CHAPTER 8: POLICY

INTRODUCTION

The timber industry using resources from the East Gippsland Forest Management Area operates within an extensive and, at times, conflicting institutional setting. The economic theory surrounding both forest management and integrated harvesting has been applied to the key problems arising from the forest operations in East Gippsland. Purely adopting a theoretical approach would mean allowing the industry's fate to be decided by market forces. Such an approach raises serious doubts about the market's ability to allocate resources in society's interests and, in any case, would be politically impossible to implement. A more reasoned and pragmatic approach is called for which will clearly achieve a Pareto improvement for society.

This chapter will draw on economic principles to recommend policy for the management and utilisation of public native forests for timber production in the East Gippsland Forest Management Area.

Recent and previous policy recommendations drawn from economic studies will be reviewed prior to recommending policy from this study. A plan of how to implement the policy recommendations will follow along with the proposed implications for the East Gippsland Forest Management Area. Finally, the policy's potential to be applied to other regions will be briefly assessed.

PREVIOUS POLICY

Forest Management

The Resource Assessment Commission's 1992 report on the Forest and Timber Inquiry presents the economic solution to the timber management problem but reverts to the sustainable yield method as the accepted forest management method. "The Inquiry is satisfied that currently the agencies have in place sustained yield management strategies for wood production. The evidence before the Inquiry is that these strategies are appropriate."[294] In referring to the economics of forest management the inquiry concludes that "in practice, forest management and harvesting usually involve much more than simply deciding on the optimal rotation."[295]

The merits of the economic approach to forest management are noted but this is not translated to being a significant improvement of benefit to society over the current sustained yield management techniques. Consequently, a cautious approach to the inclusion of economics is taken, with the suggestion that: "To derive forest management plans .... simulation models may be used, [such as linear programming and GIS] .... Within such models, non-economic objectives may be incorporated as constraints or explicit management targets."[296]

The RAC's caution may reflect that proposed policies emanating from studies using the economic solution often involve radical change without implementation considerations or concern for political sensitivity. Also, comments made by previous studies about forest management are usually in addition to the main purpose of the report. One of the submissions of the Australian Bureau of Agricultural and Resource Economics (ABARE) to the RAC Forest and Timber Inquiry was titled: 'Forestry and conservation: an examination of policy alternatives.' The submission covered all uses of all forests in Australia, hence one of the main policy recommendations was quite broad, perhaps requiring radical changes to forest management techniques in many regions of Australia.

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[294] Resource Assessment Commission Forest and Timber Inquiry Final Report Volume 1, Commonwealth of Australia 1992 p. xxxix

[295] Resource Assessment Commission Forest and Timber Inquiry Final Report Volume 2B, Commonwealth of Australia 1992 p. Q7

[296] ibid.

> "What is important is the observation that giving managers a set of objectives which exclude maximisation of economic returns in wood production will almost inevitably result in losses. The obvious solution is to establish a system which ensures that production decisions are based on equating price with marginal production cost. Either profit-maximising forest services or selling forest rights to private producers would achieve this result." [297]

Another ABARE submission to the RAC Forest and Timber Inquiry had as its focus the forests of south-eastern Australia which specifically included the East Gippsland Forest Management Area. This study used cost-benefit analysis to answer various questions including "whether it would be socially beneficial to engage in intensive silvicultural management in the South East Forests"[298] The response to this question gives a solution which would most likely be politically unacceptable to both conservationists and the timber industry: "The calculations show that, from a strictly economic perspective, the most profitable way of managing the forests would be to pulp the entire resource."[299]

A workable policy suggestion was made in a submission to Victoria's Timber Industry Inquiry in 1984 based on economic principles. FORTECH questioned the validity of sustained yield and made a suggestion to use a constrained economic solution rather than the pure theoretical solution. The sustained yield approach is referred to as the 'customary method' with the 'advanced method' including economic outcomes explained as follows: "Instead of imposing an idealised structure to sustain the yield, the new method retained the tenet of sustained yield - that yields should not decline - as a management constraint an then sought the economically optimum set of ways to manage the stand during the planning period. .... Although the customary method is still used, as in current Victorian public planning , the advanced method has been tried for Victorian mountain ash forests (Weir 1972) and is now standard practice for the national forests of the USA (Kent 1980,

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[297] ABARE *Forestry and conservation: an examination of policy alternatives* Project 9244.103, Commonwealth of Australia 1990. p. 25

[298] Streeting, Mark and Hamilton, Clive An Economic Analysis of the Forests of South-Eastern Australia Research Paper Number 5 Resource Assessment Commission December 1991. p. vii

[299] ibid.

Johnson et al 1980), State pine plantations in NSW, and industrial plantations in Victoria (Dargavel 1978)"[300]

Forest Utilisation for Timber

Although not insisting on maximum return from the forest management perspective, many previous studies and inquiries have been quite strong on ensuring efficiency in utilisation and log allocation.

The most specific and significant study completed on timber utilisation was another submission to the RAC Forest and Timber Inquiry: 'Pricing and allocation of logs in Australia.'[301]

Forest operations in East Gippsland at the utilisation level have gradually been moving towards a more commercial operation with the East Gippsland forest utilisation function soon to become a commercial arm of the Department of Natural Resources and Environment. If the correct incentives are in place for this group to operate as a profit maximising body, the allocation and pricing of logs will be more efficient than the current situation.

Even with efficient utilisation of wood from native forests, the resource constraints will remain and return to the public for commercial use of its asset will be below optimal as long as the profit maximising strategy is not used at the forest management level.

POLICY REQUIREMENTS

Those who manage and utilise East Gippsland forests for timber production have an obligation to meet the policy requirements of the National Forest Policy Statement. There

[300] FORTECH A Report on the Efficiency of Resource Use for Supplying Wood Commissioned Paper of the Board of Inquiry into the Timber Industry in Victoria September 1984 pp14-15

[301] O'Regan, M. and Bhati, U.N. Pricing and allocation of logs in Australia, Discussion Paper 91.7 Project 9226.101 Australian Bureau of Agricultural and Resource Economics, Commonwealth of Australia.

are many general references to efficient use of forest resources throughout the policy and the following specific reference to wood pricing and allocation.

"Section 2.3 Wood Pricing and Allocation

The pricing and allocation system for wood from public native forests has a major bearing on industry performance and community returns. Appropriate policies will be achieved by:

- further developing pricing and allocation systems which are market based and allow transferability of rights, a fair return to the community and promote the most efficient use resources;
- revised accounting procedures to reflect costs associated with wood production and community services."[302]

The main vehicle for implementing the National Forest Policy Statement on a regional basis is the Regional Forest Agreement process. The East Gippsland Regional Forest Agreement contains a direct reference to both the National Forest Policy Statement and Australia's Competition Principles Agreement:

"Section 61. Competition Principles

Parties recognise that under the Competition Principles Agreement, Governments aim to achieve more transparency and greater efficiency in Government owned business enterprises. The Commonwealth agrees that the day to day pricing and allocation arrangements for wood from public forests are matters for Victoria. Victoria confirms its commitment to the pricing and allocation principles set out in the National Forest Policy Statement. Victoria confirms that legislation and policies relevant to the allocation and pricing of hardwood logs from State forests will be reviewed as part of the Competition Principles Agreement before the end of 1999. Competitive neutrality principles will be taken into account in any changes following the review."[303]

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[302] National Forest Policy Statement A New Focus for Australia's Forests Commonwealth of Australia Canberra 1992

[303] East Gippsland Regional Forest Agreement Between the Commonwealth and Victorian Governments. February 3, 1997.

The policy recommendations resulting from this research will assist in meeting the policy requirements of the National Forest Policy Statement and will not violate any section of the existing East Gippsland Regional Forest Agreement.

POLICY RECOMMENDATIONS

The policy recommendations are drawn from analysis undertaken in Chapters 5 and 7 where various deficiencies in the current institutional arrangements were identified. Three main recommendations emerged from this work, the first relating to forest management, the second relating to utilisation and third relating to the linkages between management and utilisation. How these recommendations translate to workable timber production arrangements will be addressed in the policy implementation section.

Recommendation 1

Replace the sustainable yield concept with a constrained economic solution to forest management by reducing the rotation periods while maintaining current yield and current environmental guidelines.

This will increase return to the public owners of the forest without reducing currently licensed input to the timber industry. Shortening rotations would also relieve the medium term pressure to log low sawlog productive mature forests which may not be viable in their own right by allowing current regrowth to be logged sooner.

If the public is concerned about the prospect of the whole forest being pulped and a lack of domestic value adding activity, there could be an additional constraint where only the volume function for sawlog quality timber can be used to calculate the optimal rotation. The result would be a longer rotation than for pulp only which produces timber more suitable for domestic value adding.

Recommendation 2

Reduce the utilisation role of the Department of Natural Resources and Environment to that of forest production and enforcement of environmental regulations. All harvesting, transport and utilisation decisions will be made and paid for by the private sector. In order to achieve this, the following adjustments would need to be made to the current institutional arrangements:

- The log grading system is no longer needed except to describe the various qualities of logs in an estimation of the forest inventory.

- Royalties would be set by tender for all grades of logs with the Department of Natural Resources and Environment under no obligation to sell a particular volume to the processors.

- The volume based licences should be phased out with the resource security guarantee coming in the form of a forest area which is zoned for timber production only.

Recommendation 3

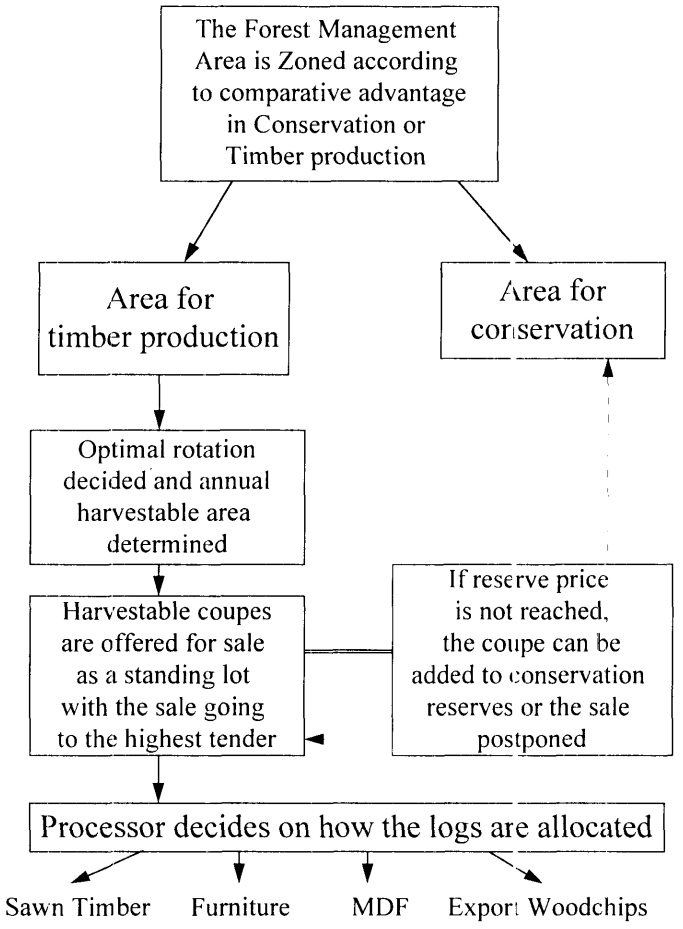
Modify the existing forest management information system to include price signals. This will link the management and utilisation functions of the Department of Natural Resources and Environment to provide a more flexible production and planning system.

The recommendations are such that either could be implemented without the other. In particular, the first recommendation regarding forest management could be implemented immediately while leaving the utilisation procedures in their current state. However, a large improvement in returns to society from forest resource use depends upon a simultaneous implementation of policy at both the management and utilisation stages of production, and the successful linking of these two systems via improved information.

POLICY IMPLEMENTATION

The framework suggested for operations in East Gippsland is contained in the concept map shown below. It is a simple, uncluttered and lightly regulated system when compared with the institutional arrangements currently in place.

Proposed timber production process



The debate about the comparative advantage of East Gippsland forests for timber or conservation will continue as a normal part of the political process. The Comprehensive Regional Assessment undertaken prior to the Regional Forest Agreement appears to have taken into account the views of all stakeholders on this matter and has resulted in the current division of forest between National Parks/Special Protection Zones and the General Timber Management Zone in East Gippsland.

Having decided which areas to devote to timber production and giving consideration to the necessary environmental regulations within those zones, the optimal rotation should be calculated. If desired, even timber flow criteria would be met by dividing the timber production area by the rotation length and only offering for sale that area which will be regenerated in the same year. If this is adhered to, no overcutting of native forest should occur.

Changing the sustainable yield concept of forest management will require a significant change in the traditional management methods currently used for Victorian forests. The change may also be politically sensitive because sustainable yield has been linked to the concept of ecologically sustainable development. This recommendation would need to be worked through at the very highest planning level. In addition to meeting National policy requirements, it should be seen as meeting the commitments of the State Government's Economic Strategy of which a 4% return is the main requirement.

Forest managers would offer the timber for sale in its standing form. The reserve price required by the seller should cover the marginal cost of production, the costs of silvicultural requirements and the costs of any environmental constraints. Silvicultural requirements include removing residual log and providing a suitable environment for regeneration. This approach means that all decisions about utilisation are made at the point of sale and all costs and benefits are built into the price. For example, if there is no market for residual log, the buyer would regard that as an additional cost since it must be removed and would discount the price offered for sawlogs accordingly. Similarly, if the logging coupe is a long distance from a main road or processing plant, the buyer will also discount the price offered by the amount of transport cost. If such lower prices do not meet the reserve requirement, the seller could postpone the sale until market conditions change. Alternatively, the coupe could be retired to a conservation reserve. This approach also gives conservation groups an opportunity to enter a tender for the coupe and pay for the opportunity cost of leaving the forest standing. Such an arrangement would also need to include regular or lump sum compensation to the land owners (Government) for the loss of rent on the land and earnings from a subsequent rotation.

The end use of the forest product would be at the discretion of processors who would direct the wood to its highest value production. If the public is concerned about encouraging domestic, high value added processing and discouraging export woodchipping, then the direct approach would be least costly. A direct subsidy to value adding domestic producers and an export tax on woodchips would result in clear incentives for processors at far less cost than the current layers of regulation.

IMPLICATIONS OF POLICY RECOMMENDATIONS

More efficient harvest scheduling

Shortening the rotation of East Gippsland native forests will make some regrowth forest available now for harvest. This will relieve the pressure on mature stands of forest to meet the sawlog commitments during the next 30 years. Assuming that a reasonable price can be obtained for regrowth sawlogs, the shorter rotation will deliver higher returns to the community for the use of the public asset. A more flexible utilisation system would also improve efficiency by allowing decisions about harvest volume and price to be made at the margin.

Incentives for more accurate inventory estimation

If the sale of timber is made while the trees are standing, there will be incentives on both selling and buying sides to accurately estimate the quality and volume of timber contained in the stand. The Department of Natural Resources and Environment could devote more resources to data collection and a much needed better picture of the forest resource could be gained. The risk of error on inventory calculation could be built into the reserve price of each coupe as it is offered for sale.

Industry Adjustment

Even though the constrained economic option would not necessarily change the total yield available to the timber industry, it would change the composition of the yield. Introducing

regrowth forest to the yield earlier than the sustainable yield management scenario would immediately force part of the industry into the processing of regrowth logs rather than mature timber. Sawmills and other operators require different equipment and plant to process younger timber than that required to process mature timber. It could be argued, however, that the industry will eventually have to adjust anyway. The sustainable yield projections indicate that a large proportion of the yield will be sourced from regrowth forests from the year 2040 to which the timber industry will not previously have been exposed. Expecting industry to adjust to regrowth forests from one year to the next would be almost impossible and asking industry to plan for regrowth forests before there are actually any for sale would be equally as difficult. The recommended scenario of harvesting regrowth earlier would provide industry with some regrowth timber and some mature timber so that it may adjust over a forty year period rather than one or two years. Deregulating the grading and pricing structure would also assist industry adjustment by allowing processors to buy any quality logs for any purpose.

Residual Log Reduction

The Department of Natural Resources and Environment are currently offering for sale 650 000 m^3 of residual log per year. This amount is based on the assumption that all forests will be logged regardless of their viability and is a necessary yield of residual log if the annual commitment of 250 000 m^3 of D+ sawlogs is to be met. Reducing the area to be logged and increasing the productivity of the forest sites to be harvested would have the impact of reducing the incidental yield of residual log. Using economic criteria for timber production would therefore also ease the pressure on the Department to sell so much residual log. For example, ceasing logging in all low productive Coastal Mixed Species and 27% of Foothill Mixed Species would reduce the total harvest of residual log by 5 970 572 m^3 which is approximately 150 000 m^3 per year over a 40 year period. This result adds to the concerns expressed about the ability for the forest to sustain residual log supply in the long term. Unless some sawlog quality logs are used for residual log purposes, there will be insufficient residual logs to meet the promised supply beyond the next 30 years. This is based on the mature/overmature resource which provides the majority of current residual log production. Again, using economic criteria now would even out the industry

adjustment impact as the large volumes of residual log would begin to phase out earlier. Deregulating the grading and pricing structure would, in any case, allow processors to buy higher quality logs.

Productivity of Land

The main concern about a negative impact of the proposed scenario is that of land productivity. Assuming that environmental values are adequately protected by the existing Code of Forest Practice and its logging prescriptions, the only real concern about shortening rotations is whether the land will cope with increased pressure of fast growing trees. Such concerns have been expressed in previous policy debates. "The Australian Conservation Foundation view, that native forests should be used only for conservation, seems to be based on two premises (Cameron and Penna 1988). The first is that efficient wood production will involve more specific selection of genotype and movement toward forest management more closely related to plantation forestry than is most current native forest regeneration. Wood production in native forests would therefore necessarily entail the survival of a much narrower genetic base than currently exists in native forests. The second argument is one for the diversity that currently exists in native forests."[304]

An economic response to the concern about land productivity would conclude that the volume function of the trees would indicate a slowing of growth rate in line with the lowering of soil productivity. It may result in shorter rotations for this initial period of sawlog shortage and a lengthening thereafter.

APPLICABILITY TO OTHER REGIONS

All three recommendations are broadly applicable to all other Forest Management Areas (FMAs) in the State of Victoria. In particular, the forest management role of the Department of Natural Resources and Environment encompasses all regions, so a change to the East Gippsland FMA forest management regime would be almost impossible without a change to all other regions. The utilisation role is a little more complex, with other FMAs

[304] ABARE op.cit. p. 31

having different arrangements for harvesting and sale of logs. However, the sawlog licencing and log grading systems are very similar and could most likely be adapted along with the East Gippsland FMA.

CONCLUSION

The policy recommendations draw together economic solutions to forest management and utilisation problems in a simple and pragmatic format. The recommendations meet the National and State policy requirements. A new approach to thinking about using public forest resources for timber production is required before these requirements will be fully met.

CHAPTER 9: CONCLUSION

SUMMARY

The East Gippsland region is host to forest resources which are of national significance to Australia. The controversy over the use of these forest resources continues, even after the signing of the 20 year Regional Forest Agreement. The forests of East Gippsland continue to be used for timber production under institutional arrangements which separate the forest management and utilisation functions. The forests are managed according to the concept of sustainable yield and utilised within the institutional constraints of the sawlog-driven concept.

The aim of this study was: "To determine whether the native forest resources of the East Gippsland region are being used in a socially optimal manner for timber production." Both forest management and utilisation aspects of East Gippsland's timber production operation have been examined in detail.

The economic theory of forestry has been used to show that sustainable yield forest management is inefficient and that a Pareto improvement is likely to be the result of implementing an economic solution to the forest rotation problem. Some complicating factors such as timber quality and pricing limit the conclusions somewhat. Despite this, the analysis questions the validity of the sustainable yield regime for the management of East Gippsland forests in the public interest. The simulation completed in this study gives an example of how such a Pareto improvement may translate into a politically acceptable outcome. Logging regrowth forests earlier would ease the pressure on the mature/overmature resource and possibly allow some further stands of old growth forests to be reserved for conservation purposes.

Joint production theory has been applied to the integrated harvesting utilisation system used in East Gippsland. The analysis concludes that integrated harvesting is likely to be socially optimal compared to the alternative of specialised harvesting. There are, however,

many features of the current utilisation system which have been found to harbour inefficiencies. In particular, the log grading, royalty equation and sawlog licencing systems result in inflexible utilisation of forest resources for timber production. Further inflexibility is imposed upon the utilisation system by the current forest management system. Current sustained yield management takes no account of the viability of a particular forest stand and therefore may schedule it for harvest even when it makes no economic sense to do so. Over time, these pressures have resulted in a shortage of forest sites carrying highly productive forest and a surplus of residual log which is incidentally harvested along with sawlogs in low productive forests. The East Gippsland Regional Forest Agreement releases this pressure by allowing unlimited export woodchips from the East Gippsland Forest Management Area. The Regional Forest Agreement does not change any other aspect of forest management or utilisation in East Gippsland.

It may be concluded that the institutional arrangements currently in place in East Gippsland do not result in socially optimal forest resource use for timber production. The recently signed Regional Forest Agreement has not specifically changed management or utilisation functions which make up the current institutional structure. Rather, it disguises inefficiency by easing pressures which were symptomatic of fundamental problems with the institutional arrangements.

The National Forest Policy Statement requires that forests be managed efficiently within the constraints of the Ecologically Sustainable Forest Management concept. This study draws out inefficient management practices associated with timber production and offers solutions in the form of pragmatic policy recommendations. The Regional Forest Agreement allows for changes to forest utilisation practices which improve efficiency. Further opportunity for policy implementation will arise at the five yearly review of the East Gippsland Regional Forest Agreement in 2002.

LIMITATIONS

The major limitation to this study was the lack of detailed knowledge about the forest resource. Forest inventory estimations appear to be of reasonable detail and reliability. However, information regarding stand growth and timber volumes in native forests is

either very poor or not available to the public. This limited the accuracy and the complexity of the simulation completed for the economic forest rotation.

There is limited literature on the economics of integrated harvesting, particularly in the utilisation of Australian forest types. Again, this limited the complexity of the analysis as time was spent applying a simple joint production framework to the overall problem.

The scope of this study and the expertise of the researcher limited the ability to fully assess the ecological impact of the policy recommendations.

AREAS FOR FURTHER RESEARCH

There is a need for more extensive and detailed forest resource inventory and growth information for Australian native forests. Such information could be used for research by scientists, foresters, economists and many others.

Broad studies on the economics of multiple use forestry in Australian native forests are required. More specific work on the valuation of non-timber forest resources could be linked in to provide a better decision making framework for Australian forests. Such studies would also make significant contribution to the debate over forest resource use for timber versus conservation.

There is scope for more research to be completed within the confines of native forest management for timber production. Increased exploration in the theory and application of the socially optimal economic forest rotation is required. An extension of the integrated harvesting rotation analysis to include multiple timber products and prices would be of great assistance to forest managers. Analysis of multiple timber products and prices also needs to be included in analysis of the utilisation phase of forest resource use. Finally, information systems need to be developed to link the forest management and utilisation phases together so that decision making about timber production can become more flexible.

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Take from Available Class of DNRE Statement of Hardwood Forest Resources											
Forest Type	Year of Origin	Util Cat.	Block Area	Productive Area(Net)	Standing D+Gross	Standing D+Net	Volume Roundwood	M3 of D+ Net/ha	Year of Harvest	Adjusted D+ yield	Adjusted Roundwood
Alpine Ash	mat/om	H	611	509	110495	88396	59102	173.666			
	mat/om	L	353	265	6276	5020.8	31266	18.94642			
	1925*	H	17	15	330	264	1800	17.6	1995	184.8	1260
	1945*	H	46	42	5460	4368	5460	104	1995	3057.6	3822
	1925	H	37	37		8140	8140	220	1995	5698	5698
	1935	H	413	395		86900	86900	220	1995	60830	60830
	1965	H	131	122		26840	26840	220	2015	18788	18788
	1975	H	1727	1668		366960	366960	220	2025	256872	256872
	1985	H	1299	1296		285120	285120	220	2035	199584	199584
	1995	H	264	263		57860	57860	220	2045	40502	40502
	U/S	H	19	19		0					
	U/S	L	8	8		0					
Mountain Ash	mat/om	H	86	34	8688	6950.4	4122	204.4235			
	UNE-S	H	16	11	1540	1232	847	112			
	1925*	H	57	37	5387	4309.6	5227	116.4757	1995	3016.72	3658.9
	1935	H	10	4		1056	1056	264	1995	739.2	739.2
	1965	H	40	36		9504	9504	264	2015	6652.8	6652.8
	1975	H	68	68		17952	17952	264	2025	12566.4	12566.4
	1985	H	37	25		6600	6600	264	2035	4620	4620
Shining Gum	mat/om	H	1024	789	172939	138351.2	98438	175.3501			
	mat/om	L	34	32	872	697.6	4174	21.8			
	mat/om	UNPROD	350	0		0					
	1965	H	102	94		24816	24816	264	2015	17371.2	17371.2
	1975	H	756	683		180312	180312	264	2025	126218.4	126218.4
	1985	H	644	541		142824	142824	264	2035	99976.8	99976.8
	1995	H	75	72		19008	19008	264	2045	13305.6	13305.6
Mountain Mixed Species	mat/om	H	30112	23416	2903563	2322850	2768302	99.19928			
	mat/om	L	31322	20756	744301	595440.8	2533218	28.68765			
	mat/om	UNPROD	19758	0		0		#DIV/0!			
	une-s	H	75	63	4423	3538.4	7985	56.16508			
	une-s	L	2147	1621	30203	24162.4	215687	14.90586			
	une	H	1383	1121		0	53850	0			
	une	L	215	155		0	5510	0			
	1945U	H	10	9	270	216	1161	24	1995	151.2	812.7
	1955U	H	488	430	4040	3232	54982	7.516279	2005	2262.4	38487.4
	1965U	H	28	28	180	144	3848	5.142857	2015	100.8	2693.6
	1975U	H	98	93	5580	4464	6498	48	2025	3124.8	4548.6
	1955U	L	18	11	250	200	1447	18.18182	2005	140	1012.9
	1965U	L	2483	2692	67225	53780	352679	19.97771	2015	37646	246875.3
	1975U	L	1495	1394	34166	27332.8	183450	19.60746	2025	19132.96	128415
	1925*	H	224	208	40340	32272	33224	155.1538	1995	22590.4	23256.8
	1935*	H	49	43	1075	860	2150	20	1995	602	1505
	1945*	H	445	411	44294	35435.2	46072	86.21703	1995	24804.64	32250.4
	1955*	H	264	244	9011	7208.8	27935	29.54426	2005	5046.16	19554.5
	1965*	H	200	191	3525	2820	13809	14.7644	2015	1974	9666.3
	1945*	L	72	38	1410	1128	4803	29.68421	1995	789.6	3362.1
	1955*	L	22	12	120	96	1632	8	2005	67.2	1142.4
	1915	H	25	23		4416	4416	192	1995	3091.2	3091.2
	1925	H	213	179		34368	34368	192	195	24057.6	24057.6
	1935	H	3353	2375		456000	456000	192	1995	319200	319200
	1955	H	1193	1064		204288	25620	192	2005	143001.6	17934

	1965	H	2163	2062		395904	22400	192	2015	277132.8	15680
	1975	H	5862	5484		1052928	15820	192	2025	737049.6	11074
	1985	H	13656	12564		2412288	2412288	192	2035	1688602	1688602
	1995	H	4059	3944		757248	757248	192	2045	530073.6	530073.6
	1935	L	2	1		192	192	192	1995	134.4	134.4
	1955	L	15	10		1920	1920	192	2005	1344	1344
	1975	L	13	13		2496	2496	192	2025	1747.2	1747.2
	1985	L	481	448		86016	86016	192	2035	60211.2	60211.2
	1995	L	159	144		27648	27648	192	2045	19353.6	19353.6
	U/S	H	235	229							
	U/S	L	1406	1262							
Foothill	mat/om	H	16364	12079	1434157	1147326	1067330	94.98515			
Mixed Species	mat/om	L	74304	58872	2125426	1700341	6376963	28.88199			
	mat/om	UNPROD	35344	0		0		#DIV/0!			
	une-s	H	79	61	890	712	6861	11.67213			
	une-s	L	6511	4964	75223	60178.4	408238	12.12297			
	une	H	3062	2782		0	139100	0			
	une	L	12092	10003		0	497500	0			
	une	UNPROD	1074	0		0		#DIV/0!			
	1935U	H	81	71		0	3550	0	1995	0	2485
	1955U	H	907	768	6400	5120	77711	6.666667	2005	3584	54397.7
	1965U	H	4353	3685	11940	9552	255373	2.59213	2015	6686.4	178761.1
	1975U	H	1275	1079	910	728	59750	0.674699	2025	509.6	41825
	1985U	H	834	722		0	36200	0	2035	0	25340
	1955U	L	10	9	90	72	1035	8	2005	50.4	724.5
	1965U	L	322	208	70	56	10855	0.269231	2015	39.2	7598.5
	1975U	L	16	14		0	700	0	2025	0	490
	1935*	H	171	148	3700	2960	7400	20	1995	2072	5180
	1955*	H	31	28	340	272	2875	9.714286	2005	190.4	2012.5
	1965*	H	101	78	847	677.6	7630	8.687179	2015	474.32	5341
	1925	H	1232	1045		150480	150480	144	1995	105336	105336
	1935	H	1593	1345		193680	193680	144	1995	135576	135576
	1945	H	6	5		720	720	144	1995	504	504
	1955	H	1982	1642		236448	5400	144	2005	165513.6	3780
	1965	H	5026	4421		636624	75200	144	2015	445636.8	52640
	1975	H	7851	7311		1052784	7550	144	2025	736948.8	5285
	1985	H	17043	15393		2216592	2216592	144	2035	1551614	1551614
	1995	H	2488	2317		333648	333648	144	2045	233553.6	233553.6
	1945	L	28	24		3456	3456	144	1995	2419.2	2419.2
	1955	L	165	120		17280	17280	144	2005	12096	12096
	1965	L	188	141		20304	20304	144	2015	14212.8	14212.8
	1975	L	194	175		25200	25200	144	2025	17640	17640
	1985	L	459	418		60192	60192	144	2035	42134.4	42134.4
	1995	L	373	340		48960	48960	144	2045	34272	34272
	1925	UNPROD	16	0		0					
	1955	UNPROD	67	0		0					
	1965	UNPROD	56	0		0					
	U/S	L	397	329		0					
	U/S	UNPROD	68	0		0					
Coastal	mat/om	H	613	93	10444	8355.2	10509	89.84086			
Mixed Species	mat/om	L	51845	46305	1194894	955915.2	4235351	20.64389			
	mat/om	UNPROD	22501			0		#DIV/0!			
	une-s	L	14253	11677	289293	23' 434.4	540425	19.81968			
	une	H	276	258		0	12700	0			
	une	L	11044	10370		0	502111	0			
	une	UNPROD	2399	0		0		#DIV/0!			
	1955U	H	280	209		15048	10450	72	2035	10533.6	7315
	1965U	H	262	247		17784	12350	72	2045	12448.8	8645
	1975U	H	544	491		35352	22550	72	2055	24746.4	15785
	1985U	H	326	293		21096	14650	72	2065	14767.2	10255
	1955U	L	340	323		23256	16150	72	2035	16279.2	11305
	1965U	L	8027	7600		547200	380348	72	2045	383040	266243.6
	1975U	L	3838	3641		262152	182092	72	2055	183506.4	127464.4
	1985U	L	3762	3571		257112	178549	72	2065	179978.4	124984.3

	1995U	L	679	645		46440	32250	72	2075	32508	22575
	1935	H	61	57		4104	4104	72	2015	2872.8	2872.8
	1945	H	356	335		24120	24120	72	2025	16884	16884
	1955	H	350	269		19368	19368	72	2035	13557.6	13557.6
	1965	H	269	249		17928	17928	72	2045	12549.6	12549.6
	1975	H	1835	1748		125856	125856	72	2055	88099.2	88099.2
	1985	H	3754	3564		256608	256608	72	2065	179625.6	179625.6
	1995	H	443	395		28440	28440	72	2075	19908	19908
	1955	L	21	19		1368	1368	72	2035	957.6	957.6
	1965	L	1941	1816		130752	130752	72	2045	91526.4	91526.4
	1975	L	471	445		32040	32040	72	2055	22428	22428
	1985	L	4474	4249		305928	305928	72	2065	214149.6	214149.6
	1995	L	80	76		5472	5472	72	2075	3830.4	3830.4
	U/S	H	156	156		0					
	U/S	L	61	61		0					
Alpine Mixed	mat/om	L	260	246	11288	9030.4	38081				
Species	mat/om	UNPROD	646	0		0					