

# **Plant recruitment across alpine summits in south-eastern Australia**

Submitted by

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## Table of Contents

Index of Tables .....	vii
Index of Figures.....	ix
Index of Boxes .....	xii
Index of Appendices.....	xii
Summary .....	xiii
Statement of Authorship .....	xiv
Acknowledgements .....	xv
<b>Chapter 1 - Introduction: alpine plant recruitment and project goals ....</b>	<b>1</b>
<b>Summary .....</b>	<b>1</b>
<b>Alpine plant recruitment.....</b>	<b>2</b>
<i>Background</i> .....	2
<i>Alpine landscapes</i> .....	2
<i>Recruitment</i> .....	3
Flowering and Pollination.....	4
Seed rain and seed bank dynamics.....	5
Seed viability, dormancy and germination .....	5
Seedling emergence and survival.....	6
<b>Australian alpine regions .....</b>	<b>7</b>
<i>Landscapes</i> .....	7
<i>Soils</i> .....	8
<i>Climate</i> .....	9
<i>Vegetation</i> .....	9
<b>Recruitment in Australian plants .....</b>	<b>10</b>
<i>Recruitment in response to disturbance</i> .....	10
<i>Australian plant recruitment</i> .....	10
<i>Australian alpine plant recruitment</i> .....	11
<b>Research focus and goals.....</b>	<b>12</b>
<i>Rationale</i> .....	12
<i>Aims</i> .....	12
<i>Research questions, thesis chapters and the life-cycle model</i> .....	13
<i>Analytical approach</i> .....	15
<i>Scale of the study</i> .....	16
<i>Thesis style</i> .....	16
<b>Chapter 2 - The relationship of alpine vegetation with climatic and environmental factors across an altitudinal gradient in Victoria, south-east Australia .....</b>	<b>17</b>
<b>Summary.....</b>	<b>17</b>
<b>Introduction.....</b>	<b>18</b>
<b>Methods.....</b>	<b>19</b>
<i>Study sites</i> .....	19
<i>Climatic and environmental variables</i> .....	25

Climatic variables .....	25
Soil properties .....	26
<i>Vegetation sampling</i> .....	27
<i>Data analysis</i> .....	27
<b>Results .....</b>	<b>29</b>
<i>Climatic and environmental variation across the altitudinal gradient</i> .....	29
Temperatures and growing degree days.....	29
Climatic variables estimated with BIOCLIM .....	30
Frost heave .....	30
Soil properties .....	33
Modelling of climate and soil properties .....	34
<i>Vegetation patterns across the altitudinal gradient</i> .....	34
<b>Discussion.....</b>	<b>40</b>
<i>Vegetation patterns with climatic and environmental parameters</i> .....	40
<i>Predicting future vegetation patterns in Victoria</i> .....	42
<b>Conclusions .....</b>	<b>43</b>
<b>Appendices.....</b>	<b>44</b>
<b>Chapter 3 - The soil seed bank at alpine summits in Victoria in relation to the standing vegetation .....</b>	<b>47</b>
<b>Summary.....</b>	<b>47</b>
<b>Introduction.....</b>	<b>48</b>
<b>Methods.....</b>	<b>50</b>
<i>Study sites</i> .....	50
<i>Sampling and laboratory methods</i> .....	50
<i>Data analysis</i> .....	51
<b>Results .....</b>	<b>53</b>
<i>Germination from seed bank samples</i> .....	53
<b>Discussion.....</b>	<b>60</b>
<i>Limitations</i> .....	60
<i>Seed bank density and composition</i> .....	60
<i>Seed bank dynamics, persistence and transience</i> .....	61
<i>Seed bank similarity with the standing vegetation</i> .....	62
<i>Seed banks across altitudinal gradients</i> .....	63
<i>Regeneration strategies and seed banks</i> .....	64
<b>Conclusions.....</b>	<b>65</b>
<b>Appendices.....</b>	<b>66</b>
<b>Chapter 4 - Laboratory germination characteristics and seed mass of alpine species from the Victorian Alps .....</b>	<b>67</b>
<b>Summary.....</b>	<b>67</b>
<b>Introduction.....</b>	<b>68</b>
<b>Methods.....</b>	<b>69</b>
<i>Study sites</i> .....	69
<i>Study species and seed collection</i> .....	70
<i>Germination trials</i> .....	70
<i>Data analysis</i> .....	71

<b>Results</b> .....	<b>72</b>
<i>Seed mass</i> .....	72
<i>Germination characteristics</i> .....	73
Comparisons of seed properties .....	75
<b>Discussion</b> .....	<b>81</b>
<i>General interpretation of results</i> .....	81
<i>Seed mass and reproductive success</i> .....	82
<i>Germination characteristics</i> .....	83
<b>Conclusions</b> .....	<b>85</b>
<b>Appendices</b> .....	<b>86</b>
<b>Chapter 5 - Case study: seed germination of <i>Aciphylla glacialis</i></b> <b>(Mountain Celery)</b> .....	<b>87</b>
<b>Summary</b> .....	<b>87</b>
<b>Introduction</b> .....	<b>88</b>
<i>Seed germination, dormancy and environment</i> .....	88
<i>Characteristics of the <i>Aciphylla</i> genus</i> .....	89
<i>Chapter focus</i> .....	90
<b>Methods</b> .....	<b>90</b>
<i>Seed collection and study sites</i> .....	90
<i>Germination trial</i> .....	91
<i>Data analysis</i> .....	91
<b>Results</b> .....	<b>92</b>
<i>Germination characteristics</i> .....	92
<b>Discussion</b> .....	<b>97</b>
<i>General interpretation of results</i> .....	97
<i>Dormancy mechanisms</i> .....	98
<i>Altitudinal gradients</i> .....	99
<b>Conclusions</b> .....	<b>100</b>
<b>Chapter 6 - Natural seedling recruitment in the Victorian alpine zone</b> .....	<b>101</b>
<b>Summary</b> .....	<b>101</b>
<b>Introduction</b> .....	<b>102</b>
<b>Methods</b> .....	<b>103</b>
<i>Study area and study sites</i> .....	103
<i>Sampling design</i> .....	104
<i>Environmental variables</i> .....	105
<i>Statistical analysis</i> .....	106
<b>Results</b> .....	<b>109</b>
<i>Environmental variables</i> .....	109
Climate .....	109
Soils.....	110
<i>Seedling emergence</i> .....	111
<i>Seedling survival</i> .....	114
<i>Seedling life forms</i> .....	116
<i>Similarities within and between sites</i> .....	117

<b>Discussion.....</b>	<b>121</b>
<i>General interpretation of results .....</i>	<i>121</i>
<i>Seedling emergence.....</i>	<i>122</i>
Environmental determinants .....	122
Altitudinal gradients.....	122
Similarity with standing vegetation .....	123
<i>Seedling establishment and survival.....</i>	<i>124</i>
Establishment and mortality rates .....	124
Survival strategies across different altitudes.....	125
<i>The role of seedlings in community level dynamics and responses to disturbance. ....</i>	<i>125</i>
<b>Conclusions.....</b>	<b>126</b>
<b>Chapter 7 - Are facilitative interactions between alpine plants during the early life-history stages more important at high altitudes? .....</b>	<b>127</b>
<b>Summary.....</b>	<b>127</b>
<b>Introduction.....</b>	<b>128</b>
<b>Methods.....</b>	<b>130</b>
<i>Study sites and species .....</i>	<i>130</i>
<i>Climate and environmental variables.....</i>	<i>131</i>
<i>Experimental design.....</i>	<i>132</i>
Seed germination .....	132
Seedling growth and survival.....	133
<i>Data analysis .....</i>	<i>133</i>
Seed germination .....	133
Seedling transplant growth .....	134
Seedling transplant survival .....	135
<b>Results .....</b>	<b>136</b>
<i>Environmental variables.....</i>	<i>136</i>
Air and soil temperatures .....	136
Frost heave .....	137
Soil moisture .....	137
<i>Seed and Seedling Experiments .....</i>	<i>139</i>
Seed germination .....	139
Seedling transplant growth .....	140
Seedling transplant survival .....	142
<b>Discussion.....</b>	<b>145</b>
<i>General interpretation of results .....</i>	<i>145</i>
<i>Seed germination .....</i>	<i>146</i>
<i>Seedling growth and survival.....</i>	<i>147</i>
<i>Further evidence for facilitative interactions at early life-history stages .....</i>	<i>148</i>
<i>The role of plant interactions during climate change in Australia; using the     altitudinal gradient in a space-for-time analysis.....</i>	<i>149</i>
<b>Conclusions.....</b>	<b>150</b>

<b>Chapter 8 - Synthesis and implications .....</b>	<b>151</b>
<b>Introduction.....</b>	<b>151</b>
<i>Chapter outline .....</i>	<i>152</i>
<b>Key findings.....</b>	<b>153</b>
<i>Key findings of the second-order study questions.....</i>	<i>153</i>
<i>Key findings and the life-cycle model .....</i>	<i>156</i>
<i>Relationships between key life-history stages.....</i>	<i>158</i>
<i>Conclusions.....</i>	<i>161</i>
<b>Australian alpine vegetation present and future.....</b>	<b>162</b>
<i>Outline.....</i>	<i>162</i>
<i>The role of disturbance .....</i>	<i>162</i>
Disturbances in alpine regions .....	163
Effects of disturbance.....	164
Vegetation responses to disturbance .....	165
<i>Potential responses of Australian alpine vegetation to future disturbance.....</i>	<i>166</i>
A conceptual model .....	167
<i>Summary and conclusions.....</i>	<i>169</i>
<b>Future research directions .....</b>	<b>170</b>
<b>Appendices.....</b>	<b>171</b>
<b>References .....</b>	<b>173</b>

## Index of Tables

Table 2.1. The eight study site locations, altitude (m a.s.l.), size (m <sup>2</sup> ) and cattle grazing history.....	22
Table 2.2. The geology and parent materials of the eight study sites (Land Conservation Council 1982)...	22
Table 2.3. Seven climatic variables from the BIOCLIM output for each mountain top site. Maximum Temperature of Warmest Period, Minimum Temperature of Coldest Period (measured as the highest/lowest temperatures respectively of any weekly maximum temperature); Precipitation of the Wettest and Driest Periods (measured as the precipitation of the wettest/driest week); Precipitation of the Wettest Quarter and Precipitation of the Driest Quarter (measured as wettest/driest consecutive 13 weeks determined to the nearest week); and the annual mean precipitation (Houlder <i>et al.</i> 2000). The fit (R <sup>2</sup> ) of the linear regression analysis of each variable with site altitude is shown in the column Altitude R <sup>2</sup> . Significant linear relationships with altitude ( $P < 0.05$ ) are marked with an asterisk.....	32
Table 2.4. Mean abundance (%) of the top five species at the eight study sites in Victoria, and the mean similarity between quadrats within each site. Sites: SP, Mt Speculation (1668 m); KB, King Billy (1969 m); MA, Mt Magdala (1725 m); BL, The Bluff (1725 m); ST, Mt Stirling (1748 m); BU, Mt Buller (1762 m); HO, Mt Hotham (1860 m); BO, Mt Bogong (1970 m). Mean Similarity, mean contribution of that species to the group; Similarity / SD, mean similarity divided by the standard deviation of each species' contribution to the mean similarity among groups; Cov, percent cover data; P/A, presence/absence data; *denotes exotic species.....	39
Table 2.5. Mean similarity (percent) of quadrats within each site based on percent cover (Cov) and presence/absence (P/A) data, with total number of species recorded at each site. Sites: SP, Mt Speculation; KB, King Billy; MA, Mt Magdala; BL, The Bluff; ST, Mt Stirling; BU, Mt Buller; HO, Mt Hotham; BO, Mt Bogong.....	40
Table 3.1. Seed density per m <sup>2</sup> (mean $\pm$ 1 standard error), family, life-form and regeneration class from soil seed bank samples collected during the spring of the 2004/2005 growing season, from eight alpine sites in Victoria. * denotes exotic species. Species names follow Ross and Walsh (2003). MS, mostly seed; MV, mostly vegetative; OS, obligate seeder; VR, vegetative reproduction maintains populations. ....	56
Table 3.2. Seed density per m <sup>2</sup> (mean $\pm$ 1 standard error), family, life-form and regeneration class from soil seed bank samples collected during the autumn of the 2004/2005 growing season, from eight alpine sites in Victoria. * denotes exotic species. Species names follow Ross and Walsh (2003). MS, mostly seed; MV, mostly vegetative; OS, obligate seeder; VR, vegetative reproduction maintains populations. ....	57
Table 4.1. Germination speed (T <sub>50</sub> ) and germination lag-time (lag) for seeds in cool (12/10°C) and warm (20/10°C) treatments of ten species from various altitudes across the Victorian alpine zone. Dashes (-) indicate seed unavailability. No <i>Aciphylla glacialis</i> seeds germinated in either treatment, therefore germination lag and speed data is not available. ....	74
Table 4.2. Pairwise comparisons of the probability of seed germination between sites, within each species, based on the probability of germination curves, explained by Mantel's $\chi^2$ in the cool treatment. Significant differences are indicated by an asterisk(s). *** denotes $P \leq 0.001$ , ** denotes $P \leq 0.01$ , * denotes $P < 0.05$ . Overall greater probability of germination between each pair is indicated in brackets with greater than (>) symbol between site names. Site name abbreviations and site altitudes are shown in Appendix 4.3. For full species names see Appendix 4.2.....	78
Table 4.3. Pairwise comparisons of the probability of seed germination between sites, within each species, based on the probability of germination curves, explained by Mantel's $\chi^2$ in the warm treatment. Significant differences are indicated by an asterisk(s). *** denotes $P \leq 0.001$ , ** denotes $P \leq 0.01$ , * denotes $P < 0.05$ . Overall greater probability of germination between each pair is indicated in brackets with greater than (>) symbol between site names. Site name abbreviations and site altitudes are shown in Appendix 4.3. For full species names see Appendix 4.2.....	79
Table 4.4. Pairwise comparisons of the probability of seed germination between the cool and warm treatments, within each species and site, based on the probability of germination curves, explained by Mantel's $\chi^2$ . Significant differences are indicated by an asterisk(s). *** denotes $P \leq 0.001$ , ** denotes $P \leq 0.01$ , * denotes $P < 0.05$ . Overall greater probability of germination between each pair is indicated in brackets with greater than (>) symbol between treatments; C, cool; W, warm. Site name abbreviations and site altitudes are shown in Appendix 4.3. For species names abbreviations, see Appendix 4.2.....	80
Table 5.1. Germination speed (T <sub>50</sub> ) of <i>Aciphylla glacialis</i> seeds from the seven sites, at various altitudes (m), collected in 2004 and 2005 .....	94

Table 5.2. Pairwise comparisons of the probability of *Aciphylla glacialis* seed germination between sites, based on the probability of germination curves, explained by Mantel's  $\chi^2$ , from seed collected in 2004 and 2005. Significant differences are indicated by an asterisk(s). \*\*\* denotes  $P \leq 0.001$ , \*\* denotes  $P \leq 0.01$ , \* denotes  $P < 0.05$ . Overall greater probability of germination between each pair is indicated in brackets with greater than (>) symbol between site names. Site name abbreviations are as follows: BO, Mt Bogong (1970 m); HO, Mt Hotham (1860 m); BU, Mt Buller (1762 m); HW, Mt Howitt (1738 m); MA, Mt Magdala (1725 m); KB, King Billy (1696 m)..... 96

Table 6.1. Two-way ANOVA comparing new seedling emergence at the seven alpine sites between sample intervals (early, mid late), growing seasons (2004/05 and 2005/06) and their interaction. All data were log-transformed +1 prior to analysis to minimise the heterogeneity of variance. Significant  $P$ -values  $\leq 0.05$ ,  $\leq 0.01$  and  $\leq 0.001$  are indicated by asterisks \*, \*\* and \*\*\* respectively. .... 114

Table 6.2. The percentage of seedlings that became established and seedling mortality across all quadrats within each site..... 115

Table 6.3. Comparison of seedling life-forms (%) that emerged in bare ground patches at each site..... 116

Table 6.4. Mean ( $\pm 1$  standard error) qualitative and quantitative similarities (using Jaccard's similarity index and the similarity ratio) for the seven study sites. Labels (a,b or ab) signify significant differences between sites, based on Bonferroni post-hoc analysis. No significant differences in quantitative similarity (SR) were found between sites. .... 117

Table 6.5. The mean similarity (%) of quadrats within each site; the number of seedling species recorded at each site; the top five typifying seedling species of each site; the mean abundance (%) within each quadrat of each of these species; the mean similarity of individual species contributions within each site; standard deviation of each species contribution to the mean similarity; contribution of each species (%) to the mean abundance at each site. Asterisks denote exotic species..... 120

## Index of Figures

Figure 1.1. The life-cycle model. Life-history stages are represented by shaded boxes; recruitment processes link life-history stages with arrows. Properties of life-history stages are represented by question marks following the text. Mortality of individuals may occur during any stage or process of the life-cycle. Adult vegetation may also persist for many years without contributing seeds or seedlings to the life-cycle model. The time-frame over which the events in the model occur is not specified. The life-history stages, their properties and the recruitment processes which are addressed in this thesis are indicated by <b>bold</b> text. ....	15
Figure 2.1. The study sites, within the Alpine National Park in north-east Victoria, south-eastern Australia. ....	21
Figure 2.2. The study sites at Mt Bogong, Mt Hotham, Mt Stirling and Mt Buller, Victoria, Australia. ....	23
Figure 2.3. The study sites at The Bluff, Mt Magdala, King Billy and Mt Speculation, Victoria, Australia. ....	24
Figure 2.4. Vertical displacement pins on naturally occurring bare ground (left) and intact vegetation (right).....	26
Figure 2.5. Accumulated monthly growing degree days (GDDs) (°C) for six sites during 2004, 2005, and 2006. Negative values of accumulated degrees are displayed as zero. Gaps in the data were due to logger failure or theft. ....	31
Figure 2.6. Mean ( $\pm 1$ standard error) vertical displacement (mm) of rubber washers on vertical displacement pins in bare ground and intact vegetation at three sites, Mt Bogong (1970 m), Mt Hotham (1860 m) and King Billy (1696 m) during the 2005/2006 growing season. $N = 10$ for each treatment at each site. Different labels (a or b) above columns indicate significant differences ( $P < 0.05$ ). Higher mean vertical displacement indicates stronger and higher frost-heave of the soil. ....	33
Figure 2.7. Mean ( $\pm 1$ standard error) percent soil moisture at wilting point (1500 kPa) at sites across the altitudinal gradient.....	33
Figure 2.8. Percent abundance of shrubs, graminoids and forbs across the altitudinal gradient of sites from line intercept data. ....	35
Figure 2.9. Position of samples from each site within the three dimensional NMDS configuration based on presence/absence data and vector of maximum correlation ( $R^2 = 0.35$ ) representing site altitude.....	36
Figure 2.10. Dendrogram of the twenty quadrats from each site based on presence/absence data, a Jaccard's distance measure and a flexible-clustering linkage method (beta at -0.95). The change in information context (% information remaining and Euclidean distance) is shown on the vertical axis as a measure of group dissimilarity. Percent linkage = 0.51. ....	38
Figure 3.1. Mean ( $\pm 1$ standard error) density of germinants from the soil seed bank (per $m^2$ ) at each site across the altitudinal gradient from samples collected before flowering (spring) and after flowering (autumn). ....	54
Figure 3.2. Mean ( $\pm 1$ standard error) similarity of seed bank samples to standing vegetation across sites of varying altitude (m) during (a) the spring collection and (b) the autumn collection. ....	58
Figure 3.3. The number of species at each site from across the altitudinal gradient according to their regeneration class, from the seed bank and the standing vegetation. Sites: BOG, Mt Bogong (1970 m); HOTH, Mt Hotham (1860 m); BULL, Mt Buller (1762 m); STIR, Mt Stirling (1748 m); BLUFF, The Bluff (1725 m); MAG, Mt Magdala (1725 m); KB, King Billy (1696 m); SPEC, Mt Speculation (1668 m). Key: MS, mostly seed regeneration; MV, mostly vegetative regeneration; OS, obligate seeder with no apparent vegetative regeneration potential; VR, vegetative regeneration can maintain populations.....	59
Figure 4.1. Mean ( $\pm 1$ standard error) seed mass and altitude for each species. Different labels (a, b or ab) above data points signify the Bonferroni significant differences within each species. Data points without labels showed no significant differences between sites. * Significant differences in seed mass between sites of <i>B. rigidula</i> in Appendix 4.1. For full species names see Appendix 4.2. ....	72
Figure 4.2. Mean ( $\pm 1$ standard error) percent germination curves for the cool (12/10 °C) and warm (20/10 °C) treatments against time (days) for seeds from species from the eleven sites. No seeds from <i>Aciphylla glacialis</i> germinated in either treatment during the experiment and therefore no germination curves are available for this species. ....	76

Figure 4.3. Mean ( $\pm$ standard error) final percent germination for (a) the cool (12/10 °C) and (b) the warm (20/10 °C) treatments. Different labels (a, b, or ab) above columns signify the Bonferroni significant differences within each species. Species columns without labels showed no significant differences between sites. No <i>Aciphylla glacialis</i> seed germinated under either treatment, zero mean final percent germination values are not presented. For full species names see Appendix 4.2. ....	77
Figure 5.1. Mean percent germination ( $\pm$ 1 standard error) of <i>Aciphylla glacialis</i> seed collected from the seven alpine sites in (a) 2004 and (b) 2005, over the duration of the experiment (days). ....	93
Figure 5.2. Mean final percent germination ( $\pm$ 1 standard error) of <i>Aciphylla glacialis</i> seed collected in 2004 and 2005 from different elevations (m). Different labels (a - d) above columns signify the Bonferroni significant differences within each year. ....	94
Figure 5.3. Mean probability of germination ( $\pm$ 1 standard error) of <i>Aciphylla glacialis</i> seed collected from the seven alpine sites in (a) 2004 and (b) 2005 based on Kaplan-Meier models over the duration of the experiment (days). ....	95
Figure 6.1. Accumulated monthly growing degree days (°C) for six of the seven study sites during 2004, 2005, and 2006. Negative values of accumulated degrees are displayed as zero. Gaps in the data were due to logger failure or theft. These data are also presented in Figure 2.5 in Chapter 2. ....	109
Figure 6.2. Mean ( $\pm$ 1 standard error) percent soil moisture within seedling plots at each site during the three sample intervals (early-, mid- and late-season) over two growing seasons during the study, (a) 2005/06 and (b) 2004/05. Wilting point for each site is represented with a horizontal dashed line. ....	111
Figure 6.3. Mean ( $\pm$ 1 standard error) seedling density per m <sup>2</sup> of new seedlings during the 2004/05 (closed circles) and 2005/06 (open circles) growing seasons, across the altitudinal gradient. Significant differences in seedling density within sites between the seasons are indicated with an asterisk. Regression lines indicate linear regression analysis between site altitude and seedling density during the 2004/05 summer (solid line, R <sup>2</sup> = 0.12, P = 0.44); and the 2005/06 summer (dashed line, R <sup>2</sup> = 0.27, P = 0.23). ....	112
Figure 6.4. Mean seedling emergence ( $\pm$ 1 standard error) per 0.5 m <sup>2</sup> quadrat for each study site during (a) 2005/06 and (b) 2004/05, during the early-, mid- and late-season sample intervals of each growing season. Different labels (a, b or ab) above columns signify significant differences within each site based on Bonferroni post-hoc analysis. Columns without labels showed no significant differences between sample intervals. ....	113
Figure 6.5. The position of seedling quadrats from each site within the three dimensional NMDS configuration based on presence/absence data. Open shapes indicate sites above 1725 m (high sites), closed shapes indicate sites at or below 1725 m (low sites). Stress: 0.21. ....	119
Figure 7.1. Soil temperatures, converted to monthly growing degree days, recorded during 2005 and 2006 in cleared (vegetation removed, dashed line, open symbol) and control (vegetation intact, solid line, closed symbol) plots at King Billy (circles) and Mt Bogong (squares). ....	136
Figure 7.2. Mean ( $\pm$ 1 standard error) vertical displacement of rubber washers on vertical displacement pins (mm) in bare ground (grey bars) and vegetated (white bars) areas at three sites, Mt Bogong (1970 m), Mt Hotham (1860 m) and King Billy (1696 m) during the 2005/2006 growing season. N = 10 for each treatment at each site. Different labels (a or b) above columns indicate significant differences (P < 0.05). Higher mean vertical displacement at indicates stronger and higher frost-heave of the soil. These data are also presented in Figure 2.6 in Chapter 2. ....	137
Figure 7.3. Mean percent soil moisture ( $\pm$ 1 standard error) for soil in cleared and control plots at the four alpine sites, at three sample intervals (early mid and late-season) for (a) the 2004/05 growing season and (b) the 2005/06 growing season. *No measurements were taken during the mid sample interval at Mt Magdala and King Billy during the 2005/06 growing season. ....	138
Figure 7.4. Mean ( $\pm$ 1 standard error) seed germination for (a) <i>Aciphylla</i> , (b) <i>Brachyscome</i> and (c) <i>Trisetum</i> seed in cleared and control plots at the four sites. Data is pooled across the 2004/05 and 2005/06 growing seasons. N = 10 seeds in each plot. There were eight plots of each treatment at each site. ....	140
Figure 7.5. Mean Relative Neighbour Effect (RNE) ( $\pm$ 1 standard error ) for (a) <i>Aciphylla</i> , (b) <i>Brachyscome</i> and (c) <i>Trisetum</i> , for pairs of planted seedlings at Mt Bogong, 1970 m (BOG); Mt Hotham, 1860 m (HOTH); Mt Magdala, 1725 m (MAG); and King Billy, 1696 m (KB), across three sample intervals (early, mid and late) during the 2005/06 growing season. Positive values indicate a facilitative interaction; negative values indicate a competitive interaction. Different labels above columns indicate significant differences between sites during that particular sample interval for each species using Bonferroni post-hoc	

tests. <i>Aciphylla</i> seedlings were not planted (NP) at Mt Bogong, <i>Brachyscome</i> seedlings were not planted (NP) at Mt Hotham. ....	141
Figure 7.6. Mean ( $\pm$ 1 standard error) Kaplan-Meier (K-M) survival probability curves for (a) <i>Aciphylla</i> , (b) <i>Brachyscome</i> and (c) <i>Trisetum</i> seedlings, at different sample intervals (early, mid and late) during the 2005/06 growing season. Seedlings were planted into cleared plots (dashed lines and open symbols) and control plots (solid lines and closed symbols) at the four different elevation sites. The experiment began (start) before snowfalls of 2005, when all seedlings were alive. ....	143
Figure 7.7. Mean ( $\pm$ 1 standard error) percentage of surviving <i>Brachyscome</i> seedlings at the mid sample interval of the 2005/06 growing season in cleared and control plots for (a) King Billy, 1696 m (KB) and (Mt Bogong, 1970 m (BOG) and (b) Mt Magdala, 1725 (MAG) and Mt Bogong, 1970 m (BOG). Crossed lines between points demonstrate the interaction of site and treatment on <i>Brachyscome</i> survival. ....	144
Figure 8.1. The key findings within the life-cycle model. Life-history stages, their properties and recruitment processes that were measured in the study are indicated by <b>bold</b> headings. Life-history stages are represented by shaded, rounded boxes. Properties of life-history stages are represented with question marks following the text. Recruitment processes link life-history stages with arrows. Recruitment processes and life-history properties which were measured in this study are bounded by sharp cornered boxes. Mortality can occur during any stage or process in the life-cycle. Adult vegetation may persist for many years without contributing seeds or seedlings to the life-cycle model. MS, mostly seed; MV, mostly vegetative; OS, obligate seeder; VR, vegetative reproduction maintains populations. ....	157
Figure 8.2. The position of standing vegetation, seedling and seed bank samples from all sites within the three dimensional NMDS configuration based on presence/absence data. A random selection of half the available data was used due to computational limitations of the software. Stress 2.1. ....	160
Figure 8.3. Conceptual model of past and future changes of alpine vegetation with respect to disturbance and climate warming. See text for details of each state and transition. The research described in this thesis predominantly focuses upon vegetation in State 4. ....	167

## Index of Boxes

Box 1.1. The second-order research questions with reference (in brackets) to the thesis chapters in which they are addressed. ....	14
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## Index of Appendices

Appendix 2.1. The 35 climatic variables estimated by BIOCLIM bioclimatic prediction system of the ANUCLIM software package (Houlder <i>et al.</i> 2000). The variables subsequently used in the BIC analysis were chosen from these nine (shaded) variables which showed strong linear relationships with altitude. ...	44
Appendix 2.2. Soil nutrients, trace elements, minerals and extractable ions and from soils at each site. Key: P, K, S: Phosphorus, Potassium, Sulphur (mg/kg). Cu, Zn, Mn, Fe: Copper, Zinc, Manganese, Iron (mg/kg) extracted using diethylenetriaminepentacetic acid (DPTA). Ca, Mg, Na, K <sub>2</sub> , Al: extractable ions of Calcium, Magnesium, Sodium, Potassium and Aluminium (meq/100g). Total N: total nitrogen (%); pH: soil pH analysed with H <sub>2</sub> O and pH electrode; OC: Organic carbon content (%). All analysis except pH was undertaken by CSBP Soil and Plant Nutrition Laboratory Ltd. Bibra Lake, Western Australia. ....	45
Appendix 2.3. Comparisons between different numbers of predictors using the Schwarz-Bayesian Information Criterion (BIC) following multiple regression analysis against site altitude. *denotes the best predictors (smallest BIC values). Max, Maximum Temperature of Warmest Period; Min, Minimum Temperature of Coldest Period; Precip, Precipitation of Driest Quarter; N, Total nitrogen; OC, Organic carbon content (%); Cu, Copper concentration, extracted with DPTA. Low BIC values, ( <b>bold</b> , marked with an asterisk*) indicate the best, more parsimonious models (Quinn and Keough 2003). ....	46
Appendix 3.1. Ordination diagram based on presence/absence data for seed bank species across sites. Stress: 0.3. ....	66
Appendix 4.1. Matrix of <i>P</i> -values which indicate any significant differences ( <i>P</i> < 0.05) in seed mass of <i>Brachyscome rigidula</i> , based on log-transformed data, after the Bonferroni adjustment, between sites of varying elevation (m, <b>bold</b> type). ....	86
Appendix 4.2. Abbreviations of species names used in Figures 4.1 and 4.3 and Tables 4.2, 4.3 and 4.4. ...	86
Appendix 4.3. Abbreviations of site names used in Tables 4.2, 4.3 and 4.4. ....	86
Appendix 8.1. ANOSIM results for the similarity between life-history stages within the NMDS ordination. Data was analysed in six randomly selected separate groups owing to computational limitations of the software. Pairwise comparisons of different life-history stages within each ANOSIM are indicated by V, standing vegetation; S, seedling flora; B, seed bank flora. ....	171
Appendix 8.2. The position of standing vegetation, seedling and seed bank samples from all sites within either two or three dimensional NMDS configurations, based on presence/absence data. A random selection of half the available presence/absence data was used for each site owing to computational limitations of the software. Stress values for each ordination are indicated next to each site name. ....	172

## Summary

This thesis investigated aspects of plant recruitment across an altitudinal gradient of mountain tops in the Victorian Alps, Australia, and provides a baseline for the patterns and processes of alpine plant recruitment in the absence of large-scale disturbance.

The patterns in alpine vegetation across the study sites were described in relation to abiotic environmental factors. Temperatures were lower and precipitation was higher at the high altitude sites. The vegetation did not differ significantly between the sites, although sites at low altitudes were shrubbier than those at high altitudes.

Analysis of the soil seed bank revealed high mean densities of germinable seed (80 to 1400 seeds m<sup>-2</sup>) across the gradient of sites. The similarity between the seed bank samples and the standing vegetation was low (qualitative similarity: 0.08 to 0.2; quantitative similarity: 0.03 to 0.19).

In laboratory germination experiments, I found rapid and substantial germination. Final percent germination was above 90% for most species. One species, *Aciphylla glacialis*, showed evidence of dormancy mechanisms. In subsequent experiments, I found that innate primary seed dormancy in this species could be broken with cold-wet stratification.

There were no significant patterns in natural seedling recruitment across the altitudinal gradient. Similarities between the seedling flora and the standing vegetation were low (qualitative similarity: 0.18 to 0.45; quantitative similarity 0.04 to 0.09). Mean seedling density was best predicted by a combination of soil wilting point, altitude and plant litter. In some cases, seedling density was greater than 80 seedlings m<sup>-2</sup>.

The relative importance of either negative (competitive) or positive (facilitative) interactions between seedlings with adjacent vegetation were investigated in relation to seed germination, seedling growth and seedling survival. Facilitative interactions were common at the higher altitude sites. At lower altitudes, facilitative and competitive interactions were common. Without close neighbours at high altitudes, seedlings were unlikely to survive into their second year.

An understanding of plant recruitment can provide a useful basis for predicting species responses to large-scale disturbance and climate change.

## **Statement of Authorship**

Except where reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis submitted for the award of any other degree of diploma.

No other person's work has been used without due acknowledgment in the main text of the thesis.

This thesis has not been submitted for the award of any degree of diploma in any other tertiary institution.

Susanna Elizabeth Venn

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