES FOR FLORA, FAUNA AND LANDSCAPE MANAGEMENT PRIORITY AREAS - A DRAFT PROPOSAL

GUIDELINES TO MANAGEMENT PRINCIPLES FOR CONSERVATION M.P.A. AREAS

The following are a set of guidelines to the management of flora, fauna and landscape M.P.A.'s as listed in Forest Department W.P. 86 of 1977.

If the Management Priority concept is to be put into practice a set of management guidelines relating to the different categories of M.P.A.'s are an essential prerequisite. These are draft guidelines only and ideas for alterations and additions are sought from anyone who feels they can contribute.

One condition for potential contributors, please criticise constructively and if you reject something, please replace it with something better. It is easy to reject, not so easy to come up with a replacement.

Dr. P. Christensen

GUIDELINES TO MANAGEMENT PRINCIPLES FOR FLORA, FAUNA AND LANDSCAPE MANAGEMENT PRIORITY AREAS - A DRAFT PROPOSAL

INTRODUCTION

The concept of Management Priority Areas originates from 1971 when the first M.P.A., the Perup Fauna area was established. The object then was to locate, select and demarcate areas of special conservation value. The presence of rare and endangered species or outstanding examples of particular forest communities were major criteria used in the initial selection of flora and fauna M.P.A.'s.

The designation of these areas as flora and fauna M.P.A.'s set them apart from the rest of the forest area and gave them special status. Their designated priority use, flora or fauna conservation, ensured that these values received priority over all others within the area.

These criteria for selection of M.P.A.'s and the original special status of flora and fauna M.P.A.'s have changed. In the Northern jarrah forest at least all areas of state forest now have designated priority uses such as timber production, catchment protection etc. Despite this the flora and fauna M.P.A.'s still deserve special status because of the relative scarcity and uniqueness of the species or communities they have been set up to protect. In addition they are generally relatively small in size. These things have been recognized and many in the north have been given protective buffer strips.

There are now a total of some 71 of these M.P.A.'s throughout state forest and they cover all major forest communities

and contain all known rare or endangered species. Ultimately detailed individual Working plans need to be prepared for each of these areas. Until the necessary knowledge becomes available and this can be done, and it is anticipated that this may take some time, some interim guidelines or principles on which to base the management of these areas is needed.

This report is a first attempt to prepare such a set of management guidelines.

The problem has been approached in a systematic manner. Firstly a definition of Scientific and flora and fauna M.P.A.'s is presented, their security of tenure is examined and then some general management principles are outlined. Following this, each M.P.A. is allocated to one of a number of very broad site-vegetation types. For each of these types, a set of guideline management principles has been prepared. These guideline principles are based on the best available knowledge at the present time and will be subject to change as new knowledge comes to hand.

PROPOSED MANAGEMENT GUIDELINES

1. Definition of Flora, Fauna and Landscape M.P.A.'s.

Flora, fauna and landscape M.P.A.'s are areas which have been set aside from the rest of state forest for the special purpose of the conservation of flora, fauna and landscape values. In these M.P.A.'s these values are given priority over all other land uses e.g. timber production, mining etc. Other land uses are not necessarily excluded but they can only be carried

out providing they have no permanent detrimental effect on the priority values.

Parts of some management priority areas, where management involves exclusion of commercial timber production, may be designated as 'forest park' areas. A 'forest park' is defined as an area of forest which is kept unavailable for the commercial production of timber except in such cases as would enable the Conservator for the betterment of the park to cut and remove timber for the purpose of tree generation (see WP 86 of 1977 p 89).

For the purpose of this document flora, fauna and landscape M.P.A.'s shall henceforth be referred to as M.P.A.'s.

2. Tenure

M.P.A.'s have the same tenure as the rest of State Forest. However, since the concept of 'forest parks' was envisaged by the Conservation through Reserves Committee and defined by the Environmental Protection Authority, those areas with this designation would appear to have some added security.

Further security would be provided if it were made standard practice to require an Impact Statement to be prepared whenever a major disturbance is contemplated within a M.P.A. area. Thus Impact Statements should be prepared by any authority contemplating such activities as open cut mining, major road construction, erection of power lines, dam constructions and clear felling.

These activities are potentially damaging to the environment and should be actively opposed in M.P.A. areas. In some M.P.A.'s clear felling may be necessary to maintain the forest ecosystem (see 6 (ii)). An Impact Statement treating alternative methods and their possible effects should however be prepared.

The Environmental Protection Authority could be the final arbitrator in cases where an Impact Statement has been prepared.

3. Objects of management of flora, fauna and landscape M.P.A.'s

3.1 General

In broad terms the management of M.P.A.'s shall aim at maintaining or enhancing flora, and landscape values and where possible increasing the native fauna populations. Secondary aims such as commercial timber productions, whilst not necessarily excluded, shall be adapted to suit the commitment to flora, fauna and landscape conservation when two aims are found to be in conflict.

3.2 Maintenance of existing Ecosystems

Management shall aim at maintaining the existing ecosystems in so far that:

(i) A tree canopy is maintained where such already exists. (Deviance from this general rule may be necessary in cases where the canopy is composed of 'seed species' e.g. karri (Eucalyptus diversicolour and Mallet (E. astringens), see 6 (ii)).

(ii) The composition of species forming the tree canopy shall not be markedly changed from that naturally occurring in the area.

(iii) Plant communities, and native fauna habitats and populations are kept at viable levels and landscape values are not damaged.

3.3 Forest Management

The forest may be managed for purposes other than the

conservation of flora, fauna and landscape values. However, such management shall be subject to any constraints imposed in achieving the objectives outlined in 3.2.

3.4 Research

A major use of M.P.A.'s shall be for research purposes. Because many of them will have fire and cutting treatments different from the remainder of State Forest (see 5 and 6) they will serve as 'benchmark' areas. Thus the effects of cutting and burning cycles different from those in current practice may be monitored and compared. Active research will be centered in certain major M.P.A.'s but other M.P.A.'s will provide areas where basic research may be carried out and any or all of them may be the centre of future research projects.

4. Management Prescriptions

4.1 The forest estate

(i) No alienation of land from State Forest shall be permitted within M.P.A.'s.

(ii) No alienation of land from State Forest shall be permitted adjacent to M.P.A.'s where such alienation would effect the M.P.A. This particularly applies where alienation would effect the closure of corridors passing between freehold lands and joining the M.P.A. to other State Forest areas.

(iii) Where freehold properties are included within the area of an M.P.A. consideration should be given to purchasing such land if it should come up for sale.

(iv) No mineral exploration or mining causing damage shall be permitted. The implementation of this preseription

is subject to changes in legislation. Until adequate legislation has been enacted, all applications associated with mining shall be opposed in the Mining Warden's Court.

4.2 Fire protection and habitat management

(i) In general terms the current 5 - 7 year spring burning regime results in a lack of 'fire diversity'. Thus at present a minimal area of State Forest is burnt during summer and autumn, and there is a general lack of fires at the hotter end of the scale. Whilst such fires may at times be damaging to timber values, they are sometimes a necessary part of the environment. M.P.A. areas may be used to correct this imbalance and portions of them may be treated with fire regimes outside of the normal prescription for protection. Since a wide range of forest and site-vegetation types are encompassed by the M.P.A. system, M.P.A.'s have been allocated to a series of broad types and each type is treated separately with respect to burning and silviculture (see 5 and 6).

(ii) As a general rule a portion of as many M.P.A.'s as practically possible should be protected from fire. Such areas may serve as controls. These control areas need not necessarily be large where it is considered too dangerous or impractical to have large control areas, 25 to 50 hectares may usefully be set aside. Such non-burn areas should be protected by burnt buffers

and be well demarcated and documented to prevent mistakes occurring during normal burning operations.

(iii) Portions of as many M.P.A.'s, as possible, in particular the larger ones, should be set aside for autumn burning. The rotation in these areas should conform with the guidelines set out in 5.

(iv) Short cycle autumn burns should not be contemplated next to major rivers. The riverine ecosystem, the narrow band of Banksia attenuata, Oxylobium lanceolatum, Agonis juniperina, Hakea oliefolia, etc. along the river banks is fragile. Many of these attractive species of understorey trees are seed species and hot autumn fire kills them. They are long-lived species and once having been killed they need protection for 20 - 40 years or more to reach their full potential. Spring burning protects this riverine fringe, autumn fires will wipe it out together with its associated fauna unless burning in autumn is carried out at infrequent intervals only.

4.3 Other Protection

(i) No further establishment of trial plots of exotic trees species shall be permitted.

(ii) Poisoning of vermin by the Agricultural Protection Board should be confined to the use of 1080 poison which is least harmful to native fauna.

(iii) No grazing leases shall be permitted with M.P.A. areas and the movement of domestic livestock through M.P.A.'s shall be by vehicle only.

(iv) The invasion and spread of exotic weed species shall be actively combatted whenever and wherever possible. Examples of obvious problem species are blackberries, Acacia dealbata, grasses etc.

(v) Major disturbance such as major road construction, water supply dams, S.E.C. power lines, gravel and sand pits shall not be permitted. In cases where the pressures are strong an Environmental Impact Statement should be prepared by the party concerned.

(vi) Normal hygiene practice against dieback shall be followed in M.P.A.'s.

4.4 Trade-cutting and Silviculture

(i) The wide range of forest types covered by M.P.A.'s makes it difficult to prescribe silvicultural treatments. Several M.P.A.'s have been set aside for the conservation of virgin forest. These and most other M.P.A.'s will ultimately need individual Working Plans with detailed prescriptions as regards their silvicultural treatment. In lieu of this, some general treatments are prescribed on the basis of forest type (see 6).

(ii) In general, unless there are specific specifications which dictate to the contrary M.P.A.'s should be managed on the group selection system with the following constraints;

(a) Not more than one third of the standing basal area of both merchantable and non-merchantable trees shall be removed in trade cutting. Tree

4.4 Trade-cutting and Silviculture ctd.

~~(ii) (a)~~ markers shall use a wedge-prism or other reputable method to effect the control of the prescription.

(iii) Apart from normal top-disposal practice, no other silvicultural operations can be prescribed as general practice.

4.5 Roading and access

(i) As a general rule new major access roads or highway construction through M.P.A. areas should be actively opposed.

(ii) Roads should be kept to the minimum necessary for access and protection purposes. Thus maintenance of existing roads should be confined to those required for these purposes only. Little-used timber extraction tracks etc. may be allowed to grow over - and physically closed by banks and signs where feasible

II. Grouping of M.P.A.'s

In the absence of detailed working plans for each of the many M.P.A.'s some alternative method of providing more detailed prescriptions for burning and silvicultural treatments is necessary. One way to do this is to divide them into groups which can be given broadly similar treatments. Thus existing M.P.A.'s have been allocated to one of seven broad categories based on forest and site-vegetation characteristics.

1. Karri forest types - predominantly karri or karri/marri forest types.

2. Southern flats - predominantly open south coastal acid peaty flats with karri, karri/marri, jarrah and other forest types

on elevated sites. Granite monadnocks are a feature of this type.

3. Jarrah forest type - A wide range of jarrah and associated forest types.

4. Wandoo woodland type - predominantly wandoo and eastern jarrah woodland types.

5. Coastal types - predominantly tuart and banksia woodland types on the spearwood and bassendean dune systems.

6. Dryandra type - Wandoo and powderbark wandoo woodlands with mallet and E. drummondii associations.

7. Inland woodland types - a range of inland low rainfall forest types.

1. KARRI FOREST TYPES

NAME OF M.P.A.	MAP REF	AREA (ha)	VEGETATION AND LANDSCAPE TYPE REPRESENTED, SPECIAL FEATURES
Boranup	1.5	3 142	Regrowth karri forest on calcareous soils on Leeuwin-Naturaliste Ridge. Caves. Historically significant.
Strickland	6.7	1 276	Pemberton and Balbarrup soil associations. Virgin tall open karri, karri-marri and marri-jarrah forest in lower Donnelly River Valley.
Hawke-Treen	11.1	989	Pemberton soil association. Virgin tall open karri forest 5 y.o., 35 y.o.** Complements Warren National Park in Lower Warren River.
Dombakup	11.2	130	Pemberton soil association. Virgin tall open karri forest.

KARRI FOREST TYPES

NAME OF M.P.A.	MAP REF	AREA (ha)	VEGETATION AND LANDSCAPE TYPE REPRESENTED, SPECIAL FEATURES
Boorara	11.4	587	Pemberton soil association. Virgin tall open karri and marri-karri forest. In Gardner River, East Branch. Rapids.
Curtin	11.6	1 256	Pemberton and Balbarrup soil associations. Virgin tall open karri forest and jarrah-marri open forest in upper Shannon River.
Wattle	13.2	2 898	Pemberton, Quagering soil associations. Virgin tall open karri forest. Entire undisturbed catchment.

SOUTHERN FLATS

Lower Shannon	13.1	8 113	Boorara, Quagering and Chudalup soil associations. Diverse vegetation, forest and flat. Borders Broke Inlet.
Johnston-O'Donnell	13.3	6 202	Pemberton, Balbarrup, Chudalup and undescribed soil associations. Lithic complex. Tall open karri forest. Jarrah-marri open forest. Jarrah open woodland, banksia and casuarina tall open shrubland. All virgin.
Mitchell-Crossing	13.4	7 335	Undescribed soil associations. Lithic complexes. Yellow tingle included in diverse vegetation types present. Scenic.
Soho	13.5	3 236	Undescribed soil associations. Rate's tingle, red flowering gum, included in diverse vegetation types present. Scenic.

JARRAH FOREST TYPES

NAME OF M.P.A.	MAP REF	AREA (ha)	VEGETATION AND LANDSCAPE TYPE REPRESENTED, SPECIAL FEATURES
Dale	2.6	6 272	Wide range of landscape and vegetation types, relatively undisturbed. Mainly Beraking surface.
Eagle Hill	8.1	4 638	Upland virgin jarrah, blackbutt in valleys, Eucalyptus laeliae, Kingia australis. Cooke and Darkin surface.
Cooke	8.2	4 695	Outstanding E. laeliae. Upland virgin jarrah. Cooke and Randall surfaces.
Gooralong	8.4	705	Virgin and high quality jarrah-marri, blackbutt in gullies. Darkin and Helena surfaces.
Windsor	8.6	4 225	Granitic monadnocks, Beraking valley. Lichens, shrublands and swamp vegetation. Upland jarrah forest.
Serpentine	8.7	1 496	Darkin surface, lateritic uplands. Valley vegetation of marri and blackbutt.
Plavins	3.6	3 495	Darkin, Beraking surfaces and adjacent lateritic uplands. Jarrah-marri forest in high rainfall. River banksia and blackbutt.
Teesdale	3.7	1 728	Helena surface. Small virgin stand of jarrah-marri. Tall jarrah-marri-blackbutt forest.
Karnet	3.8	3 688	Darkin-Helena transition. Tall jarrah-marri on uplands. Marri, blackbutt in gullies, E. laeliae around outcrops.
Wandering	3.10	4 334	Dissected lateritic slopes. Woodland of jarrah, marri powderbark wandoo and wandoo. Low woodland of rock sheoak and jam.

JARRAH FOREST TYPES

NAME OF M.P.A.	MAP REF	AREA (ha)	VEGETATION AND LANDSCAPE TYPE REPRESENTED, SPECIAL FEATURES
Surface	10.6	15 125	Lateritic uplands, Beraking and Goonaping surfaces. Largest area of virgin jarrah north of Blackwood.
Trees	4.1	7 837	Lateritic uplands, Goonaping and Beraking surfaces. Virgin open jarrah-marri forest.
Lennard	4.2	7 562	Lateritic uplands, Darkin and Helena surfaces. Tall open jarrah-marri, blackbutt-marri-jarrah on lower slopes.
Bell	10.3	2 590	Lateritic uplands and valley resembling Darkin and Nockine surfaces. A range of vegetation types including flooded gum-paperbark, blackbutt, wandoo woodland and upland jarrah forest.
Federal	10.4	1 412	Lateritic uplands and moderately incised valleys of Darkin surface. High quality blackbutt, tall jarrah-marri.
Samson	10.5	1 035	Beraking Valley surface. Lateritic uplands. Best stands of bullich in Darling Range.
Westralia	4.3	2 131	Lateritic uplands, Nockine and Darkin surfaces. Tall and open jarrah-marri forest. Blackbutt-jarrah-marri on lower slopes. Holly leaf banksia and native pear on Collie Basin.
Dardanup	4.4	1 480	Northern extension of Sunkland. Jarrah-marri: E. haematoxylon on mid and upper slopes.
Preston	5.1	2 707	Lateritic uplands, Beraking surface. High quality virgin tall open jarrah forest.

JARRAH FOREST TYPES

NAME OF M.P.A.	MAP REF	AREA (ha)	VEGETATION AND LANDSCAPE TYPE REPRESENTED, SPECIAL FEATURES
Noggerup	5.2	3 487	Lateritic uplands, Beraking surface. Tall open jarrah-marri forest, swampy woodland of Banksia littoralis.
Mullalyup	5.4	4 134	Lateritic uplands, valleys resemble Beraking and Darkin surfaces. Heath on granitic outcrops. Tall open jarrah-marri forest, open blackbutt forest in gullies.
Greenbushes	5.5	1 351	Lateritic uplands, dissected valleys of Blackwood River. Remaining virgin tall open jarrah forests of Blackwood River Valley, open jarrah-marri.
Mowen	1.2	3 242	Swamps, lateritic uplands, within Sunkland complex: swamp vegetation and bordering open jarrah-marri forest.
Chester	1.3	489	Only occurrence of karri within Sunkland.
Paget	1.4	1 427	Typical of wetter southern extremity of Sunklands complex, much of which has been alienated and cleared. Abundant Boronia megastigma.
Dickson	6.5	261	Pemberton and Balbarrup soil associations. Virgin tall open jarrah and marri-jarrah forest.
Dalgarup	12.1	3 552	Lateritic upland, incised valley of Blackwood River. Most northern occurrence of karri in State Forest. Open jarrah-marri fores
St. John Brook	12.2	3 194	Incised valley of St. John's Brook in eastern Sunklands. Outstanding development of blackbutt with shrub understorey. Possible rare fauna habitat.

JARRAH FOREST TYPES

NAME OF M.P.A.	MAP REF	AREA (ha)	VEGETATION AND LANDSCAPE TYPE REPRESENTED, SPECIAL FEATURES
Milyeannup	12.3	5 665	All variations of Sunklands landscape. Complete range of vegetation types from open jarrah-marri forest to sedgeland and shrubland.
Whicher	1.1	6 765	Lateritic uplands and incised valleys of the upper Sabina River in Whicher Range. E. haematoxylon. Open jarrah-marri forest, some endemic species.

WANDOO WOODLAND TYPE

Julimar	2.1	27 798	Northern extension of the jarrah-marri-wandoo forest and associated scrub species. Eucalyptus drummondii and Dryandra polycephala.
Gunapin	2.3	13 497	Swamp vegetation (and associated fauna), banksia woodland on deep sandy soil typical of Gunapin surface.
Sullivan	2.4	4 555	Swamps and associated flora and fauna typical of Gunapin surface.
Russell	2.5	5 702	Virgin wandoo woodland, associated vegetation types, and fauna. Beraking, Nockine surfaces.
Boyagarring	8.5	1 480	Wandoo, powderbark wandoo and associated fauna. Dissected lateritic slopes.
Lupton	8,8	2 770	Lateritic uplands and dissected slopes. Woodland of wandoo, powderbark wandoo, jarrah and rock sheoak.
Gyngoorda	3.4	3 453	Eastern lateritic uplands, dissected slopes. Woodlands of wandoo, powderbark wandoo, jarrah, rock sheoak and E. drummondii.

WANDOO WOODLAND TYPE

NAME OF M.P.A.	MAP REF	AREA (ha)	VEGETATION AND LANDSCAPE TYPE REPRESENTED, SPECIAL FEATURES
Duncan	3.5	9 935	Cooke and Randall surface. Virgin wandoo, virgin jarrah in moist sandy valleys. Most extensive and tallest stand of E. drummondii.
Wandering	3.10	4 334	Dissected lateritic slopes. Woodland of jarrah, marri powderbark wandoo and wandoo. Low woodland of rock sheoak and jam.
Nalyerin	10.7	10 375	Lake Nalyerin, Goonaping, Beraking surfaces and lateritic uplands. Vegetation (and fauna) associated with Lake Nalyerin. Open jarrah forest. Treeless sedgeland.
Stene	10.8	4 487	Undulating land, dissected lateritic slopes, Beraking and Nockine surfaces. Wandoo woodland and jarrah open forest.
Goonac	4.5	5 211	Lateritic uplands. Goonaping and Beraking surfaces. Open jarrah forest, wandoo open woodland, and dense shrubland on valley floor (Tamar habitat).
Muja	4.6	3 411	Lake Gnartiminy, lateritic uplands, Beraking and Goonaping surfaces. Swamp vegetation, including endangered Banksia meissneri.
Bennelaking	4.7	5 635	Lateritic uplands, Nockine and Beraking surfaces. Open jarrah-marri forest, wandoo open woodland, and swamp complex. Remnant of jarrah, wandoo forest, mostly cleared for agriculture.

WANDOO WOODLAND TYPE

NAME OF M.P.A.	MAP REF	AREA (ha)	VEGETATION AND LANDSCAPE TYPE REPRESENTED, SPECIAL FEATURES
Nollajup	5.6	661	Lateritic uplands, Beraking surface. Open woodland of wandoo, open forest of jarrah-marri; remnant of vegetation mostly cleared for agriculture.
Perup	6.1	39 000 (approx.)	Mainly Perup soil association. Jarrah-marri open woodland and wandoo open woodland: contains rare endemic faunal populations.

COASTAL TYPES

Melaleuca	15.1	3 208	Bassendean dune system and associated fauna.
Ridges	15.2	1 260	Spearwood dune system. Supplement and buffer to Yanchep National Park.
Wabling	15.3	5 030	Transition between Spearwood and Bassendean dune systems. Corridor through plantations. Steep limestone gradients.
Caraban	15.4	2 966	Spearwood dune system, and transition to Quindalup dune system.
McLarty	10.11	727	Spearwood dune system. Tuart. Buffer between highway and pine plantation.
Clifton	10.1	533	Spearwood dune system. Tuart forest with peppermint and jarrah woodland with narrow leaf banksia and woody pear.
Myalup	10.2	868	Corridor between Myalup Swamp and Yalgorup National Park. Transition between Spearwood and Bassendean dune systems.
Ludlow	1.6	2 880	Spearwood dune system. Tuart at height of its development. Southern extremity of its range.

DRYANDRA TYPE

NAME OF M.P.A.	MAP REF	AREA (ha)	VEGETATION AND LANDSCAPE TYPE REPRESENTED, SPECIAL FEATURES
Dryandra SF 51 SF 53	7.1	19 870	Wandoo open woodland, mallet. Remnant of Upper Murray River catchment. Rare endemic fauna.

INLAND WOODLAND TYPES

Randalls	14.1	16 350	A variety of inland forest and shrub types, mainly virgin, in an extensive area of regrowth forest. Scenic, historical interest.
Majestic	14.2	2 226	Illustrates the habitat, dimensions and regeneration of salmon gum woodlands.
Brockway	14.4	3 724	Preservation of E. brockwayi and E. dundasii. Scenic, near highway.
Kangaroo Hills	14.5	6 600	Preservation of E. campaspe and E. clelandii. Historical interest and tourist potential.
Kambalda	14.6	3 342	Undisturbed, great ecological diversity. Multiple use potential. Near Kambalda.
Cocanarup	14.7	9 095	Salmon gum and jam. On highway. Potential for recreation, tourism.

5. Suggested fire treatments for M.P.A.'s - Protection burns.

FIRE TREATMENT	M.P.A. TYPE
(i) Larger M.P.A.'s should be divided into blocks to be burnt at different times. Where possible there should be at least 4 years between adjacent burns, more if feasible. Unburnt 'benchmark' areas should be left wherever practically possible. Large unburnt areas are preferable but where this is not possible smaller areas of 20 - 50 hectares are also worthwhile. The attached Perup burning plan provides an example of this type.	All M.P.A. types.
(ii) A standard series of rotations are proposed as follows:	
(a) Burn only very occasionally if at all. Cycles to be worked out for individual M.P.A.'s according to the regeneration habit of the major tree species.	Inland types.
(b) Summer or autumn burns 15 - 25 years cycle.	Dryandra (see WP) also some parts of coastal types where 'honey' dryandra species are present.

5. Suggested fire treatments for M.P.A.'s - Protection burns.

	FIRE TREATMENT	M.P.A. TYPE
(ii) (c)	Spring burn, 10 - 15 year cycle with autumn or summer burns every 2nd rotation.	Wandoo types. e.g. Perup area.
(d)	Spring burn, 7 - 9 year cycle with summer or autumn burn every 3rd to 4th rotation.	Karri types Southern flat types.
(e)	Spring burn 5 to 7 year cycle with summer or autumn burns every 3rd to 4th rotation.	Jarrah types and coastal types.
(f)	Experimental burns. Larger M.P.A.'s may have blocks set aside for example specifically only for summer or autumn burns. Such deviations from the standard prescription are useful for comparison purposes. If it is wished to deviate markedly from the standard prescription for a type blocks receiving such experimental treatment should be kept small. Where M.P.A.'s have been set aside for very specific purposes 'experimental' treatments deviating markedly from the	All M.P.A. types.

5. Suggested fire treatments for M.P.A.'s - Protection burns.

FIRE TREATMENT	M.P.A. TYPE
(f) standard prescriptions should not be considered.	

N.B. Summer and autumn burns should not be 'holocausts'. Good complete burns, Acacia regeneration type burns, with some scorch but a minimum of defoliation, are the requirement. The object is to regenerate seed species thickets in gullies and low lying areas.

6. Suggested silvicultural treatments for M.P.A.'s.

SILVICULTURAL TREATMENT	M.P.A. TYPE
(i) Larger M.P.A.'s should be divided into blocks to be treated at different times. There should be a period of 20 - 30 years between adjacent blocks being treated. These blocks may be the same as those demarcated for burning treatments but this is not a requirement.	All M.P.A. types.
Untreated 'benchmark' areas of a substantial size should be set aside in a representative selection of each type of M.P.A.	

6. Suggested silvicultural treatments for M.P.A.'s.

	SILVICULTURAL TREATMENT	M.P.A. TYPE
(ii)	Clear felling. This should be the standard means of regeneration in all M.P.A.'s where all or a portion comprises tree species whose main method of regeneration is seed. e.g. karri and mallet. Clear felling with regeneration burning should be done in small coupes on a rotation which allows the trees to reach full maturity. Cutting in adjacent coupes should be commensurate with the size of the M.P.A. and the life span of the tree species, so as to create the minimum effect on the forest environment. Separate Working plans are needed for each M.P.A. before this treatment can be considered.	Karri types South coastal flats Dryandra Inland types.
(iii)	Selection cutting. To be permitted in areas where this treatment has already been carried out subject to the requirements specified under 4.4.	Jarrah types Wandoo types South coastal flats.

6. Suggested silvicultural treatments for M.P.A.'s.

SILVICULTURAL TREATMENT	M.P.A. TYPE
(iv) No cutting. A range of M.P.A.'s have been set aside for the conservation of virgin forest of various types. No cutting should take place in these M.P.A.'s until such time as working plans for their management have been drawn up in detail.	Most M.P.A. types.
(v) Only experimental cutting of wandoo should take place in M.P.A.'s.	Wandoo type.
(vi) No felling of minor timber species e.g. blackbutt, bullich, River banksia etc. should take place in M.P.A.'s.	All types.
(vii) Experimental: Experimental blocks of treatments different from the standard are considered valuable for future assessments. e.g. Selection cut areas in seed regenerating species area e.g. karri and mallet. Clear cut areas in jarrah and wandoo M.P.A.'s.	All types.

N.B. No cutting should take place in any M.P.A.'s without a proper Working plan having first been prepared. This must take into account the long term effects of the treatment.

Appendix 1 - BURNING PLAN FOR THE PERUP FLORA, FAUNA AND LANDSCAPE CONSERVATION M.P.A.

The following is a burning plan for the Perup. The write-up has been prepared for a future edition of Forest Focus and hence the background and reasoning for the burning schedule is fully explained.

It is included here as an appendix, an example of a burning plan for an M.P.A. area with special conservation objectives. It is visualized that similar burning plans will eventually have to be drawn up for all the other conservation M.P.A.'s. At the present time such plans exist only for the Perup and Dryandra forest.

A FIRE MANAGEMENT PLAN FOR THE PERUP FAUNA M.P.A.

By

P. CHRISTENSEN

Initially established in September 1971, the Perup Fauna Management Priority Area was the first of the Departments' fauna M.P.A.'s. Indeed, it was here that the concept of Management Priority Areas, originally an extension of the Intensive Management Units developed for Jarrah forest management, was first conceived. (see Forest Focus No 10) It is therefore fitting that the first fire management plan, designed primarily to protect fauna rather than timber values, should have been developed for this area.

Areas of Management Priority have been established throughout State Forest (see Forest Focus No.18). The designation of areas of forest for a priority use is one of the methods by which the multiple use concept is being practiced in forestry in Western Australia. Thus different areas may be designated to priority uses other than timber production, for example, watershed management, recreation, fauna, etc. Areas with priorities other than timber may need different management to optimize their potential. For this purpose special management plans need to be prepared for individual M.P.A.'s. Such plans may cover a multitude of different aspects of forest management. One of the most significant of these management factors, in terms of the change it has the potential to cause, is fire.

In recent years, research throughout Australia has shown

that fire is an essential part of many forest ecosystems. Different species or communities of plants and animals, may be dependent on specific fire regimes.

Management Priority Areas which have been established for whatever values will therefore require some form of fire treatment in the future. The Department's broadscale prescribed burning programme is designed primarily with a view to providing protection, in particular, for our timber resources. The fire regime which has been adopted for this purpose, whilst not necessarily harmful to other forest values, nevertheless may not represent the optimum fire regime for the conservation of values for which a particular M.P.A. was set aside.

Individual burning plans to suit particular needs will therefore have to be provided for each M.P.A. in the future. The burning plan outlined here is the first in a series of such plans. Because of this, the plan itself and some of the concepts and reasoning behind it are of general interest.

Firstly before any special burning plans can be drawn up it must be accepted that there has to be compromises between protection and conservation. This is implicit in the Management Priority concept, a fact not fully appreciated yet by all forest managers.

Secondly there must be compromises made in conservation, viz. between catering for maximum diversity and managing for specific objectives, a fact not fully appreciated by all conservationists.

It is quite impossible to achieve the optimum condition for all the species in the area. Under more natural conditions, before the arrival of European man, periodic fires started by

lightning strikes in the vast area of virgin forests, ensured a maximum diversity of different types of burn and fuel ages. Optimum conditions would thereby be created for each species of plant and animal somewhere in the forest at one time or another.

To mimic this situation in the relatively small areas now available is neither feasible nor practical, only a relatively few burns may be fitted into any one area and this greatly limits the possibilities.

Because of this, management primarily for particular species, has been adopted as the major objective in the Perup. Thus the woylie (Bettongia penicillata), an animal on the rare and endangered species list, and the tammar (Macropus eugenii), a species not common on the mainland, are of prime concern. The numbat (Myrmecobius fasciatus), will be taken into account in future also, when data on its biology become available.

In selecting these species for special consideration, primarily because of their scarcity value and because detailed biological data on them are available, the other species of fauna and flora have not been forgotten. Data collected from biological surveys and experimental plots over the last ten years suggests that the fire regime proposed, although it may not be the optimum for all the species within the Perup, will maintain viable populations of each. The longer rotation proposed, together with the variation in the season of burning will maintain a greater diversity of habitats than is available under the broadscale prescribed burning system. For some species, for example, the short nosed bandicoot (Isoodon obeselus)

and the spotted Western native cat (Dasyurus geoffroii) the new regime will represent something perhaps closer to the optimum than they have had for a long time.

One distinct advantage in having specific management objectives is that the success or otherwise of the management imposed on the area may be measured and evaluated. A programme of continued monitoring of both flora and fauna will monitor the operation and ensure that any changes are detected if they occur and alterations may be made to the burning plan if need be.

The data on which this burning plan is based has been obtained from detailed studies of the biology of the woylie and tammar over the last eight years. Amongst important factors are the food which they eat, their cover requirements, the size and type of home range or territory which they occupy, breeding biology, longevity, dispersal and movement patterns and mortality factors.

Thus the regeneration of suitable cover plants for the woylie, mainly Bossiaea ornata or similar clumped shrub species takes three to four years following a fire. Their major food item, underground fungi, is available all the time even immediately after a fire. They breed fast, three young per year, live for up to five or six years, disperse rapidly and occupy large, ten to 40 hectare, individual home range areas.

The tammar lives in thickets of heartleaf poison (Gastrolobium bilobium) or Melaleuca viminea which are suitable for a period of between six to 25 or 30 years following fire thereafter they thickets collapse and die. Their food, mainly grasses, is available all the time except immediately following fire. They breed relatively slowly, one young per year, live for up to six or seven years, disperse widely but occupy rather limited group

territories. Groups of individuals live in thickets of ten or more hectares in extent. Very intense fire is necessary for successful regeneration of the thickets every 24 - 30 years. In the absence of fire the thickets die, the tammar disappear and are replaced by kangaroos.

Bearing in mind the need for fire protection, a burning plan has been conceived whereby large blocks, to cater for the woylies large home range and also to make aerial ignition possible, are burnt on a rotation of nine to twelve years (Fig. 1). This gives the woylie a reasonable amount of time between burns and it allows us to include the tammar thickets every second or third burn so that these are burnt on a 20 to 30 year rotation. This is achieved by burning in autumn every second or third rotation.

Thus the first rotation burn is carried out under conditions when the forest fuels are still slightly moist, in spring, and it will result in the ridgetop vegetation being burnt, the moister tammar thickets in the valleys will be left unburnt. The second or third rotation burn, will be carried out in the dry autumn months, and will consequently be more intense, burning and regenerating the tammar thickets in the valleys as well as the intervening ridges.

Dispersion of burns within the area has been designed so that there are always adjacent blocks of three to four year old scrub available from which re-colonization by woylies, can take place. In addition, two large unburnt control areas have been left as reference areas for the future.

The plan is simple and practical and can be carried out

using normal aerial ignition techniques. It also provides a good mozaic of post-fire environments (Figs. 2). These fuel age plans show the intended dispersal of fuel ages at two year intervals to the turn of the century. A potentially dangerous situation exists in 1984-86 because of the present prescribed burning rotation where the entire area was burnt within a period of two years. This creates problems in introducing the new cycle of burning in a 9 - 12 year rotation. However, once this critical period has passed the fuel distribution under the new regime is in fact an improvement on the past burning plans with a shorter rotation. Dangerous fuel build-ups are always present in one or two blocks at any given time, but these are well dispersed, so as to reduce protection problems. Good dispersion of suitable woylie habitat and tammar thickets has been achieved at the same time.

Frequently-burnt buffer strips protect the unburnt control blocks. Such strips were considered for the perimeter but the large area of hand burning and the problem created by introduced grasses, which tend to dry later than the adjacent paddock grasses on arms ~~grasses~~, precluded this alternative.

The preparation of burning plans for M.P.A.'s with specific priorities is considered an important aspect of future planning. However, there are many M.P.A.'s with a multitude of different priorities and it will take time to prepare plans for them all. Management plans, once having been prepared, are reviewed on a five year basis. This is because the data upon which management plans are based is constantly being added to. Fire ecology is no exception, it is an active field of research and new information is constantly being gathered. Such new information may be incorporated in fire management plans and these can be altered

as and where necessary.

The concept of ongoing research coupled with constant reviews and changes in plans is an important one. For one thing, nothing is static, there is constant change and things have to change in order to adapt. In addition it is important to have a management plan with specific objectives, even if the data available are not always complete. Scientific investigations are never complete particularly in the field of ecology. No answer is ever final, there is always more to learn.

The important thing is to act on the best available data, recording the results and being ready and willing to make changes when the situation demands. In many instances, and perhaps with fire ecology in particular, no action, i.e. protection from fire because of incomplete data, may result in greater changes to the environment than even the 'wrong' action.

Incomplete data does not necessarily mean that we should sit back and take no action. Lack of 'sufficient' data has been the excuse throughout history of those who lack the courage and fortitude to make a decision.

ILLUSTRATIONS FOR PERUP'S FIRE

MANAGEMENT PLAN - FOCUS

SUBSCRIPTS FOR PHOTO'S MAPS

1. Maps showing fauna and flora M.P.A.'s in State Forest.
2. The Woylie - an animal on the rare and endangered species list. Is now almost entirely restricted to areas of State Forest.
3. The Tammar Wallaby - mainland populations of this species are becoming increasingly rare.
4. The Numbat - the present status of this species is uncertain. In recent years the introduced fox has reduced its numbers alarmingly.
5. The Short Nosed Bandicoot - a species which prefers areas of dense ground cover. Periodic high intensity fires favour this species in jarrah forest areas.
6. The Spotted Western Native Cat - an animal which is becoming increasingly rare.
7. Spotlight surveys have been used to monitor populations of native fauna in forest areas since 1970.
8. Live trapping of native fauna at regular intervals enables forest ecology researchers to keep a check on the effects of management practices on wildlife.
9. Typical woylie nesting area - dense and clumped ground cover of Bossiaea ornata 5 years after a fire.
10. Spores of underground fungi eaten by the woylie as seen under the electron microscope. Microscopic examination of woylie pellets enables the forest ecologist to determine the different food species eaten by the animal throughout the year.

11. Radio tracking research reveals that woylies have individual home range areas for nesting. Each is separate and seldom overlaps with that of other individuals though male and female areas may overlap to some degree.

12. The tammar wallaby lives in dense thickets with an open ground cover.

13. 'Tammar' thickets collapse, die and become unsuitable for the wallaby after 25 to 30 years.

14. Periodic high intensity fires are necessary to regenerate these thickets in the Perup area.

15. Young joey's are periodically removed from the mother's pouch during trapping operations for weighing and measuring.

16. Tracings of radio telemetry signals from transmitters fitted to tammars by means of a collar, enable the researcher to determine nightime activity patterns.

17. Maps showing the size and distribution of burning units on a plan of the Perup's Fauna Priority area.

18. A series of plans show the patterns of distribution of dangerous fuel levels and areas suitable for woylies at two year intervals till the turn of the century. Only the white areas regenerating 0 - 2 years after fire are totally unsuitable for the woylie, and some other species. The green areas are suitable. Red areas have fuel accumulations of eight years or more, potentially hazardous but good habitat for the woylie and other animals.

Fig 1 Plan of the Perup flora fauna and landscape Management Priority area burning blocks.

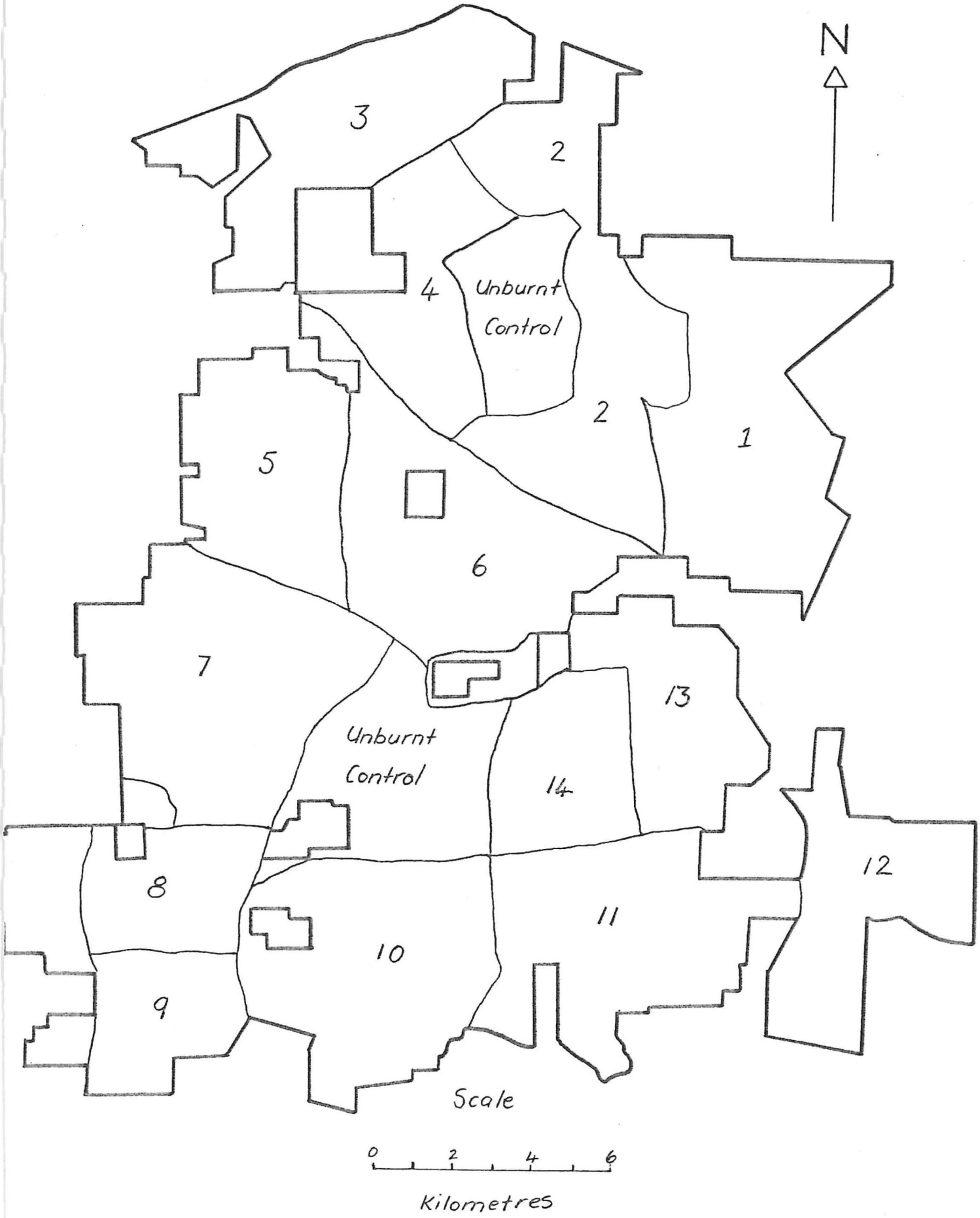
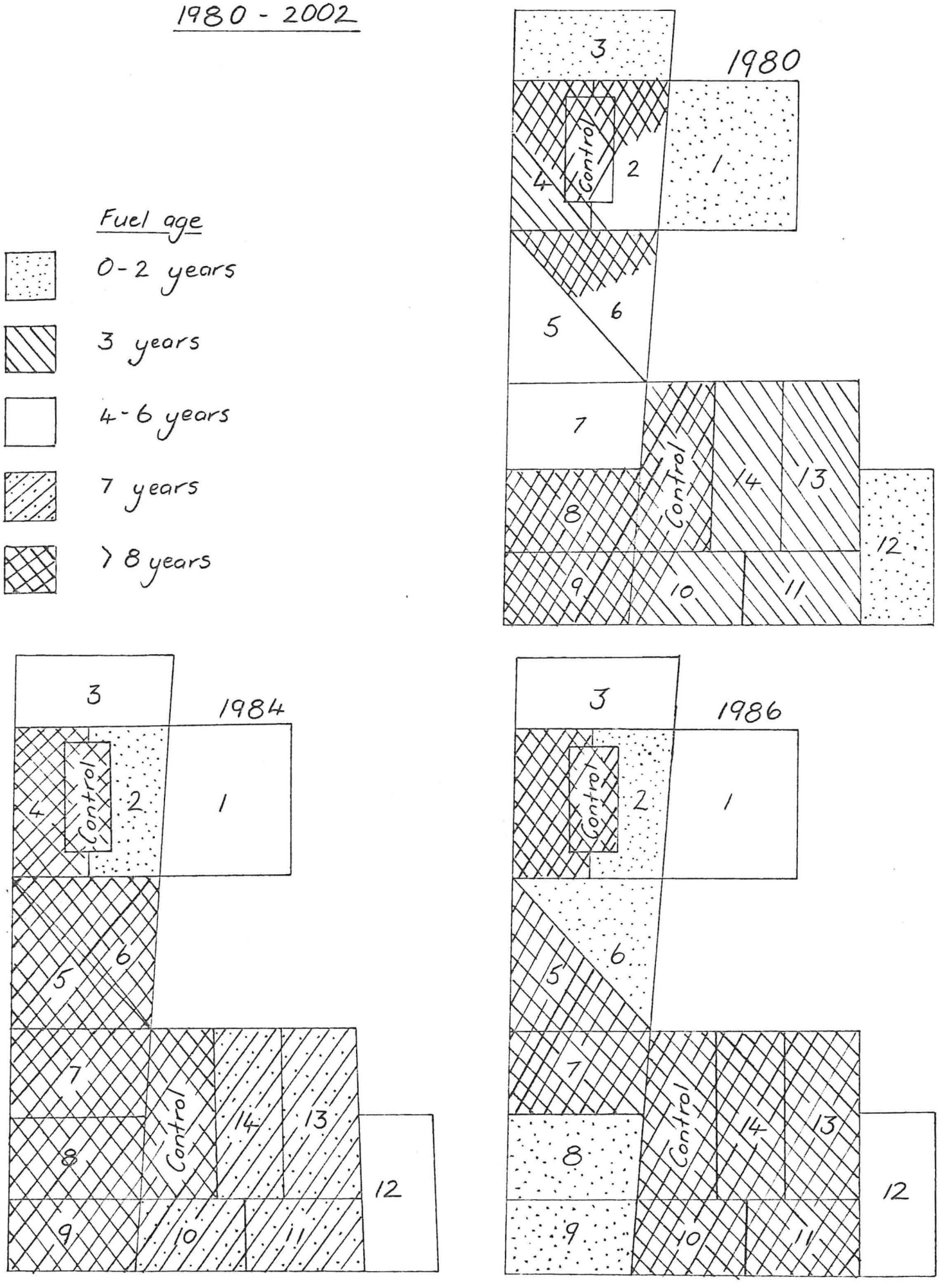


Fig 2 Fuel plans showing fuel ages at two year intervals fourteen Perup burning blocks over the period 1980 - 2002



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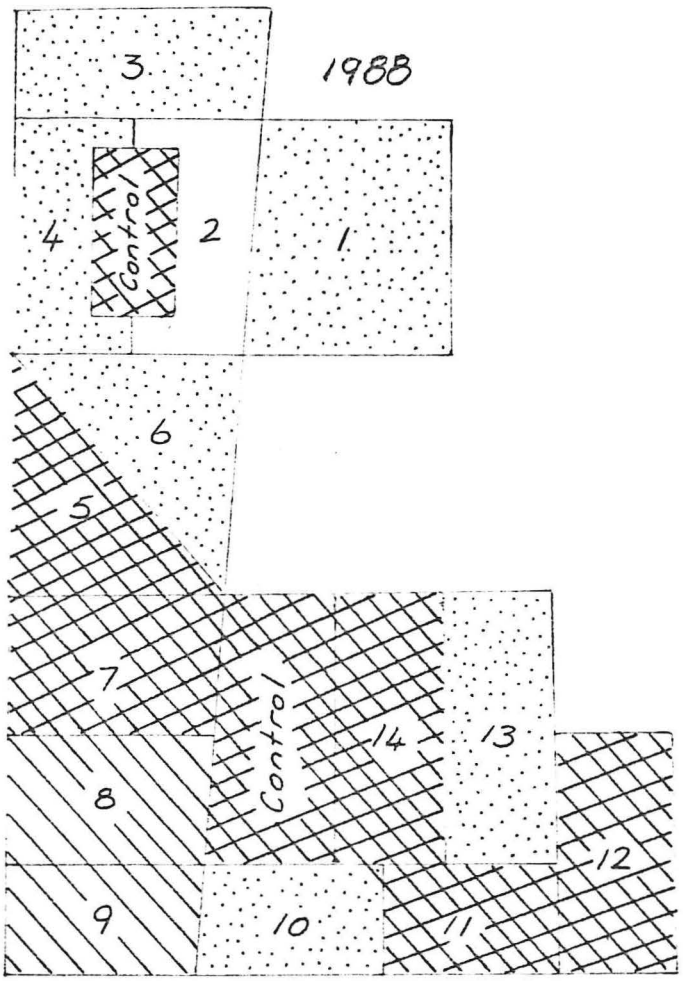
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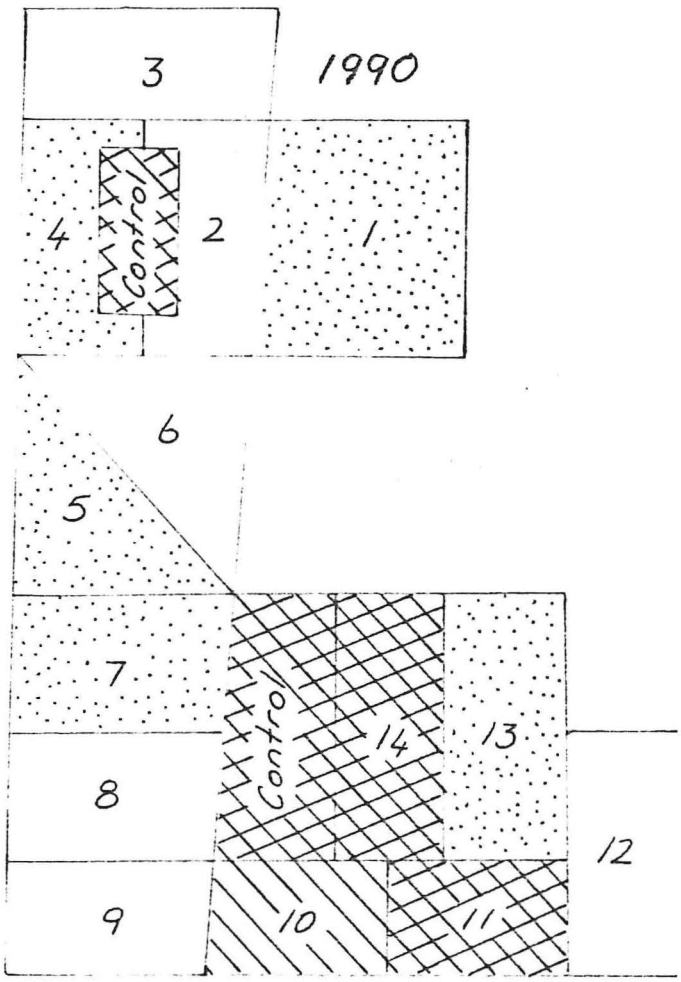
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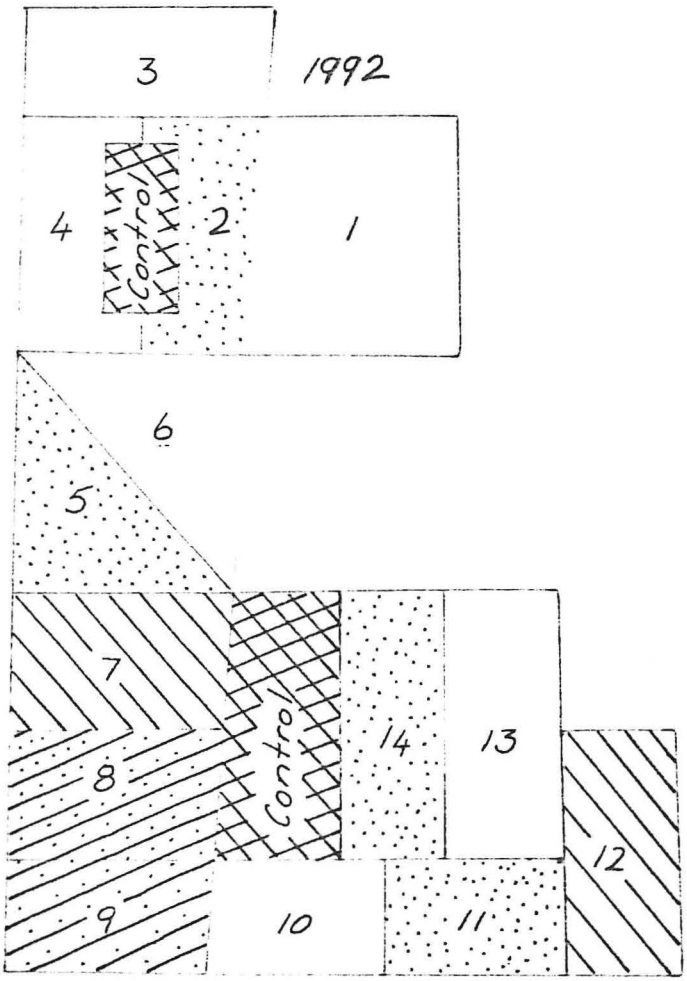
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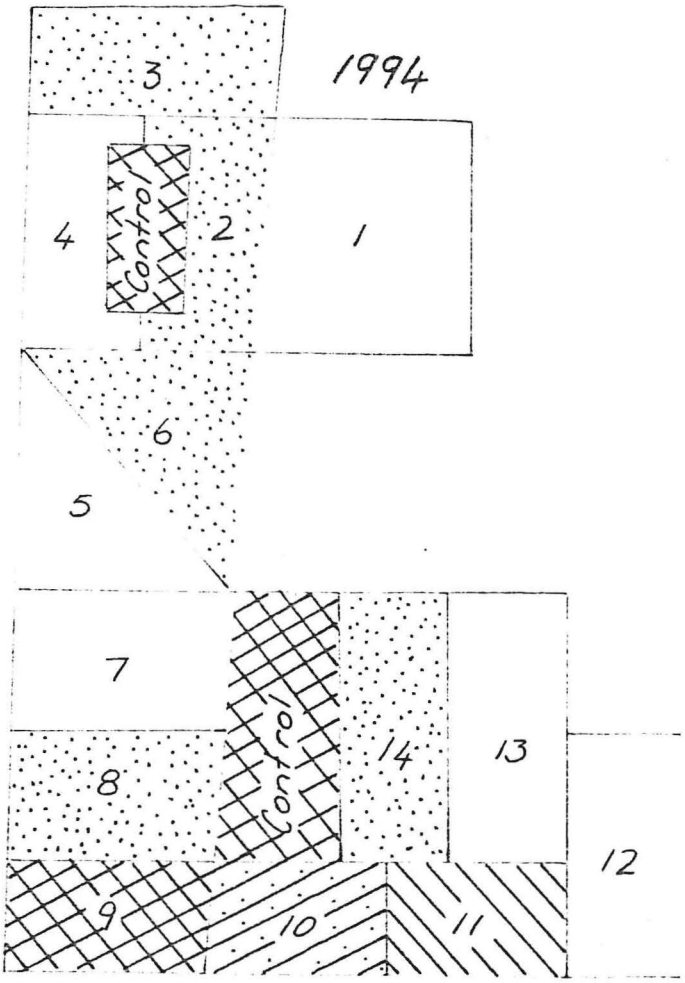
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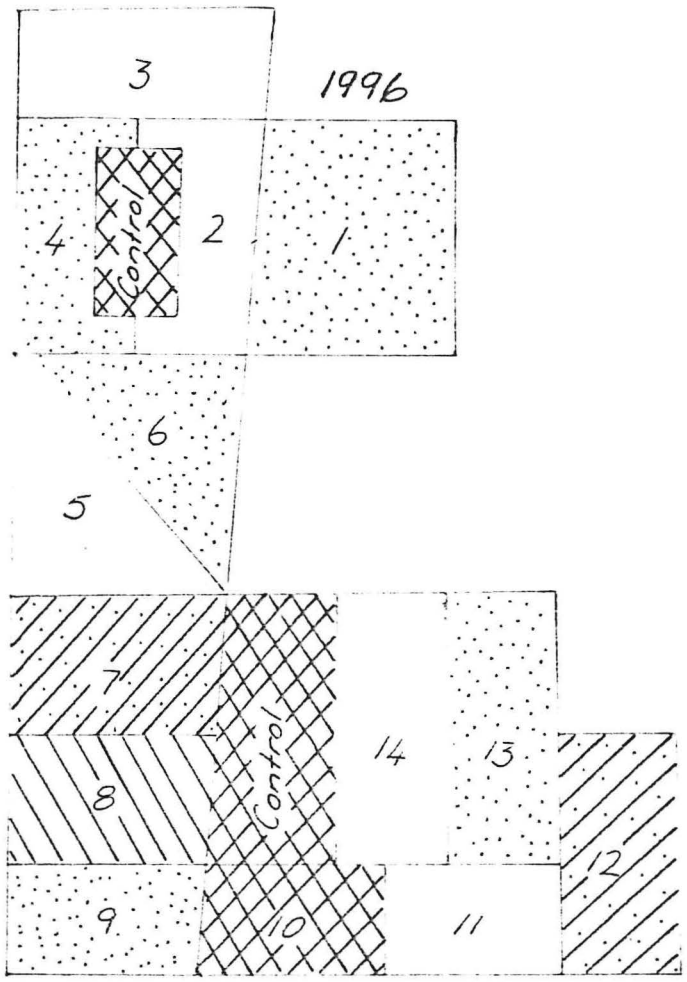
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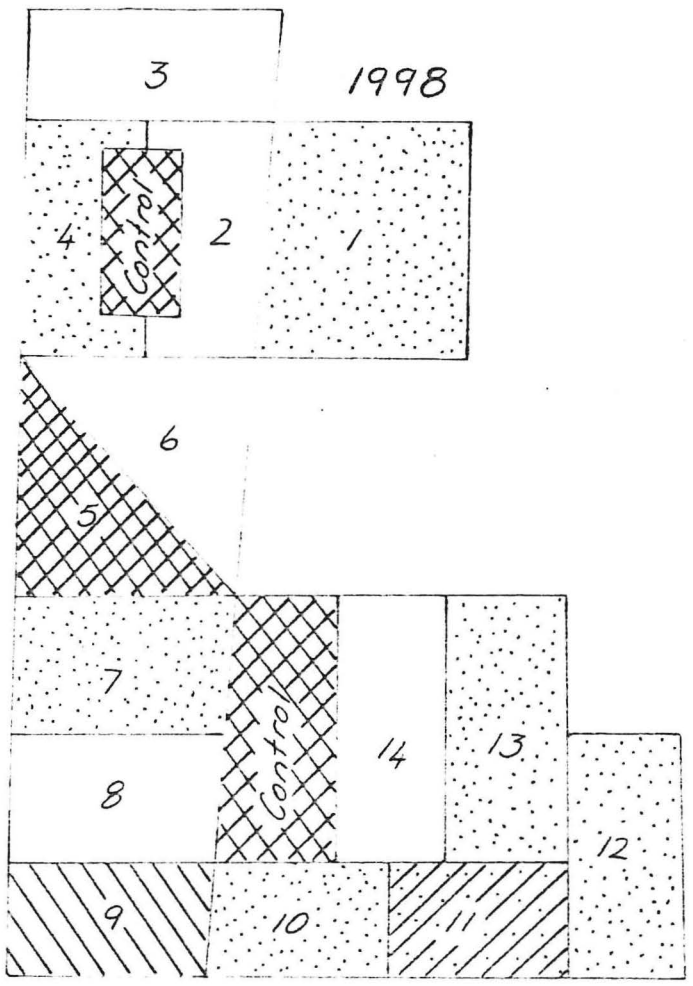
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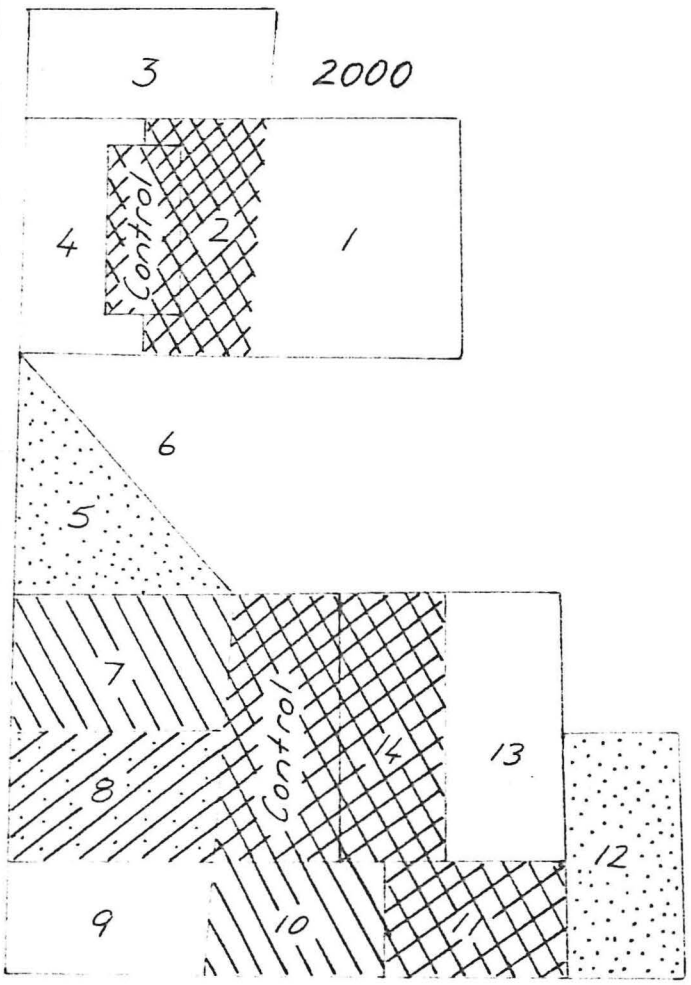
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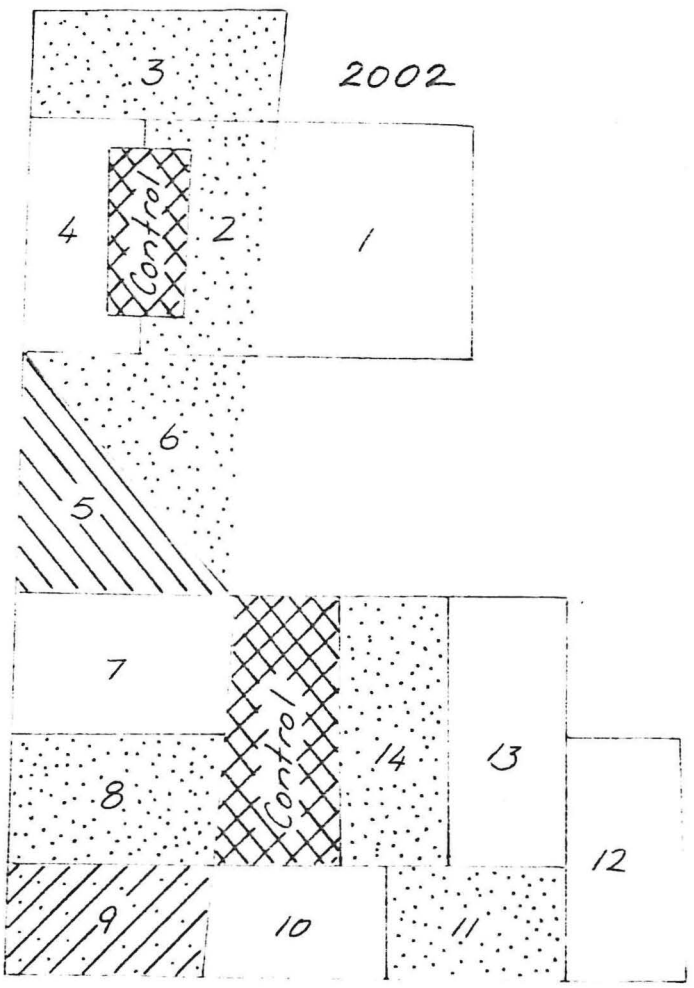
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