FORESTS DEPARTMENT
WESTERN AUSTRALIA

HARDWOOD OPERATIONS CONTROL SYSTEM

LOGGING & REGENERATION
SOUTHERN REGION

HARDWOOD OPERATIONS CONTROL SYSTEM

The Hardwood Operations Control System for Logging and Regeneration as described in this booklet, was implemented in the Southern Region in 1975, in response to the increased complexity and magnitude of these Operations when chipwood logging commenced. The integration of all sawmill logging in the region with chipwood logging demanded a centralised planning system and a more appropriate means of control to ensure that integration was maintained and to facilitate the regional co-ordination of forest operations.

In 1976, a broader based H.O.C.S. was introduced to other regions in the Forests Department. This system covered all hardwood operations but in less detail and was based on the forest block as the management unit. The logging and regeneration control system in the Southern Region was incorporated within the total system, and the remaining elements of the broader H.O.C.S. were implemented in the Southern Region in 1979.

F.J. BRADSHAW
PLANNING OFFICER
SOUTHERN REGION

HARDWOOD OPERATIONS CONTROL SYSTEM

LOGGING AND REGENERATION - SOUTHERN REGION

SCOPE : This outline covers that part of the H.O.C.S. relating to logging and regeneration programming and control as it applies in the Southern Region.

In this region, 4 year logging plans are prepared at a regional level and implemented at the Divisional level. This covers the integrated logging for 12 sawmills and one chipmill, with a combined intake of approximately 1,000,000 m^3 of jarrah, karri and marri. Logging plans are updated annually and the H.O.C.S. system described here, sets out the detailed annual programme and provides for a record of the activites carried out. The regeneration programme is a natural consequence of the logging programme.

The system specifically covers :

1. Logging
   - sawlogs
   - chipwood
   - thinnings
2. Regeneration
   - cull felling
   - scrub rolling
   - regeneration burning
   - planting, seeding
   - top disposal
   - top disposal burning

THE MANAGEMENT UNIT

The basic Management Unit is the coupe, aggregated into forest blocks, then Divisions and Region. All areas within State Forest in the region are allocated to a specific pre-determined coupe which range from 50 - 800 ha in size.

A coupe sheet (1:25,000 plan of the coupe) is prepared for each coupe as the need arises, and shows all permanent cutting constraints (stream, road reserves etc.) Block plans (1:50,000 plans of the block) are similarly prepared.

THE MAP RECORD

Coupe - there are three basic coupe record sheets.

1. Resource at time of Management Level Inventory, which shows forest type, cutting history which affects Volumes, Inventory Lines etc. Appendix 1
2. Cutting since Inventory Appendix 2
3. Regeneration - date and detail where this is known. (Applies to even aged regeneration only) Appendix 3

Items 2 and 3 are updated annually.

Block - 3 block plans are maintained which summarise the information from the coupe plans. These are for sawlog cutting (Appendix 5)
chipwood cutting (Appendix 4)
regeneration (Appendix 6)

THE CARD RECORD

Visible edge card records (Appendix 7) are maintained for each coupe which show :

Volume of sawlogs and chipwood by forest types at time of inventory.

Volume removed since inventory, updated monthly from mill returns.

Summary of cutting since inventory.

Areas of even-aged regeneration.

The visible edge data are tabed to indicate : current years operation
incomplete operations
miscellaneous reminders

THE ANNUAL PROGRAMME

Logging

On the basis of the revised 4 year logging plan, the cutting boundaries and broad prescriptions are marked on the relevant 1:25,000 coupe sheets and distributed to the appropriate Division for implementation. The coupe sheet is returned to the Regional Inventory and Planning Officer when the operation is completed (Appendix 2) for summarising and recording. Incomplete coupes are returned at the end of the year for recording progress and for re-programming.

Regeneration

Predictions of the regeneration programme are made on the basis of the cutting plan in March each year in time for the annual and three year budget estimates.

Coupe sheets for regeneration are prepared in September showing the area expected to be cut and ready for preparation and listing the operations to be carried out. These show areas for preparation and burning in the coming summer and regeneration in the following winter. (Appendix 3)

CONTROL

Field implementation and control is carried out by Divisional staff and Regional Industry Control or Operations staff, and in accordance with detailed written prescriptions for each phase of the job. (Example Appendix 1

Coupes are signposted in the field and each trip of logs which leave the bush are marked or recorded in carters books with the Forest Block and coupe number. These are marked against measured logs or weighed trips by the sawmill or chipmill companies.

Monitoring of the actual sawmill cut against Permissible Intake, is carried out by Divisional staff from Sawmill returns each month. (Appendix 8)

REVIEW

Volumes removed from each coupe are recorded on sawmill log returns by the sawmiller (Appendix 9), summarised by Divisional staff (Appendix 10) each month, and sent to the Regional Inventory and Planning Office for collation and recording on cards. (Appendix 7) Actual volumes removed are compared with predicted volumes for the area cutover each year. (Appendix 11). This provides a basis for amending future estimates.

Areas logged and areas regenerated are monitored by 35mm aerial photography at the end of each year for logging (Appendix 12) and the end of each summer for regeneration (Appendix 13). This is the basis for checking the operation and provides a precise record; incomplete areas are taken into account at the annual revision of the logging plan. (35mm oblique aerial photographs are rectified to 1:40,000 vertical photos for plotting.)

A review of planning performance is carried out each year to compare planned versus actual achievement for the previous 12 months, to determine success rates and highlight problem areas. Comparisons presently made include :

Whether the specific coupes planned to be cut, were actually cut.

How did the total area planned to be cut compare with the actual area cutover (for each species and product)?

How did the area predicted to be ready for regeneration preparation compar with what was actually ready?

How did estimated volume compare with actual removals for the area actually cut? (Appendix 15)

APPENDICES

1. Coupe resource map at time of Management Level Inventory.
2. Coupe sheet for logging.
3. Coupe sheet for regeneration.
4. Block plan for chipwood cutting history.
5. Block plan for sawlog cutting history.
6. Block plan for regeneration history.
7. Coupe card.
8. Sawmill monthly return.
9. Sawmill log folio return.
10. Source of logs.
11. Actual removals and comparison of actual Vs estimated volumes.
12. Photograph of logged area.
13. Photograph of logged area and prepared for regeneration.
14. Annual summary of cutting.
15. Annual planning review.
16. Schedule of H.O.C.S. operations for Divisions and Inventory and Planning.
17. Detailed cutting prescription.
18. Annual summary of regeneration.

APP. 1

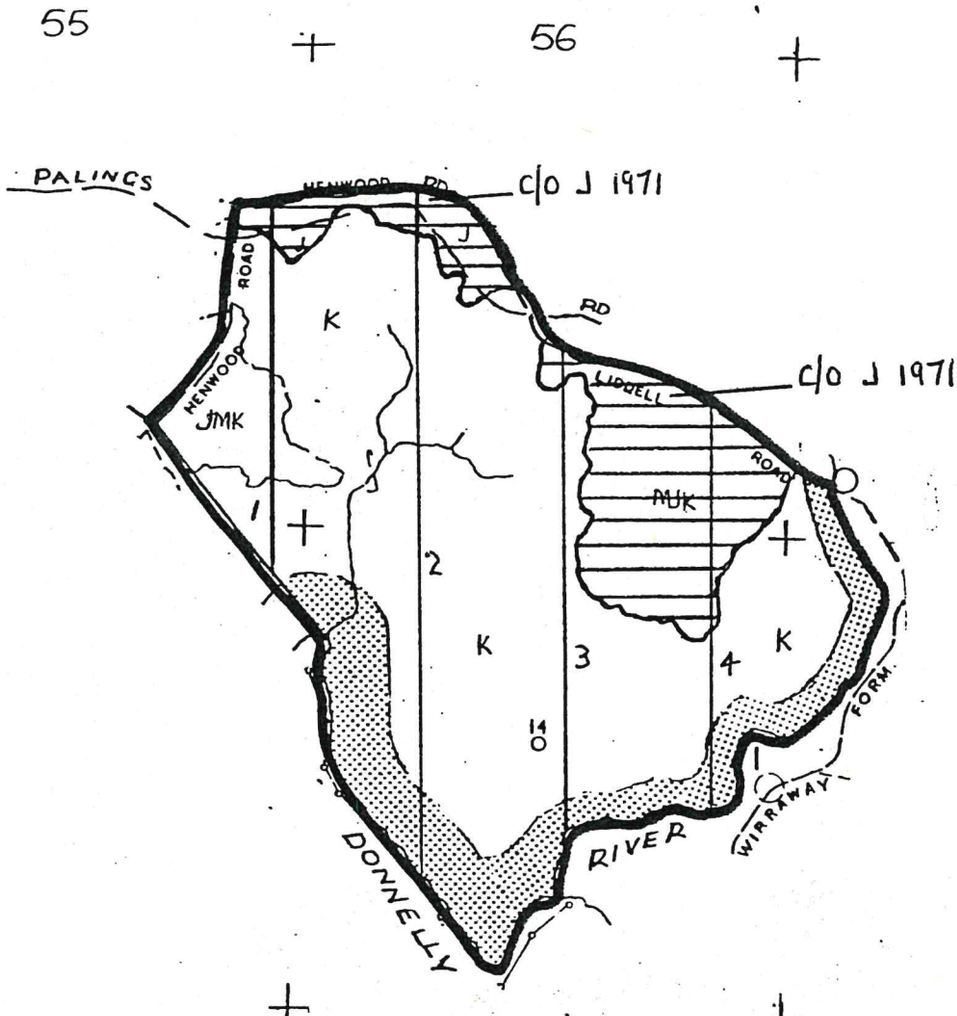
GRAPHITE BLOCK - coupe 8

SYMBOLS USED:

J • jarrah
K • karri
S • summer logging
W • winter logging
C/F • clear fallen
S.T.S. • seed trees standing
REGEN • regeneration
G/S • group selection cut
M • marri
-X—X- • boundary between S&W
-•—•- • boundary between S.M.P.'s
N F • non forest
C l • cleared
K.S.T. • karri seed trees
stream reserve
amenity reserve
D/B • dieback
P.P. • private property
P • pine plot

LINES & RESOURCES

J - W
K - W.
MIXED - W.



MANJIMUP SHIRE

GRID REF: HC 56

APP. 2

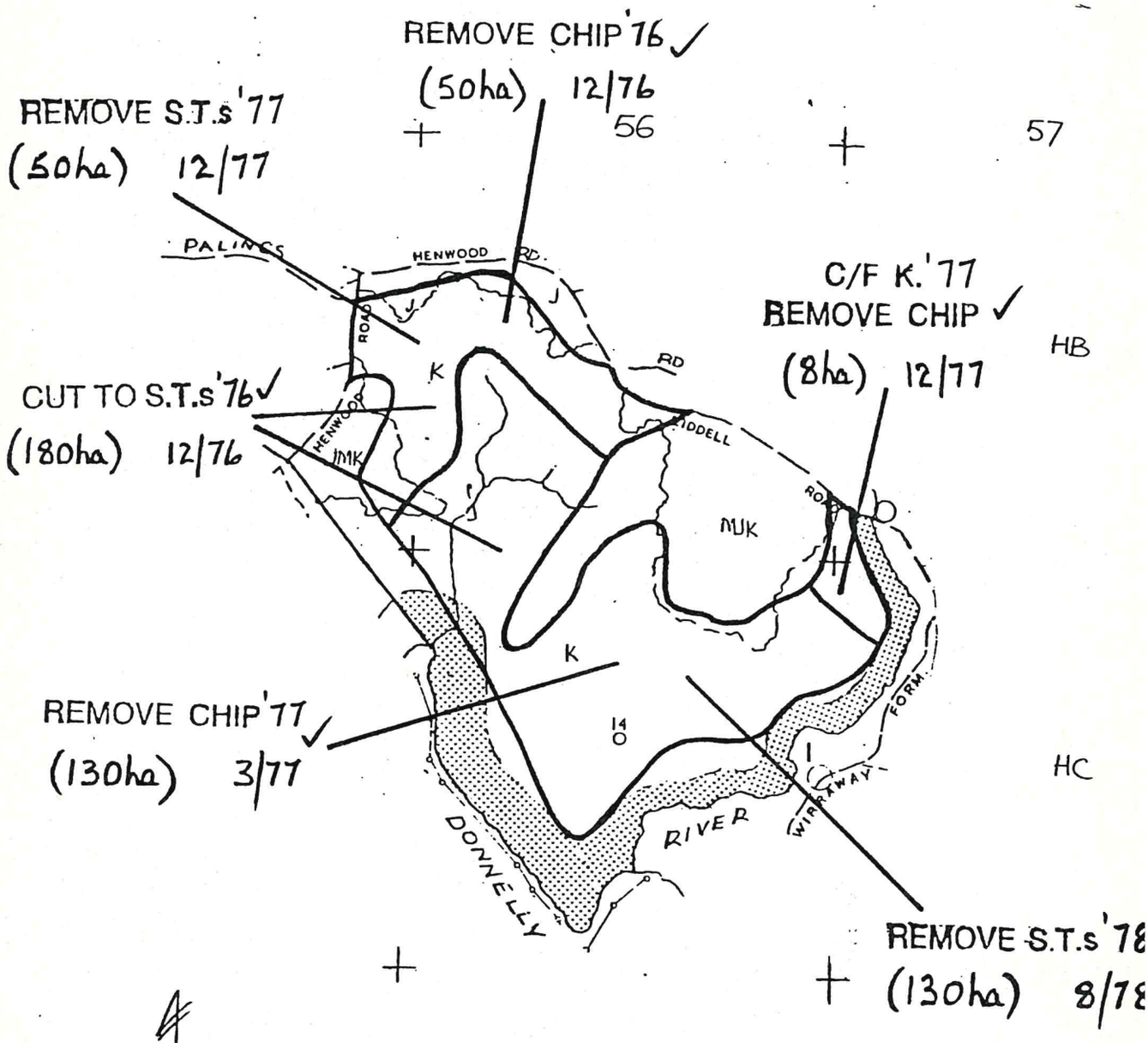
GRAPHITE BLOCK - coupe 8

CUTTING

SMP · 1543

SYMBOLS USED:

J · jarrah
K · karri
S · summer logging
W · winter logging
C/F · clear fallen
S.T.S. · seed trees standing
REGEN · regeneration
G/S · group selection cut
M · marri
-X—X- boundary between S & W
-•—•- boundary between S.M.P.'s
N.F. · non forest
Cl · cleared
K.S.T. · karri seed trees
stream reserve
amenity reserve
D/B · dieback
P.P. · private property
P · pine plot



MANJIMUP SHIRE

GRAPHITE BLOCK - coupe 8

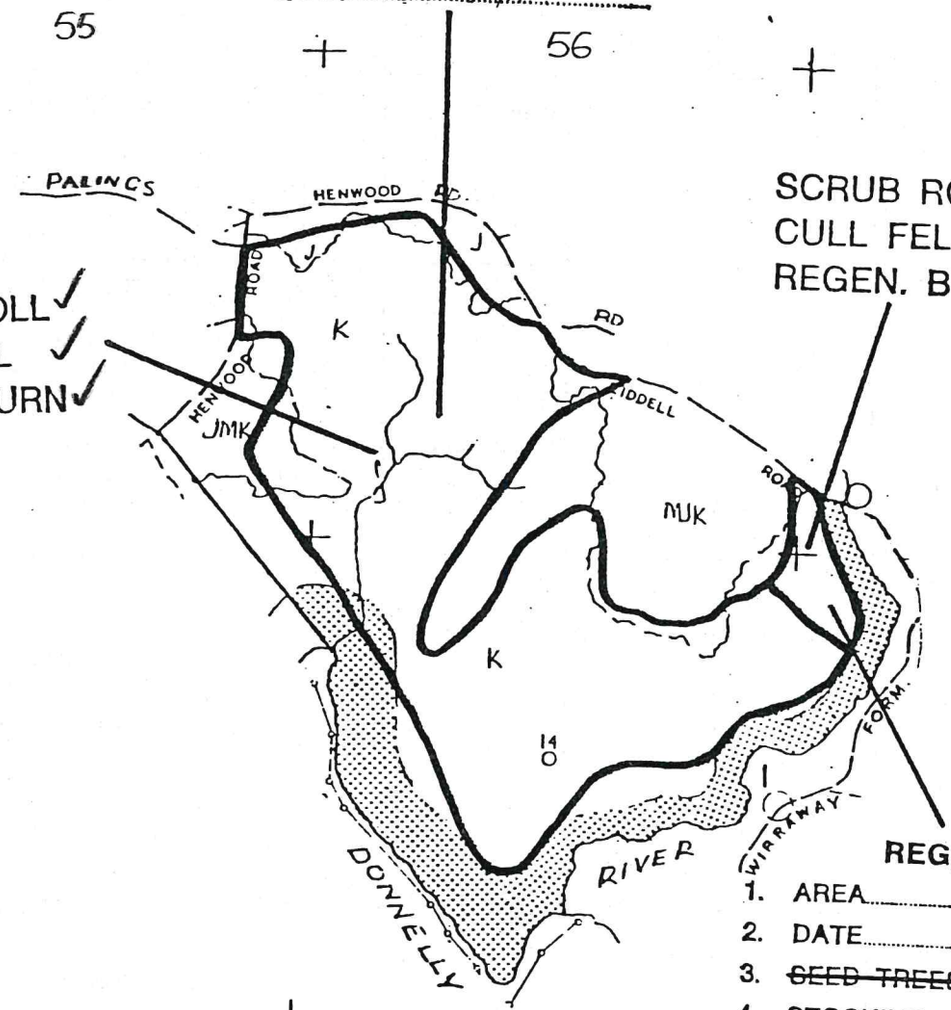
REGENERATION

SYMBOLS USED:

- J - jarrah
- K - karri
- S - summer logging
- W - winter logging
- C/F - clear fallen
- S.T.S. - seed trees standing
- REGEN - regeneration
- G/S - group selection cut
- M - marri
- -X—X- boundary between S & W
- -o—o- boundary between S.M.P.'s
- N F - non forest
- C I - cleared
- K.S.T. - karri seed trees
- stream reserve
- amenity reserve
- D/B - dieback
- P.P. - private property
- P - pine plot

REGENERATION

1. AREA 180 (ha)
2. DATE 3/77
3. SEED TREES/~~PLANTED/SEEDED.~~
4. STOCKING % 60 (MIL/AC).
5. SPACING N/A.
6. FERTILIZER—
   - 6.1. APPLIED AT TIME OF PLANT OR LATER
   - 6.2. TYPE N/A.
   - 6.3. RATE N/A.



REGENERATION

1. AREA 8 (h
2. DATE 6/78
3. ~~SEED TREES~~/PLANTED/~~SEEDED.~~
4. STOCKING %
5. SPACING 4 x 2 M.
6. FERTILIZER—
   - 6.1. APPLIED AT TIME OF PLANT OR LATI
   - 6.2. TYPE 6:1 SUPER/AGRAN
   - 6.3. RATE 60 mg/PLANT

MANJIMUP SHIRE

BLOCK ..... COUPE .....

REGENERATION AND REHABILITATION

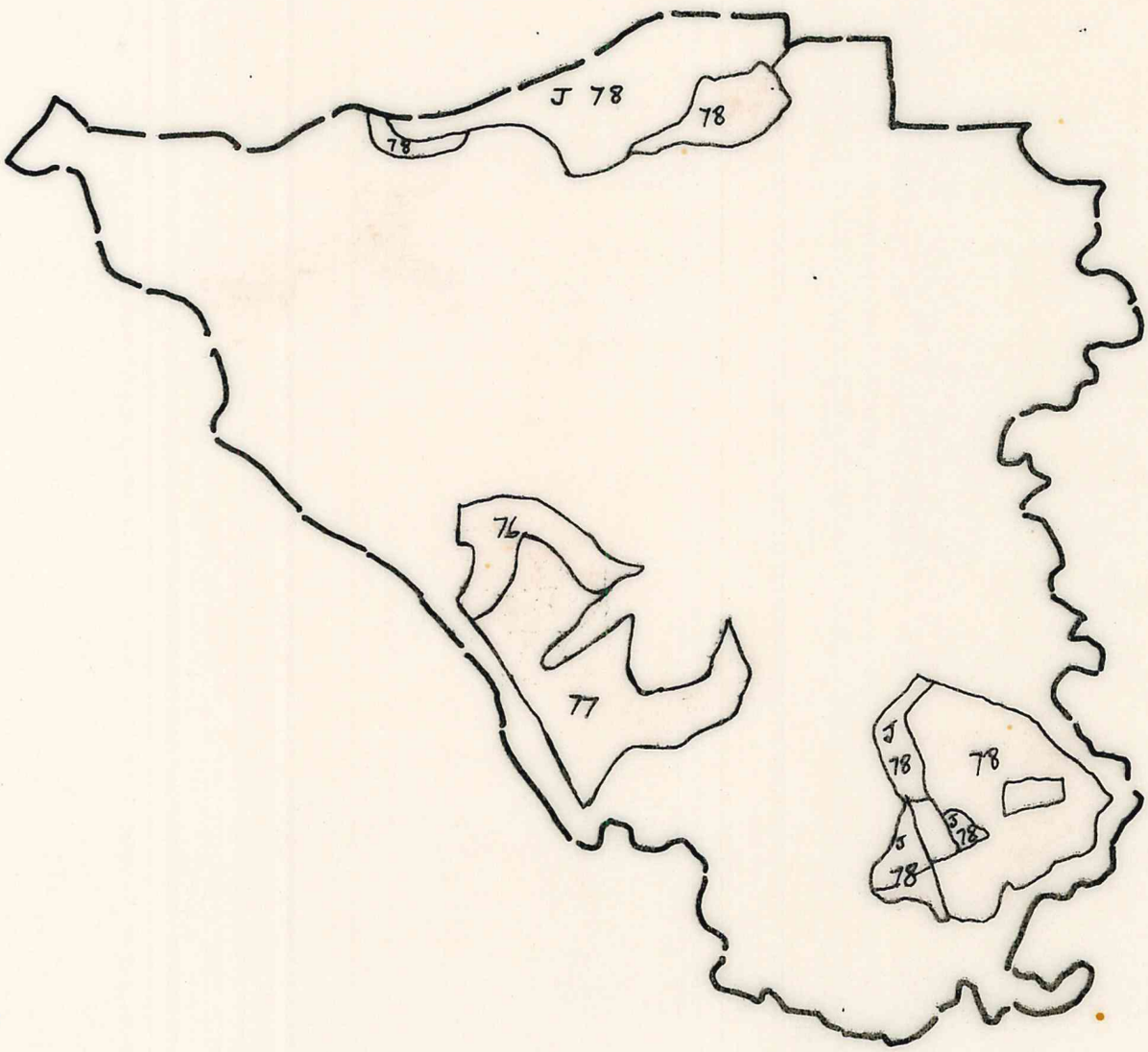
OPERATION	DATE COMPLETED	AREA	TYPE	STOCKING OR SPACING OR RATE	REMARKS
1. LOGGING			To S/T's Remove S/Ts C/Fall		EROSION CONTROL? .....
2. PREPARATION			S/Roll, Reheap, Cull Fell.		PREPARATION DONE BY ....
3. SLASH BURN					RESULT ? ....
4. REGENERATION 4.1 SEED TREES			Species	Stocking	REGENERATION SURVEY RESULT .... WHEN DONE ....
4.2 PLANTING			Species	Spacing	SURVIVAL COUNT RESULT ..... WHEN DONE .....
4.3 SEEDING			Broadcast Direct	Rate	SURVIVAL COUNT RESULT ..... WHEN DONE .....
4.4 INFILL PLANT			Species	Stocking	SURVIVAL COUNT RESULT ..... . WHEN DONE ..... .
5. FERTILIZER APPLICATION				Rate	APPLIED AT TIME OF PLANT OR LATER.
6. REHABILITATION 6.1 RIP LANDINGS/ SNIG TRACKS.		Area & Number	Machine Used D6/D7/OTHER		DONE BY ..... . SEASON .....
6.2 PLANT LANDINGS/ SNIG TRACKS		Area & Number	Species	Spacing	DONE BY ..... . SURVIVAL COUNT RESULT ..... .
7. Additional comments.					

GRAPHITE BLOCK

PRINT 10 B

CHIPWOOD REMOVAL Border and date

APP. 4



GRAPHITE BLOCK

– PRINT 10 A

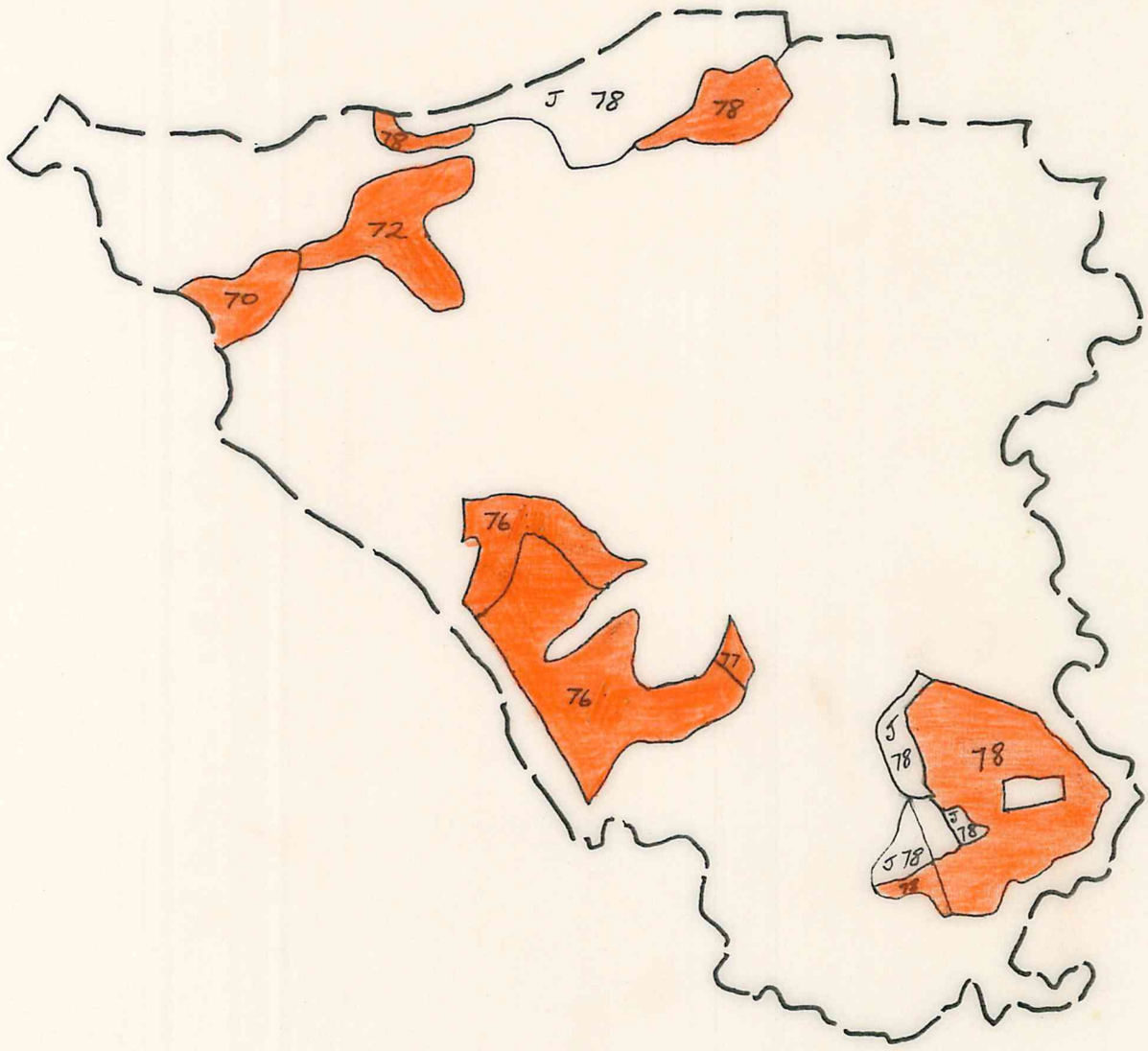
FINAL SAWLOG CUT

KARRI (cutting to seed trees) & JARRAH (heavy selection since 1970)

– border & date.

KARRI (removal of seed trees) – wash (colour of decade).

APP. 5



APP. 6

GRAPHITE BLOCK

REGENERATION

SYMBOLS USED:

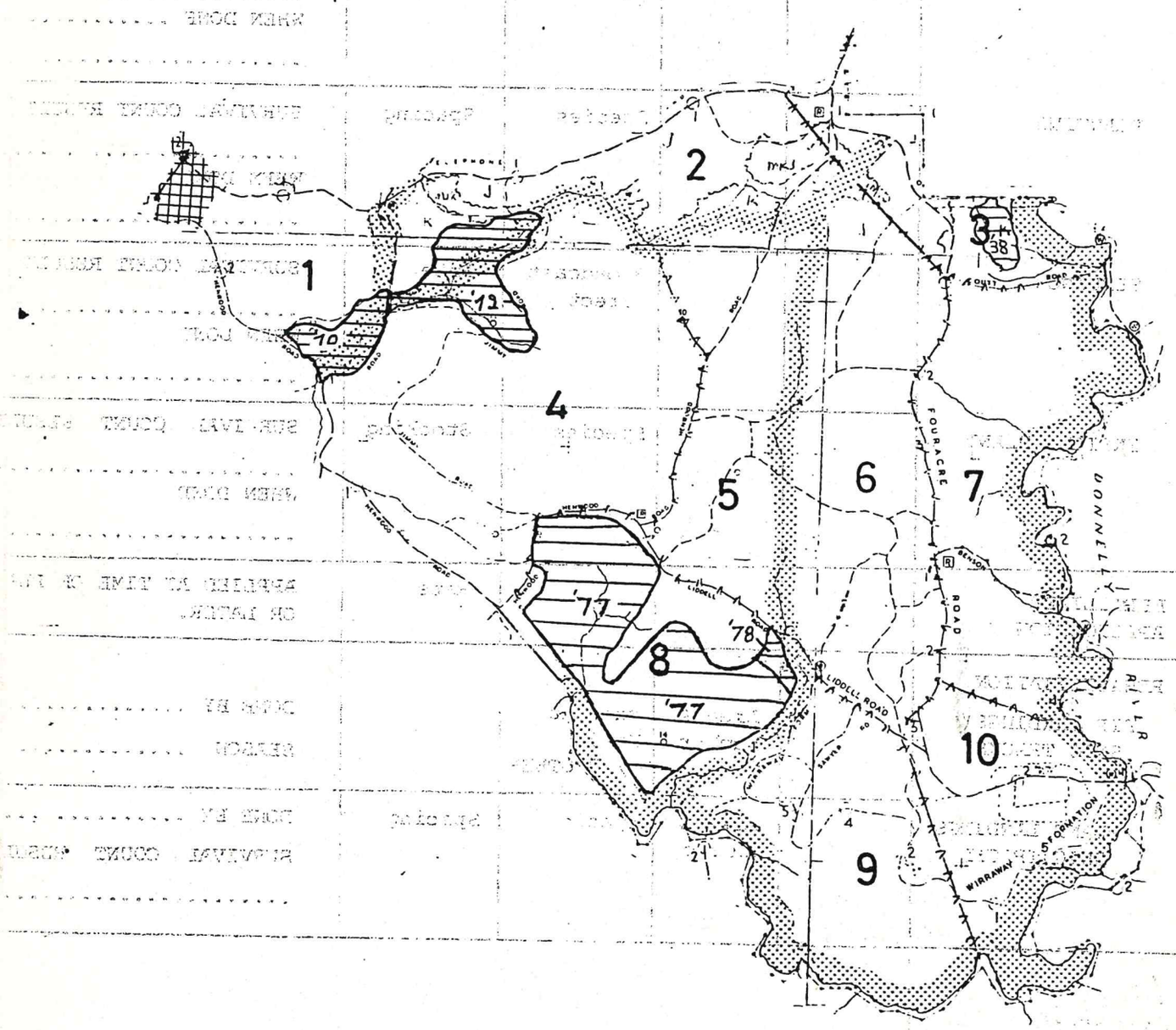
J : jarrah
K : karri
M : marri
boundary between S.M.P.'s
NF : non forest
C : cleared
stream reserve
amenity reserve
P.P. : private property
P : Pine plot
coupe boundary

KARRI

JARRAH

MARRI

Up to date at AUG 1978



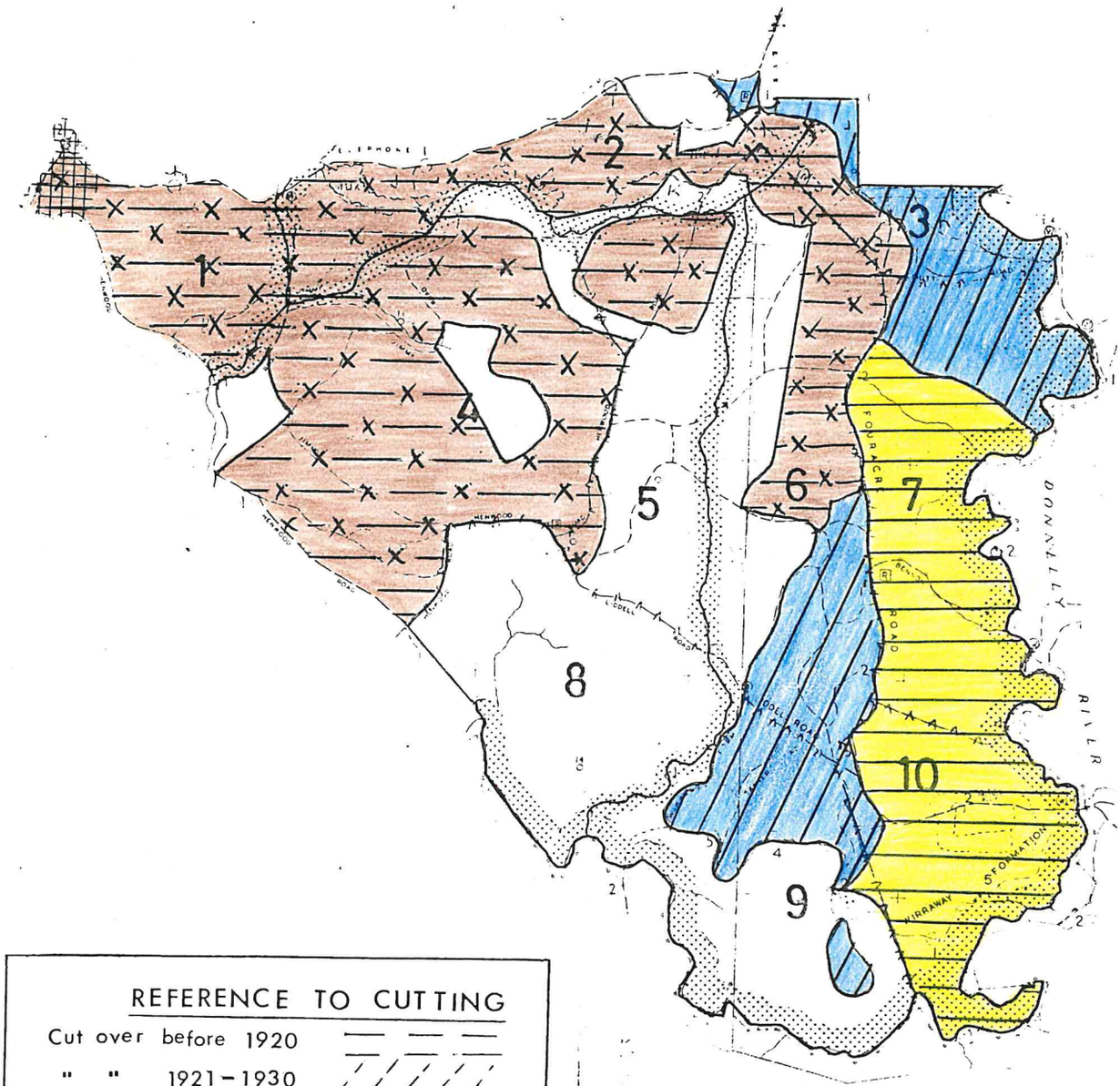
GRID REF: HR · 62

GRAPHITE BLOCK

DECADES of CUTTING PRIOR to 1970. – PRINT 10

SYMBOLS USED:

J · jarrah
K · karri
M · marri
—•— boundary between S.M.P.'s
N.F · non forest
Cl · cleared
stream reserve
amenity reserve
P.P · private property
P · Pine plot
^ ^ · coupe boundary



REFERENCE TO CUTTING

Cut over before 1920	
" " 1921 – 1930	
" " 1931 – 1940	
" " 1941 – 1950	
" " 1951 – 1960	
" " 1961 – 1970	
" " 1971 – 1980	

GRID REF: HB: 56

1:50,000 0 1000 metres

N

INVENTORY DATE:

BLOCK GRAPHITE COUPE No. 8 **APP. 7a**

ASSESSED VOLUME AVAILABLE (M³) DATE

TYPE	AREA (ha.)	SP	SAWLOGS	SEED/CROP TREES	S/L RESIDUE	S/T RESIDUE	CHIPLOGS
KARRI	214.	K	47,000	15,000	7,600	2,600	7,300
WINTER		M					36,700.
JARRAH Rec. C/O	15.	J	ø	(100)	ø	(50)	(50)
WINTER		M					2,000.
MIXED Rec. C/O	41.	K	ø	(1000)	ø	(500)	200.
WINTER		J	ø	ø	ø	ø	(2,500).
		M					7,300.
MIXED JMK	14.	J	ø	(50)	ø	ø	(150)
WINTER		M					1,000
		K	200	500	50	50	100
		J	ø	(150).	ø	(50)	(2,700)
TOTAL	284	K	47,200	16,500	7,650	3,150	7,600
		M					47,000.

REMOVED		SAWLOGS TO:		CHIPWOOD TO:	
	J				
	K				
	M				
REMAINING	J				
	K				
	M				

ROMEO VICKERS S 162

BLOCK GRAPHITE COUPE No. 8. NETT AREA (ha.) J K

DATE	CUTTING	ha.	DATE	REGENERATION	ha.
976.	CUT KARRI TO ST'S. ✓ 12/76.	180.			
1976.	REMOVE CHIPWOOD. ✓ 12/76.	50.	1977.	REGEN. - SEED TREES. ✓ 8/77.	180
977.	REMOVE CHIPWOOD. ✓ 3/77.	130.			
977.	C/F K + REMOVE CHIPWOOD ✓ 12/77.	8.			
1977.	REMOVE ST'S. ✓ 12/77.	50.	1978	REGEN - HAND PLANT ✓ 6/78	8.
978.	REMOVE ST'S. ✓ 8/78.	130.			

BLOCK

8.	SAWLOG	S/L RES	CHIPLOG	ST	CULL FELL	SCRUB ROLL	REG BURN	REG COUNT	PLANT	T/D	T/D BURN	PHOTO
	J	J K	J	K	K	K	K	K	K	J	J	

GRAPHITE - COUPE 8 VOLUME REMOVALS (m^3). APP. 7b

MONTH	KARRI SAWLOG.		JARRAH SAWLOG.		KARRI CHIPWOOD		JARRAH CHIPWOOD		MARRI CHIPWOOD	
	Removed	Remaining	Removed	Remaining	Removed	Remaining	Removed	Remaining	Removed	Remaining
FEB '76.	804	62896	4	146	-	18400			135	46865
1 R '76.	3417	59479	-	146	73	18327			135	46730
APR '76.	2954	56525	15	131	210	18117			2486	44244
1 Y '76.	1591	54934	-	131	387	17730			-	44244
UN '76.	2726	52208	178	-47	505	17225			218	44026
L '76.	2388	49820	161	-208	1344	15881			72	43954
G '76.	1533	48287	6	-214	369	15512			3764	40190
EP '76.	1201	47086	30	-244	487	15025			5818	34372
'76.	1143	45943	46	-290	152	14873			6448	27924
OV '76.	1143	44800	20	-310	238	14635			3085	24839
'76.	1649	43151	-	-310	432	14203			91	24748
ONTH	KARRI SAWLOG.		JARRAH SAWLOG.		KARRI CHIPWOOD		JARRAH CHIPWOOD		MARRI CHIPWOOD	
	Removed	Remaining	Removed	Remaining	Removed	Remaining	Removed	Remaining	Removed	Remaining
N '77.	1015	42136	-	-310	612	13591			1980	22768
B '77.	3345	38791	3	-313	2010	11581			984	21784
AR '77.	2537	36254	19	-332	1339	10242			900	20884
'77.	223	36031	-	-332	94	10148			74	20810
AY '77.	46	35985	-	-332	-	10148			735	20075
'77.	95	35890	-	-332	8	10140			1241	18834
UL '77.	1911	33979	37	-369	199	9941			24	18810
'77.	9	33970	-	-369	222	9719			234	18576
OV '77.	1765	32205	15	-384	418	9301			60	18516
'77.	2535	29670	3	-387	793	8508			31	18485
ONTH	KARRI SAWLOG.		JARRAH SAWLOG.		KARRI CHIPWOOD		JARRAH CHIPWOOD		MARRI CHIPWOOD	
	Removed	Remaining	Removed	Remaining	Removed	Remaining	Removed	Remaining	Removed	Remaining
N '78	4	29666	-	-387	-	8508			-	18485
AR '78	786	28880	-	-387	98	8410			-	18485
R '78	2137	26743	2	-389	577	7833			83	18402
AY '78	35	26708	-	-389	151	7682			-	18402
'78	2	26706	-	-389	-	7682			-	18402
'78	9	26697	-	-389	-	7682			5	18397
T '78	622	26075	-	-389	31	7651			29	18368
N '78	2118	23957	10	-399	167	7484			26	18342
C '78	584	23373	-	-399	275	7209			36	18306
B '79	11	23362	-	-399	-	7209			-	18306

WESTERN AUSTRALIA
FORESTS DEPARTMENT

Form F.D. 15[illegible]

APP. 8

Summary of Sawmilling Operations

Conducted by .... at .... Sawmill, obtaining
(Name of Mill)

log supplies from Permit License No. .... during the calendar month ended the ....31st....

day of ....JULY.... 19 79

1. Total Quantity of Log Timber removed to Mill Landing						
Cut on Crown Lands and subject to Royalty		Cut on Private Property Quantity		Quantity of Log Timber on Mill Landing at end of Month	Quantity of Log Timber put through the Mill during Month	
	No. of logs	cubic metres	No. of logs	cubic metres	cubic metres	cubic metres
K	1445	7498·73			950 47	[illegible]
Y	4	10·85			85 4[illegible]	[illegible]
M	15	76·59			[illegible]	[illegible]
J	455	909·93			[illegible]	-

2. Sawn Timber produced from Log Timber treated at the Sawmill

[illegible] Karri Peeler 4·41

	Jarrah (Marri) cubic metres	Karri cubic metres	Other cubic metres	Total cubic metres
(1) Sleepers .... (a) Local				
(b) Interstate				
(c) Overseas		758 87		
(2) Crossing Timber		433 05		
(3) Cases and Case Timber .... (a) Fresh Fruit Cases				
(b) Other				
(4) Telegraph Arms .... (a) Local and Interstate				
(b) Overseas				
(5) Other for Interstate Export Green		81 5[illegible]		
(6) Other for Overseas Export Green		13 5[illegible]		
(7) All other for Disposal .... (a) Flooring Boards		323 05		
(b) Weather Boards				
(c) Other for Seasoning		30 80		
(d) Scantling to 150 mm x 75 mm		162 70		
(e) Scantling over 150 mm x 75 mm		150 41		
(f) Pickets				
(g) Other (specify) [illegible]		26 05		
(8) For Mill Use	(8 69)	(15 67)	(4 [illegible])	
Total		3081 13		

3. Firewood Produced—(a) For sale ....50.... tonnes; (b) For own use ....90.... tonnes.

4. Recovery— $\frac{\text{Sawn Output in cubic metres}}{\text{Logs through Mill in cubic metres (Full Volume Measure)}} \times \frac{100}{1} =$ [illegible] 35 %

5. Disposal of Sawn Timber excluding W.A.G.R. Sleepers during the above month—

(a) Forwarded for export (Interstate) .... [illegible] cubic metres

(Overseas) .... 1015 89 cubic metres

(b) Despatched for consumption within the State (Metropolitan Area) .... 933 0[illegible] cubic metres

(Other) .... 767 45 cubic metres

(c) Otherwise disposed of (Mill use, rejects, etc.) .... 65 62 cubic metres

6. Labour employed at Mill—

Falling	Hauling and Delivering	Under Mill Roof including Log Landing	Loading and Stacking	Roads and Tram-line Construction and Maintenance	Management and Clerical	Other	Total
2	6	71	44	.	5	15	143

7. No. of hours Mill worked ....352....

I certify that the above information is true in every detail.

Date ....6-8-1979....

.... Signature

I make this statement knowing that I am liable in case of falsehood in it to the penalty as set out in the Forests Act.

104128/9/77-20M-MS/352

APP. 9

WESTERN AUSTRALIA

FORESTS ACT, 1918

(See Forest Regulations Nos. 58 to 62)

LOG BOOK

F.D. 183a

№ 20906

Mill ....

Place ....

Month JULY 19…

Mill Landing Book Folio	Consecutive Number of Log	Species of Timber	Size: Length	Size: Mid Diameter	Cubic Contents	Where Obtained: Permit No. / Location No.
Brought forward						
	1	K	98	1420	15.13	BVI
	2		87	1160	9.17	
	3		56	1190	6.28	
	4		99	1480	16.97	
	5		35	1160	3.62	
	6		30	1180	3.31	
	7		83	1110	8.01	
	8		103	540	2.38	
	9		123	890	7.68	
	10		102	1200	11.63	
	11		109	1190	12.11	
	12		73	1130	7.28	
	3	J	134	620	4.11	LES
	4		65	880	3.94	
	5		30	900	1.93	
	6		35	580	91	
	7		71	640	2.29	
	8		94	800	4.78	
	9		105	380	1.21	
	20		71	540	1.63	
	1		139	470	2.45	
	2		29	420	40	
	3		34	350	34	
	4	K	38	1360	5.56	BVI
	5		116	1300	15.52	
	6		60	1020	4.95	
	7		100	1170	10.84	
	8	J	112	480	2.07	LES
	9		94	420	1.33	
Total					168.33	

Mill Landing Book Folio	Consecutive Number of Log	Species of Timber	Size: Length	Size: Mid Diameter	Cubic Contents	Where Obtained: Permit No. / Location No.
Brought forward ...					168.33	
	30	J	144	570	3.74	LES
66822	1		131	450	2.11	
	2		91	690	3.41	
	3		75	480	1.37	
	4		132	500	2.64	
	5		73	340	67	
	6		93	420	1.31	
	7		113	450	1.82	
	8		128	560	3.21	
	9		129	530	2.88	
	40	K	118	540	2.75	BVI
	1		124	760	5.70	
	2		121	1000	9.52	
	3		124	700	4.84	
	4		124	800	6.31	
	5		129	840	7.18	
	6	J	88	340	82	LES
	7		94	410	1.27	
66823	8		43	500	84	
	9		90	620	2.76	
	50		87	750	3.85	
	1		96	470	1.70	
	2		45	390	54	
	3		80	540	1.87	
	4		98	880	6.03	
	5		108	460	1.83	
	6		43	430	62	
	7		76	520	1.65	
	8		91	460	1.40	
Total					252.97	

Logs not subject to royalty to be underlined in red.

FOR OFFICIAL USE ONLY.

Mill landing inspected. Date .... Signature ....

APP. 9b

WESTERN AUSTRALIA

FORESTS DEPARTMENT

CHIPWOOD LOG RETURN

BUNNINGS BEAVIS ONE Month JULY 1979

Date	Docket Number	Species	Net Weight	Block and Coupe or P.P. Loc.	Date	Docket Number	Species	Net Weight	Block and Coupe or P.P. Loc.
Brought forward					Brought forward				
3.7.79	36338	K	46.4	BV1					
4.7.79	36183	-	38.4	-					
-	36339	~~S~~K	59.1	-					
6.7.79	37227	K	41.2	-					
-	37228	-	32.9	-					
	37229	-	33.1	-					
9.7.79	37230	-	41.0	-					
-	37231	-	41.9	-					
	37232	-	36.9	-					
12.7.79	37236	-	37.2	-					
13.7.79	36184	-	30.1	-					
-	37237	-	39.6	-					
-	37238	-	36.7	-					
-	37239	-	49.1	-					
16.7.79	37241	K	27.9	-					
-	37242	-	47.3	-					
18.7.79	37247	-	37.7	-					
26.7.79	37249	-	37.6	-					
-	37250	-	37.5	-					
-	38802	-	48.2	-					
27.7.79	38651	-	35.1	-					
-	38803	-	36.5	-					
30.7.79	38652	-	41.3	-					
-	38804	-	48.7	-					
31.7.79	38653	-	39.5	-					
-	38654	-	44.3	-					
-	38805	-	43.2	-					
			1088.4						
			909.27 m^3						
		tns		m^3					
KAMI	=	1088.4	=	909.27 m^3					
MARK	=	9	=	9					
Total					Total				

Logs not subject to royalty to be underlined in red.

FOR OFFICIAL USE ONLY.

Mill landing inspected. Date..... Signature .....

Source of logs for Month of .....DECEMBER..... 19..78..
.BUNNINGS-DEANMILL:(NEW).

SMP	BLOCK	COUPE	VOLUME IN CUBIC METRES		
			J	K	OTHER MARRI.
1543.	GRAPHITE	2.	14·67	1,269·92	2·87.
1543.	GRAPHITE	8.		581·23	
1543.	GRAPHITE	10.		1,379·10	8·21.
1543.	GRAY	1.		900·38	
1543.	GRAY	5.		223·74	
1543.	IFFLEY	6.		2,367·73	
OTHER		TOTALS =	14·67	6722·10	11·08
TOTAL				6,747·85 m^3	

Total agrees with total on log folio sheet: YES. ✓

M.L.I.V's ACTUAL REMOVALS & COMPARISONS

SPECIES KARRI/MARRI.. RECENT OPS

COMPLETED COUPES

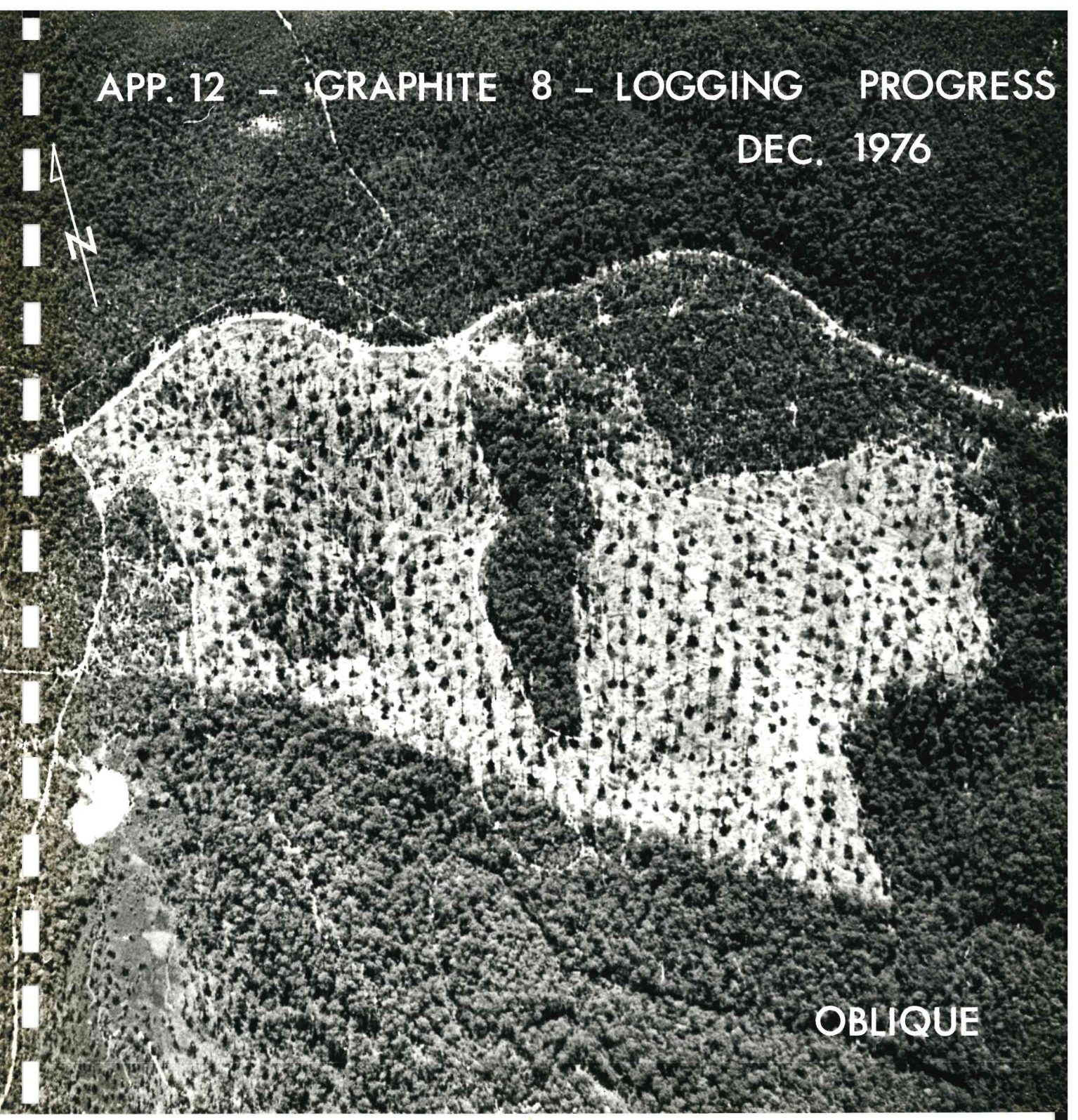
DATE OF SUMMARY 31-12-1978.....

BLOCK & COUPE.	DATE OF COMPL.	AREA	ACTUAL REMOVALS								ESTIMATED REMOVALS (for C/O AREA)								ASS DATE	ASSOR. ASSOR.	STD STD CODE
			SAWLOG						CHIP								CHIP				
			CUT TO S/T	Vol/ha	REMOVE S/T	Vol/ha	C/FELL	Vol/ha		Vol/ha	CUT TO S/T	± %	REMOVE S/T	± %	C/FELL	± %		± %			
IFFLEY 2.	11/78	115.					10,176	88·5	20,816	181·0.					5,553	-45	9,434	-54	10/74		c/o 12456
IFFLEY 3.	3/78	135.					13,274	98·3	23,238	172·1.					6,447	-51	11,632	-50	11/74		c/o 3456
GRAPHITE 8.	2/79	188.					40,327	214·5	39,885	212·1.					40,557	+·6	35,237	-11	11/74		V 12456
DOMBAKUP 6.	2/78	120.					25,206	210·0	22,466	187·2.					14,455	-43	17,439	-22	2/74		V 3456
CROWEA 12.	2/78	130.					13,216	101·6	20,825	160·2.					6,384	-52	24,795	+19	1/75		V 3456
CHALLAR 9	1/79	110.					9,900	90·0	12,752	115·9.					5,003	-49	8,513	-33	5/75		c/o 345
WESTCLIFFE 10*11	9/78	185.					49,018	264·9	26,776	144·7.					37,578	-23	30,582	+14	2/75		V 12456

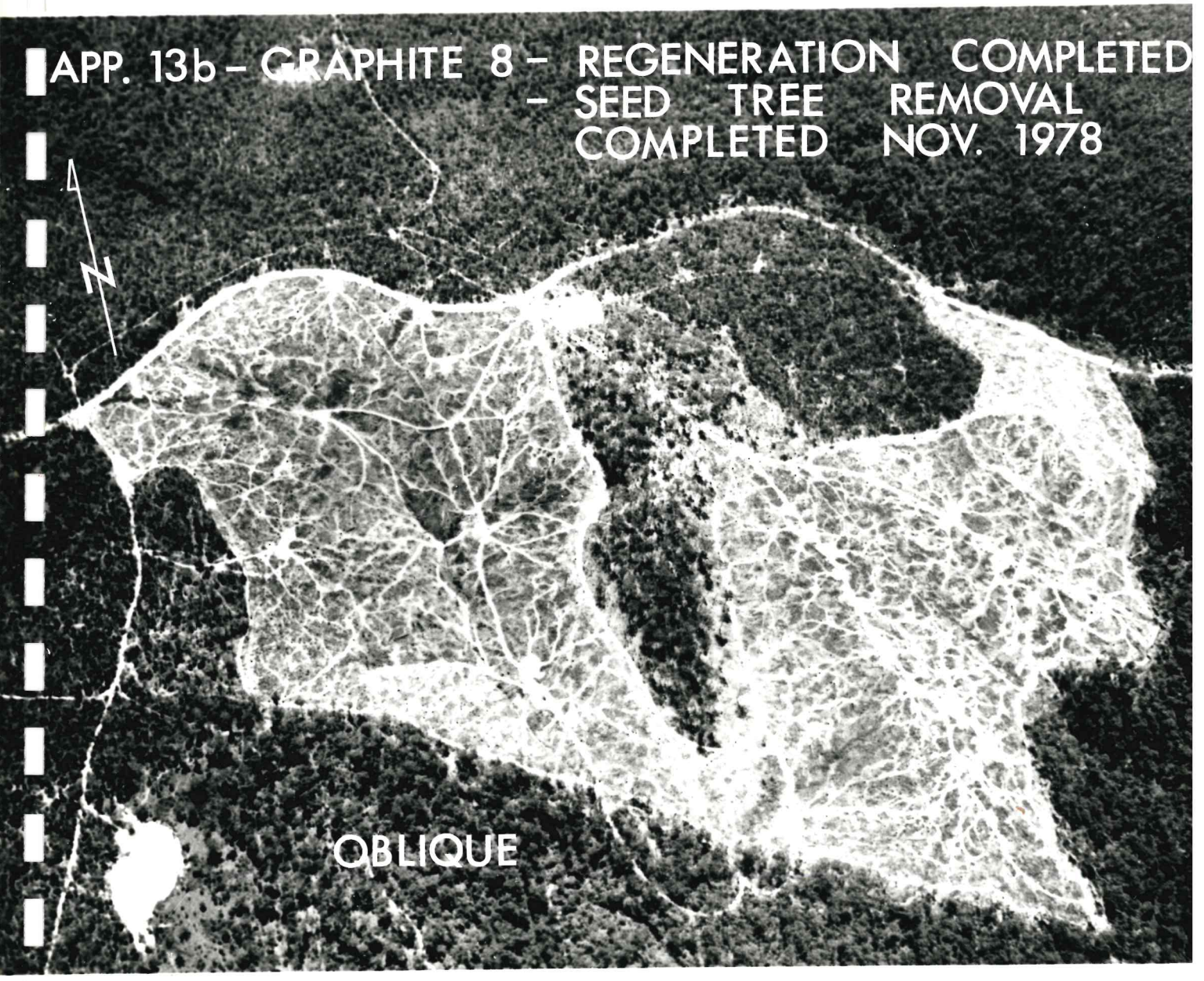
STAND CODES at time of Inventory — V = Virgin; C/O = Cut Over; F'D = Fire Damage

SAWLOG — 1 = Cut to S/T's; 2 = Remove S/T's; 3 = C/Fell

CHIPWOOD SOURCE - 4 = Chiplogs; 5 = S/L Residue; 6 = S/T Residue


APP. 12 - GRAPHITE 8 - LOGGING PROGRESS
DEC. 1976
N
OBLIQUE


APP. 13a – GRAPHITE 8 – REGENERATION BURN.
– SEED TREE REMOVAL
COMMENCED APR. 1977
NOT
BURNT
N
OBLIQUE


APP. 13b – GRAPHITE 8 – REGENERATION COMPLETED
– SEED TREE REMOVAL
COMPLETED NOV. 1978
N
OBLIQUE

SUMMARY OF CUTTING SOUTHERN REGION

Year Ended December 1978.....

Tenure	S.M.P.	Area C/O for Sawlog (ha)			Area C/O Chip (ha)		Thinnings (ha)			Remarks
		Jarrah	* Karri	** Karri S/T Rem.	Jarrah	Karri	S/L	Chip	Marri S/L	
STATE FOREST	F.P(S)L -1627		120	57						
STATE FOREST	F.P(S)L-1618		6	117						
STATE FOREST	F.P(S)L-1617	45	215	65		200				
STATE FOREST	F.P(S)L-1632	907								
STATE FOREST	S.M.P.-1330	337								
STATE FOREST	S.M.P.-1331	843								
STATE FOREST	S.M.P.-1328	1197								
STATE FOREST	S.M.P.-677	342								
STATE FOREST	F.P(S)L-1628								32	
STATE FOREST	F.P(S)L-1570	90	10		40	105				
STATE FOREST	S.M.P.-1332		245			430				
STATE FOREST	S.M.P.-1193		547	145		715				
STATE FOREST	S.M.P.-1329		519	285		629				
STATE FOREST	S.M.P.-1333	52	680		52	840				
STATE FOREST	S.M.P.-1543	747	415	194	217	383				
STATE FOREST	F.P(S)L-984						12	12		
STATE FOREST										
	TOTALS =	4,560	2,757	863	309	3,302	12	12	32	

* KARRI = C/F K OR CUT TO SEED TREES. ** KARRI S/T REM. = REMOVAL OF SEED TREES.

APP. 14

ANNUAL PLANNING REVIEW - 1978

This report attempts to measure how well the original objectives of the 1978 Logging Plan were met.

The comparisons between what had taken place by December 31 and what was planned to take place at January 1, 1978 are strict and made in the same way as they were for the 1977 logging. This allows the additional comparison of 1978 with 1977, which is useful for indicating whether or not our planning is improving.

Planning for all Karri mills and chiplogging was carried out by D.F.O. Lush, and for the Jarrah mills, by D.F.O. Chandler.

1. STANDARDS OF SUCCESS

within $\pm$ 10% - highly successful

within $\pm$ 20% - satisfactory

worse than $\pm$ 20% - not satisfactory

2. BASIS FOR COMPARISON

Final results at the end of the period are compared directly with the predictions made at the beginning of the period, no allowance being made for alterations which may have been made throughout the year in the light of new information or for changing factors beyond the control of the Department (eg. changing chip quotas). Some comparisons therefore take into account not only the quality of the base data but also the ability to predict changes in market conditions and various policy changes. The test is therefore stringent. For example, in the first comparison, the change of Quininup to Jarrah causes more than one failure - firstly the jarrah coupe that was cut and secondly the Karri coupe which was not cut as a result. The errors are not compensating.

3. RESULTS

3.1 Coupes Cut

Were the coupes which were planned to be cut, actually cut?

	PLANNED FOR CUTTING	ACTUALLY CUT	PLANNED BUT NOT CUT	ADDED OR SUBTRACTED
KARRI	67	65	6	+ 4
CHIP	50	51	3	+ 4
JARRAH	61	37	23	+1, - 2
	178	153	32 43	+9, -2

Total variance from the plan = 43 coupes

= 24% ∴ NOT satisfactory

Variance due to :

	1978	1977
a) Planning errors	9%	10%
b) Unexpected catchment cutting		6
c) Change of species by mills	10	9
d) Change in chip output		2
e) Winter logging	5	
f) TOTAL variance	24%	27%

3.2 Areas Cutover

Was the area which was planned to be cut, actually cut?

	PLANNED (HA)	ACTUAL (HA)	DIFFERENCE (÷ PLANNED) 1978	1977
JARRAH	17002	4560	-73% *1	-72%
KARRI	3456	2428	-30 *2	-21
KARRI S/T's	749	863	+13 *3	+4
CHIPWOOD	3928	3816	- 3 *4	-7

*1. As for 1977, the Jarrah mills were not planned in detail. A small part of this difference is also due to Millars remaining on Karri through the year and not cutting their Jarrah.

NOT SATISFACTORY

*2. In constrast to Millars, Bunnings sought additional Jarrah cutting through the year and cut less of their Karri as a consequence.

NOT SATISFACTORY

*3. Millars remained in Karri through the winter and had winter logging difficulties, forcing the approval of seed tree removal from Sutton 5.

SATISFACTORY.

*4. HIGHLY SUCCESSFUL.

3.3 Regeneration Programme

Was the area which was predicted to be cut in time to be prepared fo regeneration, actually cut?

	PREDICTED	ACTUAL	DIFFERENCE (÷ PREDICTI	
			1978	1977
With ST's	704	455	-35%	4%
Artificial	2300	1781	-22%	22%
Prepared and Carry Over	327	420	+28%	

∴ With ST's - Not Satisfactory
Artificially - Not Satisfactory
Prepared and carry over - Not Satisfactory

See 3.2 *2, and 3.1 a), c) and

3.4 Management Level Inventory

3.4.1 How close were the estimated inventory figures to the actual remov overall? (Could only be calculated for those coupes where a valid comparison is possible).

	ESTIMATED (m^3)	ACTUAL (m^3)	DIFFERENCE (÷ ACTUAL)	
			1978	1977
JARRAH S/L	31048	44471	+43%	-9%
KARRI S/L	129952	161063	+24%	+8%
CHIPWOOD	152815	178242	-17%	+13%
KARRI S/L + CHIPWOOD	282767	339305	-20%	-4%

All estimates except Jarrah are satisfactory on this basis, howev individual coupe variation remains high and is worrying.

3.4.2 On an individual coupe basis, what percentage of coupes were satisfactory or better?

	1978	1977
JARRAH	29%	
KARRI	22%	11%
CHIPWOOD	44%	50%

A.R. LUSH
DIVISIONAL FOREST OFFICER
INVENTORY AND PLANNING

ARL:SG

SCHEDULE OF HOCS OPERATIONS FOR DIVISIONS & I & P

LOGGING

DIVISIONAL ACTION	INVENTORY & PLANNING ACTION
1. Coupe Sheets received in January.	1. Management level inventory done to establish resource. Seed supply sampled.
2. Note all cutting constraints, e.g. plots, leases & dieback, etc.	2. 4 year cutting plans revised by December.
3. Demarcate coupe and specific boundaries.	3. After agreement of plan, Inventory and Planning Office prepares coupe sheets for each coupe (Appendix 2). 3.1 Original is held in the Current Operations file. 3.2 1 copy to Forester Industry Control, 2 copies to OIC Division. 3.3 Update cards. 3.4 Tab current operations and photo required.
4. Determine order and method of logging in discussion with OIC Industry Control.	4. Volume removed Summary, received from Divisions (Appendix 10), update volume statement on cards (Appendix 7), note change of operations if it occurs - highlight major volume discrepancies.
5. 5.1 Division indicates on the coupe sheet, the date when programmed cutting is completed and returns it immediately to Inventory and Planning Office. 5.2 Relevant comments may be made on the coupe sheets, including the boundary if the cutting boundary is different to that specified.	5. When completed coupe sheets are returned : 5.1 Hold sheet till it is photographed. 5.2 Remove current Operations tab. 5.3 Return coupe sheet to coupe file. 5.4 Destroy equivalent sheet in Current Operations file.
6. Each month, volumes removed from each coupe are summarised by Divisions and forwarded to Inventory and Planning Office (Appendix 10)	6. August - review progress of cutting and likely areas completed for burning in following Summer - advise OIC Operations of most likely Regeneration program.

APP. 16

LOGGING

DIVISIONAL ACTION

7. Comments on revision of following years cutting to be made to Inventory and Planning in October for inclusion in revised plan.

8. At December 31st, incomplete coupe sheets are returned immediately to Inventory and Planning Office, showing progress. If no operations in a coupe, return the blank coupe sheet with the comment "No Cutting Done".

INVENTORY AND PLANNING ACTION

7. December - incomplete coupe sheets are returned.

   7.1 Treat as for 5 above.

   7.2 Include incomplete section with new years cutting.

   7.3 Refer incomplete or blank sheets to OIC Planning.

   7.4 Check any coupe sheets remaining in Current Operations file, this indicates that these sheets have not been returned from Divisions- follow up.

8. November-December - Photograph all cutting areas.

   8.1 Plot actual boundaries on Block and coupe sheets and determine area cut for current year.

   8.2 Transfer to mosaics.

9. Prepare final form of 'Permit Cutting - Southern Region'.

   9.1 Appendix 14A

   9.2 Summary of Cutting Southern Region (Appendix 14B). Note: include areas East of Frankland River.

10. Update HOCS prints 10A and 10B (Appendix 4, 5) and forward copy to Head Office with summary of Cutting Southern Region.

    Send a copy of HOCS prints 10A and 10B to the Divisions concerned.

11. Record area and volume on Actual Removal forms (Appendix 11A) for all coupes or part coupes where all products have been removed and for which the area producing the volume is known.

12. Update reliability Report (M.L.I. V's Actual), as coupes are complete or mostly complete (Appendix 11B).

REGENERATION

DIVISIONAL ACTION	INVENTORY AND PLANNING ACTION
1. Regeneration Operation coupe sheets are received in September each year.	1. At the time of Estimates regeneration programme is prepared, using proposed cutting as basis. Provide O.I.C. Operations with a list of expected regeneration operations. Check cards for areas not done in previous year(Note Landing and snig-track rehabilitation requirements).
2. Complete regeneration coupe sheets are marked for date and area. Record regeneration stocking and refilling. Return sheets to Inventory and Planning Office when completed (at least by August).	2. <u>September</u> - Prepare coupe sheets for Regeneration Operations (Appendix 3). Amend Summary of Regeneration Operations. List seed tree coupes requiring rehabilitation. Send copy to O.I.C. Operations, and O.I.C. Divisions after O.I.C. Operations has approved. Original copy is kept on Current Regeneration Operations file. 3. Photograph areas after regeneration burn. (Appendix 13). 4. <u>August</u> - Receive coupe sheets as finished or by August. Check that all sheets are received against summary. Destroy corresponding sheet in Current Regeneration Operations file. Return sheet to coupe record file. Correct areas against photographs. Amend coupe cards (area and tabs). Update mosaics Update 1:50,000 Regeneration HOCS Plan (Appendix 6 - HOCS print 14) Update yearly Regeneration summary cards (Appendix 7). Send copy of amended Regeneration HOCS plans (Appendix 6) to Drafting Branch and OIC Divisions. 5. Note, Jarrah type regeneration. Jarrah is considered regenerated when sawlog and chipwood are removed and when it has had a top disposal burn. 6. Bring to the attention of OIC Planning any abnormal situations, e.g. culls remaining, areas cut but not regenerated, etc.

KARRI REGION JOB PRESCRIPTION

TITLE: Treemarking for the Seed Tree system in pure and mixed Karri Stands.

PREPARED BY: S.D.F.O. Underwood.

FOR ISSUE TO: Treemarkers and Procurement Staff.

DATE: October, 1975.

OFFICER RESPONSIBLE: Inspector Smart.

PRESCRIPTION:

The aim of the operation is to retain and protect trees which will provide a seed source for regeneration.

1. Seed Tree Stocking. Seed trees will be retained at a stocking of 4 trees per hectare. This corresponds to a spacing of 60 metres between the boles.

   Allowed variation : (i) up to 70m in high site quality pure Karri stands.

   (ii) down to 50m in S.F.D. areas or MK stands.

2. Seed Tree Specification. The seed tree will be a wind-firm dominant or codominant with a healthy spreading crown, of good form and free from hereditary defect.

   Allowable variation : Retain any seed source (i.e., cull tree or group of piles) if no seed tree meeting the above specification is available at prescribed spacing.

3. Seed Tree Species. Seed trees will be karri, but marri or tingle will be retained in the absence of a suitable karri seed tree at the prescribed spacing.

4. Seed Tree Protection. Retain any other tree which will uproot or damage the crown of a seed tree if the other tree is felled.

SIGNATURE : R Underwood SDFO.

SUMMARY OF REGENERATION OPERATIONS IN SOUTHERN REGION

WINTER : 1977

COUPE	AREAS FOR REGENERATION (ha)				SCRUB	CULL	REGEN	TYPE OF REGEN.			REMARKS
	PROPOSED AREA	COMPLETED		TO BE CARRIED FORWARD	ROLLED	FELLED	BURNT	PLANTED	SEEDED	ST's.	
		DIV. EST	ACTUAL								
OORARA 10			60		✓	✓	✓	30		30	
AWSON 3			71		✓	✓	✓	✓			
OMBAKUP 7			95		✓	✓	✓	✓			
OMBAKUP 17			155		✓	✓	✓	✓			
RANKLAND 3			17		✓	✓	✓	✓			
RAPHITE 8			180		✓	✓	✓			✓	
RAY 1			80		✓	✓	✓			✓	
FFLEY 2			115		✓	✓	✓			✓	
FFLEY 3			120		✓	✓	✓			✓	
AIRN 8			180		✓	✓	✓			✓	
AIRN 9			177		✓	✓	✓	12		165	
OOLE 8			28		✓	✓	✓	✓			
OOLE 13			130		✓	✓	✓	20		110	
OOLE 16			60		✓	✓	✓	✓			
ARREN 6			215		✓	✓	✓	✓			
ESTCLIFFE 10			115		✓	✓	✓			✓	
ESTCLIFFE 11			70		✓	✓	✓			✓	
			1,868 ha					703 ha		1,165 ha	

APP. 18