APPENDIX.

CONTROL SITE PHOTOGRAPHS, VEGETATION COVER DATA AND SUMMARY ASSESSMENTS

Control no: 106

No. of competitors: 198

Pre-event

Post-event

One year

Not monitored

Summary assessment

Immediately following the event, there was some flattening of grass along the route past the control (mainly outside the quadrat) but no other impacts. Further monitoring was considered unnecessary.

Overall post-event impact: Minimal

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	90	0	8	2	0	High groundcover (forbs/ grass)
Post-event	83	3	12	2	0	As above, minor trampling
One year						Not monitored

Control no. 114

No. of competitors: 175

Pre-event

Post-event

One year

Summary assessment

There was some increase in bare ground following the event and an increase in litter cover, possibly due to litter movement from outside the quadrat. The increase in bare ground was more evident outside the quadrat. There was also obvious trampling of the grass.

After one year the groundcover had largely recovered with the areas of litter cover and bare ground reduced.

Overall post-event impact: Moderate
Overall one-year impact: Minor

Note: The photograph angle for one year appears to be rotated 90° anticlockwise from the pre-event and post-event photographs.

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	83	0	12	3	2	High groundcover, minor litter cover
Post-event	57	0	31	12	0	Some tussock trampled
One year	72	0	21	5	2	High groundcover, low litter cover, bare ground recovered

Control no: 116

No. of competitors: 216

Summary assessment

Litter appeared to have moved downslope, covering groundcover and exposing an area of bare ground just outside the quadrat (not indicated in numerical results but visible in photograph). A native raspberry plant had gone. After one year, there was regrowth of the native raspberry and a thin cover of litter over the bare ground outside the quadrat.

Overall post-event impact: Moderate
Overall one-year impact: Minor

Pre-event

Post-event

One year

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	24	7	65	4	0	Native raspberry present
Post-event	9	1	86	4	0	Native raspberry damaged, litter trampled
One year	11	<1	86	3	0	Native raspberry regenerating, bare ground recovered/ unchanged

Control no: 117

No. of competitors: 321

Summary assessment

Litter and small rocks had moved downhill within the quadrat. There was not much change within the quadrat, although the litter was flattened and the area of bare ground outside the quadrat increased. This bare ground was covered with leaf litter after one year. Lichen on the rock remained intact.

Overall post-event impact: Major
Overall one-year impact: Negligible

Pre-event

Post-event

One year

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	27	4	47	9	13	Small rocks 80-90% lichen
Post-event	28	1.5	58	3.5	9	No lichen damage, minor rock exposed
One year	56	0	37	1	6	Native raspberry growth, native ground lily growth

Control no: 120

No. of competitors: 320

Summary assessment

There was some heath damage near the control and particularly downslope of the control (outside the quadrat), exposing areas of rock. Lichen on the rock remained intact.

After one year, there was partial recovery of the heath, although much of the disturbed area was covered with litter.

Overall post-event impact: Major
Overall one-year impact: Minor

Pre-event

Post-event

One year

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	3	11	63	2	21	Rock 90-100% lichen
Post-event	1	1	67	2	29	Lichen intact, no shrub damage
One year	1	4	81	<1	14	Increased litter

Control no: 122

No. of competitors: 324

Pre-event

Post-event

One year

Summary assessment

There was an increase in bare ground immediately following the event, mainly as a result of reduced litter cover. This was evident both within the quadrat and outside it on the exit route.

After one year, the area of bare ground was reduced but it was still evident. There was increased regeneration of groundcover, mainly *Themeda*.

Overall post-event impact: Major
Overall one-year impact: Minor

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	55	0	32	5	8	Lichen on rock 85% Minor bare ground
Post-event	62	<1	16	16	6	No lichen damage. Some new bare ground
One year	83	<1	3	12	2	*Olearia erubescens* 30 cm, ? new growth

Control no: 123

No. of competitors: 429

Pre-event

Post-event

One year

Summary assessment

Immediately following the event a small increase in bare ground due to litter loss was evident within the quadrat. More extensive litter disturbance was evident outside the quadrat, downslope on the exit route from the control.

After one year, this bare ground was covered with litter or groundcover, and there was further development of groundcover and shrubs in some of the litter areas.

Overall post-event impact: Moderate
Overall one-year impact: Minor

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	11	6	63	6	14	*Daviesia* shrub to 1.4 m
Post-event	10	4	55	14	17	Groundcover pressed down Shrub growth undamaged
One year	32	8	40	9	11	Shrub growth maintained Increased groundcover

Control no: 128

No. of competitors: 271

Summary assessment

This site was completely covered with litter prior to the event. That litter was trampled but remained generally intact, except for a small amount of bare ground. Minor lichen damage occurred on the rock. A deep litter cover had developed one year after the event.

There was obvious tracking down the hill into the control immediately after the event but this was not evident after one year.

Overall post-event impact: Minor
Overall one-year impact: Negligible

Pre-event

Post-event

One year

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	0	1	78	0	21	Rock with 85% lichen. High litter cover
Post-event	0	0	73	3	24	Slight litter cover. Lichen intact
One year	0	0	80	0	20	As for pre-event assessment

Control no: 129

No. of competitors: 295

Pre-event

Post-event

One year

Summary assessment

There was obvious grass flattening on the routes in and out of the control following the event which resulted in a reduction in the area of groundcover and an increase in litter. Some small areas of bare ground developed just outside the circular quadrat. There was possibly some grass damage. There was minor damage to lichen on the rocks within the site, but most lichen remained intact.

After one year the grass had recovered, largely covering the bare spots, and the condition of the site was very similar to that prior to the event.

Overall post-event impact: Moderate
Overall one-year impact: Negligible

Note: This control was used also for the land function analysis monitoring.

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	51	0	6	24	19	Loose soil. Rock all lichen-covered
Post-event	30	0	21	26	23	Moderate trampling. Minor lichen damage
One year	54	0	6	20	20	Good *Themeda* growth. Minor lichen damage

Control no: 132

No. of competitors: 167

Pre-event

Post-event

One year

Summary assessment

The groundcover (grass) was flattened on the route out of the control and there was some movement of litter and a minor increase in bare ground. A large fallen branch had been moved into the quadrat.

After one year, there was dense regeneration of grass and forbs (especially sorrel) in areas of litter and bare ground.

Overall post-event impact: Moderate
Overall one-year impact: Negligible

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	56	0	41	3	0	Good groundcover
Post-event	36	0	57	4	3	Branch moved, some trampling
One year	66	0	32	1	1	Forb cover (sheep sorrel)

Control no: 133

No. of competitors: 356

Summary assessment

This was one of the more disturbed control sites immediately following the event, with a significant increase in bare ground within areas of litter or groundcover, both within and outside the quadrat, some flattening of grass, and movement of sticks.

After one year, however, there was a light cover of leaf litter over most of the bare ground, and further movement of the sticks. Some disturbance of the site unrelated to the orienteering event occurred during that period as the marker peg had been pulled out and a stick with flagging tape had been broken.

Overall post-event impact: Major
Overall one-year impact: Minor

Pre-event

Post-event

One year

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	8	0	44	40	8	Coarse loose soil. Bark/ leaf litter
Post-event	2.5	0	31	60	6.5	
One year	3	0	77	15	5	

Control no: 134

No. of competitors: 315

Pre-event

Post-event

One year

Summary assessment

Immediately after the event, the area of bare ground was increased due to loss of litter. Elsewhere the litter or grass was flattened, with some grass exposed possibly due to litter movement. Some flattening occurred also downhill of the control but this was relatively minor.

After one year, fresh litter had accumulated to eliminate the bare ground, and some grass and sorrel had regenerated.

Overall post-event impact: Moderate
Overall one-year impact: Negligible

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	14	0	81	5	0	Coarse heavy litter, heavy wood
Post-event	19	0	69	12	0	Some slight trampling. Increased new bare ground
One year	39	0	59	2	0	Large wood still in place

Control no: 138

No. of competitors: 123

Pre-event

Post-event

One year

Not monitored

Summary assessment

The litter was flattened immediately after the event, but otherwise there was not much impact. Further monitoring was considered unnecessary.

Overall post-event impact: Minor

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	11	1	69	2	17	Leafy litter, no rock or lichen
Post-event	7	0	71	5	17	No disturbance
One year						Not monitored

Control no: 144

No. of competitors: 253

Summary assessment

Very minor damage occurred to the *Leucopogon* low shrub and litter and groundcover outside the quadrat was flattened, but there was a generally low level of impact immediately after the event.

The flattened area accumulated litter after one year and there was regeneration of groundcover. Otherwise not much further change was evident.

Overall post-event impact: Minor
Overall one-year impact: Negligible

Pre-event

Post-event

One year

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	29	33	29	9	0	*Leucopogon hookeri* (low shrub) present
Post-event	14	23	57	5	1	No trampling
One year	35	19	45	1	0	As above

Control no: 145

No. of competitors: 390

Pre-event

Post-event

One year

Summary assessment

The grass around the control was flattened but otherwise not damaged during the event, resulting in a rock being covered with thatch (measured as litter). Similar impacts were noted on the routes into and out of the control.

The situation was reversed after one year, with the grass regenerating and the rock becoming exposed. A stem of blackberry had grown over the control site from outside.

Overall post-event impact: Moderate
Overall one-year impact: Negligible

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	39	0	2.5	2.5	56	Rock with 70-90% lichen
Post-event	28	0	31	6	35	Grass flattened, no lichen damage
One year	37	0	1.5	0.5	61	Blackberry present

Control no: 146

No. of competitors: 105

Summary assessment

Immediately following the event, there was some increase in bare ground, within and outside the quadrat due to litter disturbance. Elsewhere the litter was flattened, but remained in place.

After one year, the litter cover was restored with leaves and bark. A new wattle seedling had grown within the quadrat.

Overall post-event impact: Minor
Overall one-year impact: Negligible

Pre-event

Post-event

One year

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	<1	1	95	4	0	*Daviesia* shrub to 0.3 m
Post-event	0	<1	76	20	4	*Daviesia* shrub undisturbed
One year	1	2	93	1	3	New wattle seedling

Control no: 147

No. of competitors: 66

Pre-event

Post-event

One year

Not monitored

Summary assessment

Apart from some flattening of grass, no post-event impact was evident. Further monitoring was considered unnecessary.

Overall post-event impact: Minimal

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	81	2	9	4	4	*Derwentia* 'shrub' < 0.5 m
Post-event	81	2	12	3	2	*Derwentia* not trampled
One year						Not monitored

Control no: 148

No. of competitors: 230

Summary assessment

There was an increase in bare ground, but this was virtually all in an area that was previously litter. Some of the litter was scattered over an area that was previously rock. Lichen on the rocks remained largely intact. Some of the bare ground and litter areas were covered with grass after one year, with litter redistributed over most of the rocks.

Litter was flattened near the drinks located downhill of the control, but maintained its cover. That area remained covered with litter after one year.

Overall post-event impact: Moderate
Overall one-year impact: Negligible

Pre-event

Post-event

One year

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	2	2	79	3	14	80% lichen on rock
Post-event	7	2	72	15	4	Some lichen flaked off, but mainly intact
One year	17	7	74	1	1	Good litter cover

Control no: 155

No. of competitors: 184

Pre-event

Post-event

One year

Summary assessment

The main impact immediately following the event was partial flattening of the heath. This impact was less severe than at some other controls, and the heath appeared to have recovered fully after one year.

Overall post-event impact: Moderate
Overall one-year impact: Negligible

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	26	64	9	1	0	*Mirbelia* low shrub dominant
Post-event	32	56	10	<1	1	Heath flattening (partial)
One year	28	65	3	4	0	

Control no: 157

No. of competitors: 112

Pre-event

Post-event

One year

Summary assessment

Immediately after the event there was much flattening of the low heath (*Mirbelia*), as well as disturbance of litter to create bare ground, mainly outside the quadrat.

The flattened heath had fully recovered after one year, and the areas of bare ground had acquired a light cover of litter.

Overall post-event impact: Moderate
Overall one-year impact: Negligible

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	39	17	39	5	0	Low *Mirbelia* shrub, grassy
Post-event	34	11	49	6	0	Some *Mirbelia* shrub trampled
One year	79	3	17	1	0	

Control no: 160

No. of competitors: 226

Pre-event

Post-event

One year

Summary assessment

Within and immediately around the monitoring site itself, there was minor impact immediately after the event, with just some slight disturbance to litter. This was a drinks control and trampling of grass below the drinks location was evident, although there was not much damage. There was no sign of disturbance after one year.

The route out of the control to the south showed obvious litter disturbance and possibly some minor grass damage. This had fully recovered with some grass growth after one year.

Overall post-event impact: Minor
Overall one-year impact: Negligible

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	30	6	60	3	1	Shrubs – briar rose to 30 cm
Post-event	37	<1	60	1	2	As above, no trampling
One year	50	0	50	0	<1	Minor fog grass invasion

Control no: 161

No. of competitors: 254

Pre-event

Post-event

One year

Not monitored

Summary assessment

Immediately following the event, the grass was flattened around the control, increasing the exposure of the rocks, but otherwise there was no impact. Some litter disturbance was evident 3 to 4 metres from the control. Further monitoring was considered unnecessary.

Overall post-event impact: Minor

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	34	0	31	16	19	90% lichen on rock. Low *Cassinia* shrub
Post-event	27	3	32	4	34	No lichen damage. *Cassinia* intact
One year						Not monitored

Control no: 166

No. of competitors: 328

Summary assessment

During the event, litter was pushed from upslope of the control (outside the quadrat) to cover some bare ground and rock within the quadrat, and expose bare ground outside it. There was no disturbance downhill of the control, suggesting that runners generally arrived and departed from above.

After one year, all of the exposed bare ground had been covered with leaf litter.

Overall post-event impact: Moderate
Overall one-year impact: Negligible

Pre-event

Post-event

One year

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	<1	0	82	14	4	Small rocks, 70-90% lichen cover. Loose soil
Post-event	<1	0	92	7	1	Lichen intact, loose litter moved around
One year	0.5	0	98	1.5	0	

Control no: 168

No. of competitors: 135

Pre-event

Post-event

One year

Not monitored

Summary assessment

Almost no post-event impact was evident. Further monitoring was considered unnecessary

Overall post-event impact: Minimal

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	82	0	13	5	<1	Short pasture growth
Post-event	82	2	9	6	1	Minor new bare ground
One year						Not monitored

Control no: 170

No. of competitors: 100

Pre-event

Post-event

One year

Not monitored

Summary assessment

While some flattening of litter and grass was evident after the event, there was no real impact. Further monitoring was considered unnecessary.

Overall post-event impact: Minimal

Vegetation cover

Survey	Percentage cover					Comments
	Groundcover	Shrubs	Litter	Bare ground	Rock	
Pre-event	24	0	72	4	<1	Low groundcover. High litter cover
Post-event	21	0	79	0	0	Minor or no trampling
One year						Not monitored