

## THE EFFECT OF STOCK EXCLUSION ON SHORT TUSSOCK GRASSLAND, PORT HILLS, CANTERBURY: A SUMMARY

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### Introduction

The short tussock grassland of the Port Hills (dominated by *Poa cita* and some *Festuca novae-zelandiae*) is an essential part of the character of the area. However, this grassland is not a natural community as the Port Hills were largely forested in pre-human times, with grassland expanding after Polynesian and European fires and logging. Subsequent oversowing with pasture grasses, grazing, burning and the invasion of weeds have created the present character of the grassland. Because of the large number of introduced species present, active management (especially grazing) is likely to be necessary to maintain the native element. Although highly modified, this grassland still has more value from a conservation perspective, than the vegetation that would replace it if it were not actively managed. The aim of this study was to determine the effect of the removal of grazing on the native element of the Port Hills grassland.

### Methods

Seven pairs of grazed and ungrazed sites were selected for comparison (Appendix). Most of the pairs were situated across a fenceline but two pairs were on adjacent ridges. An unpaired site on Mt. Cavendish was included as an example of 'good' tussock grassland. Slope, aspect and soil depth, moisture content, organic matter content and pH were measured to ensure the paired sites were physically comparable. The vegetation was sampled using five alternate 0.5x0.5 m plots along a 4.5x0.5 m transect. The number of transects per site varied according to available sampling area. Percent ground cover was estimated for all species in each plot and the results averaged for each transect. In total 280 plots in 56 transects at 15 sites were sampled. Tussock size and density was measured in one 4.5x4.5 m plot at each site.

### Results

Comparison of the environmental factors measured showed that there was no significant difference between grazed and ungrazed transects at each site. This means that differences in the vegetation are not due to physical factors (e.g. soil moisture content).

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There is a significantly greater cover of introduced species in ungrazed transects but this is composed of significantly fewer species. This suggests that only a few introduced species dominate when grazing pressure is removed. The most important of these appears to be Cocksfoot (*Dactylis glomerata*) which is a tall, vigorous but highly palatable grass. Associated with this increase in the cover of introduced species is a decrease in the percent ground cover and number of native species in the grassland.

Tussock density also appears to decrease when grazing pressure is removed, most probably due to competition from the rank sward of Cocksfoot and other introduced grasses that develops without grazing. However, tussock height is less in the grazed sites, due most likely to the tussocks being browsed. This probably only occurs when there is little other available feed and indicates the need to control grazing intensity in order to maximize the benefit to the native element in the grassland.

### Conclusions

These results indicate that to maintain good tussock density and the maximum number of native species in highly modified short tussock grassland, such as occurs on the Port Hills, grazing at controlled intensities must be included as part of the management regime. The importance of grazing for the maintenance of native species will of course vary depending on the degree of modification of the grassland and the climate of the site. However, the use of grazing as a management tool applies equally to Port Hills reserves such as Mt. Cavendish as it does to private land.

Because grazing appears to be the most appropriate form of management in these grasslands, the covenanting of other good areas of short tussock grassland under the QEII National Trust or similar scheme would necessitate no change in usage. The maintenance of short tussock grassland is essential to the character of the Port Hills and its conservation appears to be one of the all too few areas where the farmer and the conservationist can agree.

Two of the unreserved areas sampled, Living Springs and Kennedys Bush grazed, were comparable to Mt. Cavendish in both tussock density and floristic composition. However both lack the areal extent and visual impact of Mt. Cavendish. The Living Springs site supports a relatively good cover of *Poa cita* at the top of the ridge in association with a number of other indigenous species. It is situated on the next major ridge past Cass Peak) heading towards Gebbies Pass. A track heads over a small rock outcrop from the

graveled parking area (1.6 km south of the Sign of the Bellbird) and cuts across the slope. Leaving the track, it is a relatively easy wander up to the ridge top. The south facing slope below the ridge top is of the greatest botanical interest but the site is also worth visiting for the wonderful views to be had from the top.

## APPENDIX

### Location of study sites

		Grazed Y/N	Location NZMS260M36	Alt. (m)	% moisture	pH	% organic matter	Tussock Density
1:	Living Springs	Y	799290	524	37.98	4.8	23.51	57
	Cass Peak	N	796301	546	40.55	5.1	25.86	33
2:	Kennedys Bush	Y	794315	440	38.00	4.7	33.88	55
	Kennedys Bush	N	795314	440	34.72	5.2	19.91	4
3:	Sugar loaf	Y	a:815336 b:821337	460	42.81	4.7	14.60	26
	Sugar loaf	N	a:816336 b:820336	460	42.66	5.2	11.50	18
4:	Reservoir	Y	827344	420	34.86	5.0	19.96	34
	Reservoir	N	827344	420	47.49	4.6	16.99	4
5:	Rapaki Spur	Y	836374	240	23.33	5.1	16.74	12
	Huntsbury Spur	N	824366	240	17.63	4.8	17.03	5
6:	Jollies Bush	Y	888356	360	38.42	5.3	8.04	22
	Jollies Bush	N	889356	360	55.40	4.9	15.89	2
7:	Evans Pass	Y	897349	160	16.27	5.4	7.91	21
	Evans Pass	N	897348	160	34.22	5.9	8.15	3
8:	Mt. Cavendish	Y	871353	439	37.38	5.3	-	54