Mapping Park Experiences and Environmental Impacts in the Greater Alpine Region of Victoria, Australia

A PPGIS Survey of Park Visitors

by Greg Brown, Delene Weber, and Dino Zanon

2009

UniSA

Parks VICTORIA

Contents

List of Figures

List of Tables

List of Appendices

Summary

The project was undertaken to provide public input into the development of a new Greater Alpine National Parks Management plan. Over 350 respondents provided information about their experiences and impacts they had observed through an interactive web-based public participatory geographic information system (PPGIS).

Objectives of Study

- Increase knowledge and understanding about the types of experiences and perceived resource impacts that can be effectively mapped in a PPGIS system
- Evaluate an internet system for capturing and reporting community information for a geographic large area
- Identify the spatial location of park experiences, impacts, special places, and concerns with facilities/services in the Greater Alpine Region.
- Increase knowledge about the relationships between perceived impacts and experiences
- Increase understanding of the differences and similarities between visitor and Parks Victoria staff perceptions of resource impacts.
- Assess the cost effectiveness of developing additional PPGIS systems for other parks in Victoria.

Methodology

- In collaboration with Parks Victoria, design and promote an interactive website (www.parksvictoria.net) that allows park visitors to identify and map their park experiences and perceived environmental impacts
- Intercept visitors at major tourist/recreation nodes within the study area to collect contact information and provide codes to access the PPGIS website.
- Calculate response rates for different sampling groups (park visitors, PV staff, volunteer public)
- Analyse similarities/differences between survey participants on a range of questions related to knowledge of the Alpine parks, experience, use, and demographics.
- Create an atlas of "hotspots" for each of the experiences and impacts mapped by respondents.
- Examine correlations between visitor impacts and experiences
- Examine similarities/differences among park units based on experiences and impacts using a variety of techniques (e.g. radar charts, diagnostic indices).
- Analyse similarities/differences in mapped experiences and impacts between sampling groups (visitors, PV staff)
- Identify facility/service issues and concerns in the Alpine region

Key Results

- While data was collected from all areas in the Greater Alpine region, Alpine National Park accounted for the majority of mapped experiences (63%) and impacts (67%) in the study region
- Aesthetics/scenery and overnight experiences are an important part of the visitor experience in all parks
- Although experiences differ somewhat by individual park unit, national parks in the region tend to provide similar experiences
- The mix of park experiences (the "experience profile") differs between national parks and historic areas with national parks providing higher levels of scenery, solitude, and opportunities for physical activity and historic areas providing opportunities for social interaction, learning/discovery, and higher levels of crowding
- Historic areas were relatively high in the learning/discovery and crowding experiences relative to national parks

- Park experiences were mapped at a much higher rate (avg. 13 markers per respondent) than perceived environmental impacts (avg. 2 markers per respondent)
- The mapping of perceived impacts differ between visitors and PVstaff. PV staff identify more track and campsite impacts while visitors identify relatively more noise, rubbish, wildlife, and water impacts
- The “volunteer public”, those individuals that voluntarily went to the PPGIS website and mapped park experiences and impacts, perceive themselves to be highly informed and familiar with the Alpine parks

Chapter 1

1.0 Introduction

Parks Victoria is preparing a new Greater Alpine National Parks Management Plan. The Alpine parks management plan will include the Alpine, Baw Baw, Mount Buffalo, Errinundra and Snowy River National Parks as well as the Avon Wilderness Park, Walhalla and adjacent Historic Areas. The planning area covers over 860,000 hectares in size.

Under government legislation all national parks and other protected areas need to have a management plan and most plans are reviewed every 10-15 years. The plan for the Alpine National Park (1992) is due for review. The other parks within the study area either have plans due for review or plans which expire shortly. The Greater Alpine National Park Management Plan will consolidate all the existing plans to provide a broad strategic plan for managing and protecting these special Alpine parks.

As part of the planning process, this project implemented a web-based public participation GIS (PPGIS) system to collect place-based spatial data about visitor experiences and perceived resource impacts in the greater Alpine study area. Visitors to the Alpine area were contacted and provided with an access code to a website (www.parksvictoria.net) where they mapped their park experiences and perceived environmental impacts by placing markers on a map of the study area. An option was provided that allowed individuals to visit the PPGIS website and request an access code without having been explicitly contacted for survey participation. Several different map views of the study area (relief, satellite) were provided in the PPGIS system to orient participants.

This report describes: 1)the methods used; 2) the spatial distribution of park experiences and perceived environmental impacts in the study region, 3) the relationship between park experiences and perceived environmental impacts, and 4) the relationships between respondent characteristics and perceived impacts and experiences. The report concludes with recommendations pertaining to this and future PPGIS studies.

Chapter 2

2.0 Methods

2.1 Study Location – the Greater Alpline Region of Victoria

The Greater Alpine Region of Victoria is located in central and eastern Victoria. National parks and historic areas extend in an arc from Baw Baw National Park in the southwest to Errinundra National Park in the east (see Figure 1).

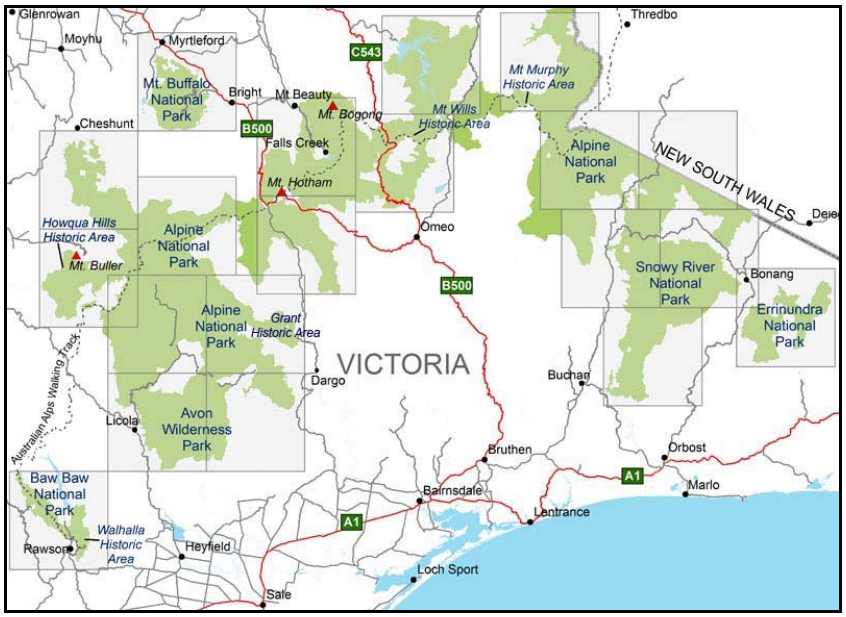


Figure 1. Map of Greater Alpine study area.

2.2 Sampling

Park visitors were contacted fact-to-face at mutiple locations in the study area. Surveying was conducted over eleven days, including the Australia Day long weekend and the Easter school holidays. The locations where surveying took place are listed below. For further detail, see Appendix 1.

Australia Day long weekend (January 24 – 26th)

- Howqua Hills Historic Area: Sheepyard Flat, Pickerings Hut, Merrijig, Devon's Flat, Tunnel Bend, Noonan's Flat, Eight Mile, Fry's Hut.
- Alpine National Park: Bogong High Plains, Wallace Hut, Mt Nelse, Pretty Valley, Falls Creek
- Mt Buffalo National Park: Lake Catani, The Horn, Gorge area

Easter School Holidays (April 4 – 13th)

- Errinundra National Park: Goongerah Camping Ground
- Snowy River National Park: Balley Hooley, McKillops Bridge
- Buchan Caves, Buchan South Caravan Park, Lakes Entrance, Bairnsdale Visitor Information Centre, Omeo Visitor Information Centre
- Victoria Falls Historic Area: campground

- Walhalla Historic District: main street and valley

The interviewers intercepted potential participants at key visitor nodes. The nature of the study was briefly described and the visitors were asked if they would voluntarily participate in the study. If they agreed, they were provided with a one-page information sheet that described the study and provided an access code to the PPGIS website. A total of 579 visitor contacts were made using this method.

To increase the sample size, an option was provided that allowed individuals to visit the PPGIS website and request an access code without having been explicitly contacted for participation. The PPGIS web-site was advertised via radio spots (774 ABC Melbourne and 100.7 ABC Gippsland), through flyers in visitor information centres and on the Parks Victoria Alpine Planning Team's wePlan Alpine website (www.weplan.parks.vic.gov.au). Media releases were also sent to all local newspapers in the study region and outdoor magazines (18 total).

2.3 Survey Procedure

After extensive consultation with Parks Victoria staff and based on current literature, key impact and experience variables for investigation were determined and human ethics approval was sought and gained (Protocol P384/08). In January 2009 an interactive web-based public participation GIS survey was launched (www.parksvictoria.net). Participants were recruited on-site at various parks and also by adverstising the web-site. When participants accessed the website they were welcomed by a page explaining the study and the time needed to complete the survey. Participants then entered their access code, or a button to request an access code was provided for those who had not received an access code via field surveying or who had lost it. Further information and a consent to participate request was then provided. The survey consisted of two components; (a) a spatially based component and (b) a series of 10 questions relating to their knowledge and use of the area, as well as basic socio-demographic data.

Upon consenting that they had read the background information and were over the age of 18, respondents were offered a demonstration of how the PPGIS system worked. They were then able to proceed by clicking on the tile representing the park section they had visited, selecting either a satellite or relief map view, and then proceeding to drag the experience and impact markers across to the relevant location on the map. Each person was given a total of six markers for each of the 18 variables shown in Table 1. A desription of each variable was provided. They could go to other maps within the study area but the number of markers did not replenish at each map. Respondents were able to annotate comments for each marker location. At the completion of mapping, visitors were asked a series of ten survey questions.

The short questionnaire consisted of comments on the length of time they had lived in their community, their self-assessed knowledge of the Victorian Alps, their self-assessed knowledge of the natural environment, the number of times they had visited the national parks in the Victorian Alps, and a series of basic demographic questions. A copy of these questions and descriptions of each of the variables investiaged via PPGIS are provided as Appendix 2.

The design of the survey and ability to answer questions personally via email was consistent with recommendations of the Tailored Design Method described by Dillman (2000). For those email addresses collected on-site, if no response had been registered after one week from the date a personal reminder of the importance of completing the survey had been emailed, a second reminder was sent. If another two weeks elapsed with no response, a third personal reminder explaining how much we valued their opinion was emailed. This reminder emphasised the ease of the PPGIS system and offered potential rewards (e.g. shopping vouchers for the first five to complete the survey). The Parks Victoria staff were contacted via email by a Parks Victoria staff member of the Alpine Planning team. They were sent reminders of the importance of participation and how much we would appreciate feedback on at least three occasions.

Table 1. Variables that respondents could map on the PPGIS website.

Experience Variables	Impact Variables	Other Variables
Aesthetic/scenic	Track condition (degraded)	Special places
Crowding/congestion	Campsite condition (degraded)	Facilities/services changes
Solitude/escape	Rubbish/litter	
Social interaction	Wildlife (dead or sick)	
Trail-based activity	Vegetation (dead/unhealthy)	
Other physical/adventure	Water quality (degraded)	
Overnight stay/camping	Noise	
Learning/discovery		
Wildlife viewing		

2.4 Analysis Methods

Survey data. We examined the similarities/differences among participants in the mapping of park experiences and perceived environmental impacts using frequency tables, cross-tabulations with a chi-square test to measure strength of association, bivariate correlations, and analysis of variance. All statistical tests were performed in SPSS® software. Qualitative data collected from annotated map points and from an open-ended survey question were coded into thematic categories.

Spatial data. Several analysis techniques were applied to the spatial data in this report: 1) descriptive maps were generated with ArcGIS software that graphically display the distribution of mapped points in the study area, 2) "hotspot" maps that show the density of mapped points in the study area, and 3) descriptive maps of experiences, impacts, and facilities by park unit, resort, and visitor node.

Chapter 3

3.0 Results

3.1 Survey Response Rates

A total of 351 responses were received on the PPGIS website. This comprised 248 responses from visitors intercepted on site; 83 responses from the general public; and 20 responses from Parks Victoria staff. The response rate resulting from on-site surveying was 51% (84% in January and 27% at Easter). The response rate from Parks Victoria Alpine-based staff members was 25%.

3.2 Distribution of Visitor Experiences and Environmental Impacts in the Study Region

A total of 5,776 attributes were mapped in the study region, and specific comments were annotated for 372 points. The frequency of attributes mapped appears in Table 2. Mapped park experiences account for 79.2% of total mapped attributes while perceived environmental impacts account for 12.9% of mapped attributes. Special places (6.7%) and facilities/services (1.5%) account for the remainder of mapped attributes. The number of mapped, positive park experience attributes (aesthetic, overnight, solitude, physical activity, trail activity, social interaction, learning, and wildlife viewing) represent about 75 percent of total attributes mapped while the number of negative attributes (crowding, track condition, campsite condition, rubbish, vegetation, noise, water quality, and wildlife) represent about 18 percent of total attributes mapped.

Table 2. Frequency of mapped attributes in the study region. 'E' indicates experience attribute and "I" indicated impact attribute.

Map Attribute	Frequency	Percent of Mapped Attributes
Aesthetic/scenic (E)	942	16.3
Overnight (E)	812	14.1
Solitude/escape (E)	558	9.7
Other physical activity (E)	546	9.5
Trail activity (E)	496	8.6
Special Places	385	6.7
Social interaction (E)	366	6.3
Learning/discovery (E)	312	5.4
Crowding/congestion (E)	269	4.7
Wildlife viewing (E)	265	4.6
Track condition (I)	166	2.9
Rubbish/litter (I)	119	2.1
Vegetation (dead/unhealthy) (I)	113	2.0
Campsite condition (I)	109	1.9
Noise (I)	109	1.9
Facilities/services	87	1.5
Water quality (I)	80	1.4
Wildlife (dead or sick) (I)	42	.7
Total	5776	100.0

3.2.1 Distribution of Visitor Experiences by Park

A total of nine visitor experience variables were investigated. Table 3 presents the distribution of these experiences at each park unit and highlights the park unit where people associate most strongly with each experience. Park experiences in the Greater Alpine Region are unevenly distributed among the different national park units. About 63 percent of all mapped experiences were in Alpine National Park (n=2,195) followed by Mt. Buffalo National Park (15%, n=510) and Howqua Hills Historic Area (7%, n=260). The results show that aesthetics and overnight experiences are an important part of the visitor experience at all parks. Errinundra N.P. had the highest percentage of aesthetic/scenic experiences (33%). Howqua Hills H.A. had the highest percentage of crowding/congetion experiences (19%) but this may be a function of the time of surveying (Australia Day long weekend). Errinundra N.P. had the highest percentage of solitude/escape experiences (19%), Howqua Hills H.A. the highest percentage of social interaction experiences (13%), Grant H.A. the highest percentage of trail (track) experiences (17%), Mt Buffalo N.P. the highest percentage of (non-hiking) physical activity experiences (18%), Mt. Wills H.A. the highest percentage of overnight experiences (26%), Grant H.A. the highest percentage of learning/discovery experiences (31%), and Avon Wilderness Park the highest percentage of wildlife viewing experiences (10%).

Interestingly, solitude/escape was not an experience confined to only remote or wilderness parks but was important to visitors at most parks. The three historic areas and Mt. Buffalo were the only sites where less than 15% of the experiences mapped related to the solitude/escape variable. Over 10% of variables mapped for the Howqua Hills and Mount Wills Historic Areas related to social interaction. Trail related activity was an important part of the visitor experience at most parks with 6 of the 10 units recording more than 10% of the experiences mapped as trail related. Other physical activities were very important at Mt Buffalo, Snowy River , Baw Baw and the Alpine National Park. Learning/discovery was an important experience at several parks, most notably at the Grant Historic Area. Wildlife viewing was not mapped as extensively as other variables.

Table 3. Percentage of mapped visitor experiences for national parks and historic areas in the Greater Alpine region. Bold/underline indicates the largest percentage for the experience category.

Landscape Unit	Aesthetic/ scenic	Crowding /congest-ion	Solitude/ escape	Social interact-ion	Trail activity	Other physical activity	Over-night	Learning/ discovery	Wildlife viewing
Alpine National Park	21.3	4.9	14.8	5.4	13.1	10.2	19.5	6.0	5.0
Avon Wilderness Park	16.7	0.0	16.7	3.3	13.3	6.7	23.3	10.0	**10.0**
Baw Baw National Park	17.4	3.0	15.2	7.6	13.6	15.9	18.9	4.5	3.8
Errinundra National Park	**33.3**	0.0	**19.0**	1.6	9.5	1.6	9.5	15.9	9.5
Grant H.A.	8.6	8.6	2.9	8.6	**17.1**	2.9	17.1	**31.4**	2.9
Howqua Hills H.A	12.7	**18.8**	5.0	**12.7**	7.7	6.5	22.3	7.7	6.5
Mount Buffalo National Park	22.5	3.1	9.2	9.0	11.8	**17.8**	13.5	5.5	7.5
Mount Wills H.A	13.2	2.6	7.9	10.5	7.9	10.5	**26.3**	18.4	2.6
Snowy River National Park	21.4	3.6	15.2	6.3	5.4	17.0	15.2	6.3	9.8
Walhalla H.A	22.8	5.7	7.3	8.9	10.6	8.1	13.0	17.9	5.7
Total	189.9	50.4	113.1	73.9	110.0	97.2	178.8	123.6	63.3
Mean	20.7	5.5	12.9	6.7	12.1	11.1	18.4	7.0	5.7
Max	33.3	18.8	19.0	12.7	17.1	17.8	26.3	31.4	10.0
Min	8.6	0.0	2.9	1.6	5.4	1.6	9.5	4.5	2.6
Range	24.8	18.8	16.2	11.1	11.8	16.3	16.8	26.9	7.4

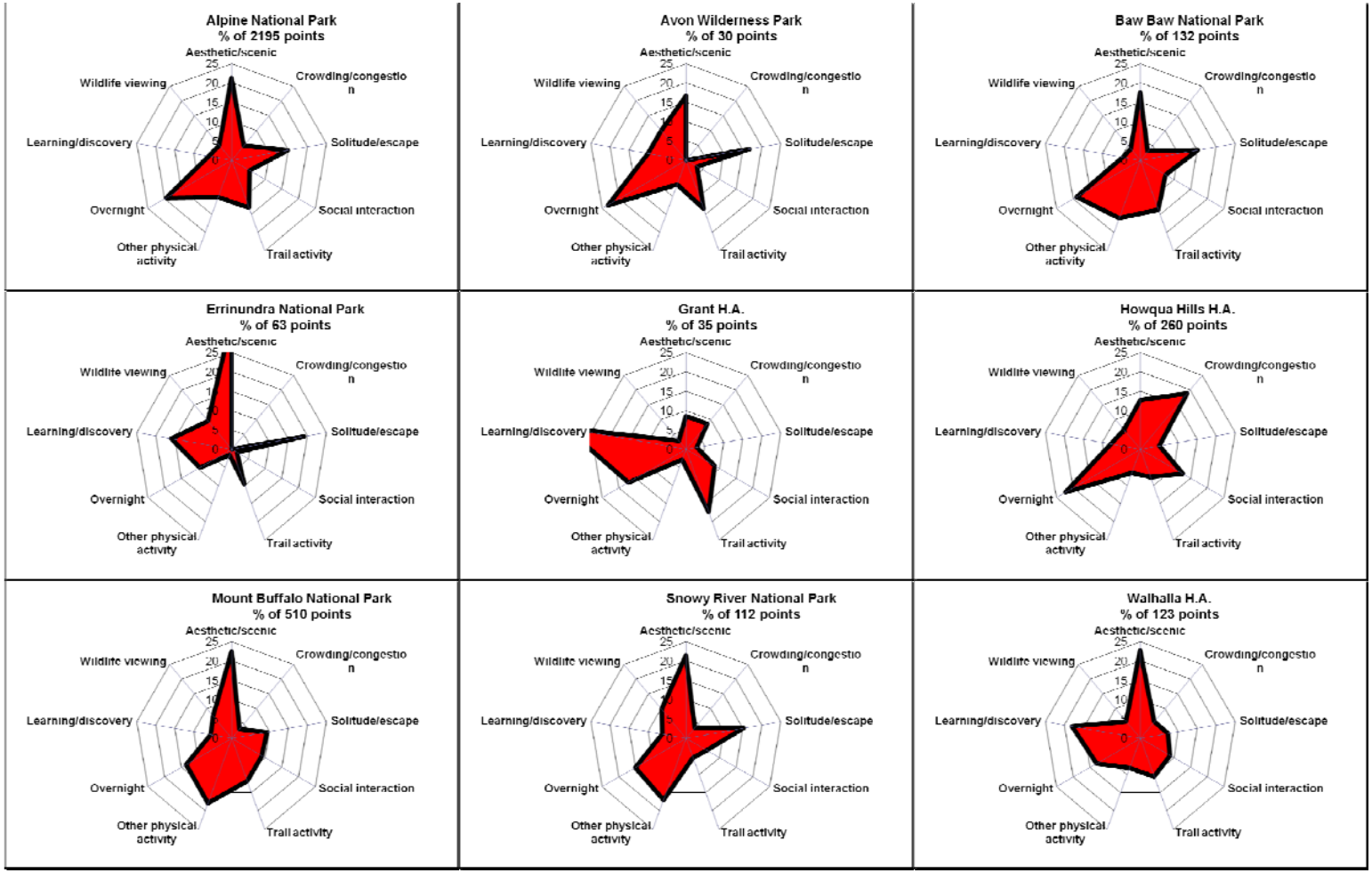
The distribution of experiences in park units is also presented in graphical format using radar charts which provide for visual comparison of the park experience profiles (See Figure 2).

Several parks share the same dominant (most frequently identified) experience as indicated in Table 4. For example, the aesthetic/scenic experience was the most frequently identified experience in Alpine, Errinundra, Mt. Buffalo, and Snowy River NPs and the overnight experience was most frequently identified in Avon Wilderness Park, Baw Baw NP, Howqua Hills H.A., and Mt. Wills H.A. The learning/discovery experience was most frequently identified in Walhalla and Grant Historical Areas.

Table 4. Same dominant park experience by park unit.

Park Unit	Alpine National Park	Avon Wilder-ness Park	Baw Baw National Park	Errinundra National Park	Grant H.A.	Howqua Hills H.A	Mount Buffalo National Park	Mount Wills H.A	Snowy River National Park	Wal-halla H.A
Alpine National Park	---			Aesthetic /scenic			Aesthetic/scenic		Aesthetic /scenic	
Avon Wilderness Park		---	Over-night			Overnight		Overnight		
Baw Baw National Park		Overnight	---			Overnight		Overnight		
Errinundra National Park	Aesthetic/ scenic			---			Aesthetic/scenic		Aesthetic /scenic	
Grant H.A.					---					Learn/ Discover
Howqua Hills H.A		Overnight	Over-rnight			---		Overnight		
Mount Buffalo National Park	Aesthetic/ scenic			Aesthetic /scenic			---		Aesthetic /scenic	
Mount Wills H.A		Overnight	Over-night			Overnight		---		
Snowy River National Park	Aesthetic/ scenic			Aesthetic /scenic			Aesthetic/scenic		---	
Walhalla H.A					Learni ng/disc overy					---

Figure 2. Radar charts showing the distribution of park experiences by park in the Greater Alpine Region.



To better understand the overall similarity (dissimilarity) in park experiences, bivariate rank correlations were calculated for the park units (See Table 5). A rank correlation quantifies the relationship between the park experiences (using the ranks of frequencies) on a scale from -1 to +1. A high, positive correlation would indicate that inviduals have similar experiences in the two parks while a value of 0 would indicate no relationship between experiences in the two parks. A negative rank correlation would indicate that park experiences tend to have opposite frequency ranks.

The strongest correlations in park experiences occurred between Baw Baw and Mt. Buffalo NPs (r=.92), Avon Wilderness Park and Alpine NP (r=.85), and Mt Buffalo and Alpine NP (r=.83). The weakest rank correlations in park experiences were between Mt. Buffalo and Grant HA (r=.00) and Mt. Buffalo and Howqua Hills HA (r=.03). The park experiences tend toward opposite ranks between Snowy River NP and Grant HA (r=-.21) and between Snowy River and Howqua Hills HA (r=-.18).

Table 5. Rank correlation coefficients of park experiences between park units. Bold/underlined values are statistically significant.

Park Unit	Alpine National Park	Avon Wilder-ness	Baw Baw N.P	Errinun dra N.P.	Grant H.A.	Howqu a Hills H.A	Mount Buffalo N.P.	Mount Wills H.A	Snowy River N.P	Wal-halla H.A
Alpine National Park	---	**0.850**	**0.917**	**0.717**	0.225	0.058	**0.833**	0.625	**0.700**	0.675
Avon Wilderness Park	**0.850**	---	0.683	**0.867**	0.208	-0.075	0.533	0.458	0.567	0.508
Baw Baw National Park	**0.917**	0.683	---	0.467	0.125	0.125	**0.917**	0.692	**0.783**	0.575
Errinundra National Park	**0.717**	**0.867**	0.467	---	0.258	-0.175	0.417	0.425	0.550	0.592
Grant H.A.	0.225	0.208	0.125	0.258	---	**0.700**	-0.008	0.617	-0.208	**0.717**
Howqua Hills H.A	0.058	-0.075	0.125	-0.175	**0.700**	---	0.025	0.450	-0.175	0.467
Mount Buffalo National Park	**0.833**	0.533	**0.917**	0.417	-0.008	0.025	---	0.508	**0.767**	0.508
Mount Wills H.A	0.625	0.458	0.692	0.425	0.617	0.450	0.508	---	0.542	**0.850**
Snowy River National Park	**0.700**	0.567	**0.783**	0.550	-0.208	-0.175	**0.767**	0.542	---	0.375
Walhalla H.A	0.675	0.508	0.575	0.592	**0.717**	0.467	0.508	**0.850**	0.375	---

The overall similarity (dissimilarity) in park experiences can be examined by using both the dominant park experience and experience rank correlations in a simple cluster analysis. Table 6 displays park units that shared the same dominant park experience (+) and had a statistically significant rank correlation (+). Some park units had both the same dominant park experience and a significant rank corrleation (++). Table 7 groups the parks into 3 clusters: parks that had 1 or more "++" relationships with other park units, parks that 1 or more "+" relationships with other park units but no "++" relationship, and parks that had no "++" or "+" relationships with other park units. Note: no park units actually fell into cluster 3 indicating that all park units share some similarities in experiences.

Table 6. Similar park units based on same dominant experience and significant rank correlation (++) or significant rank correlation (+).

Park Unit	Alpine National Park	Avon Wilder-ness Park	Baw Baw National Park	Errinun-dra National Park	Grant H.A.	Howqua Hills H.A	Mount Buffalo National Park	Mount Wills H.A	Snowy River National Park	Walhalla H.A
Alpine National Park		+	+	++			++		++	+
Avon Wilderness Park	+		+	+		+		+		
Baw Baw National Park	+	+				+	+	+	+	
Errinundra National Park	++	+					+		+	+
Grant H.A.						+				+
Howqua Hills H.A		+	+		+			+		
Mount Buffalo National Park	++		+	+					++	+
Mount Wills H.A		+	+			+				+
Snowy River National Park	++		+	+			++			+
Walhalla H.A	+			+	+		+	+	+	

A simple cluster analysis reveals that national parks (i.e., Alpine, Errinundra, Mt. Buffalo, and Snowy River) tend to provide similar experiences while historic areas (i.e., Grant, Howqua Hills, Mt. Wills, and Walhalla) tend to provide a different mix of experiences. Although grouped with the historic areas, Baw Baw NP and Avon Wilderness Park have relatively high rank correlations with the other national parks and with some of the historic areas. Thus, it would appear that the set of experiences between national parks and historic areas do differ overall, with national parks providing higher levels of scenery, solitude, and opportunities for physical activity and historic areas providing opportunities for social interaction, learning/discovery, and higher levels of crowding. Trail activities, wildlife viewing, and overnight experiences are common to both national parks and historic areas.

Table 7. Similar Park Unit Clusters.

Landscape Unit	Cluster 1	Cluster 2	Cluster 3[a]
Alpine National Park	x		
Avon Wilderness Park		x	
Baw Baw National Park		x	
Errinundra National Park	x		
Grant H.A.		x	
Howqua Hills H.A		x	
Mount Buffalo National Park	x		
Mount Wills H.A		x	
Snowy River National Park	x		
Walhalla H.A		x	

Cluster 1: Have 1 or more "++" relationships with other landscape units.
Cluster 2: Have 1 or more "+" relationships with other landscape units, but no "++".
Cluster 3: Have no "++" or "+" relationships with other landscape units.
[a]No park units appear in Cluster 3 indicating that all park units share some degree of similarity in experiences.

Additional diagnostic indices were generated for park experiences as shown in Table 8. A definition, mathematical formula, and explanation of each index is provided in Appendix 3. These indices allow park units to be compared based on the number, frequency, density, and diversity of mapped experiences. For example, Alpine NP had significantly more identified park experiences (P0 index, n=2195 points) than any other park (63% of all mapped points, P1 index). The frequency of mapped experience points in Alpine NP was more than 6 times the average frequency of mapped experience points in other units (F index). The highest density of mapped experiences was located in Howqua Hills HA (D2 index) and the highest diversity of mapped experiences was located in Walhalla HA (D3 index). Errinundra NP had the lowest diversity of mapped experiences (D3 index) and the number of mapped scenic experiences (the dominant experience), was significantly more than the second most frequently mapped park experience as indicated by the D1 index (.429).

Table 8. Diagnostic Indices of Experiences by Park. Bold/underlined indicates the largest value for the index.

Park Unit	Hectares	Value Sum Absolute (P0)	Value Sum Percent (P1)	Dominant Value (D)	Value Dominance (D1) Index *0.000 = Min 1.000 = Max*	Value Frequency (F) Index *1.000 = Mean*	Value Density (D2) Index *Points per Acre*	Value Diversity (D3) Index (Absolute) *0.000 = Min 1.000 = Max*
Alpine National Park	658,964	**2,195**	**62.750**	**Aesthetic /scenic**	0.084	**6.275**	0.00134	0.934
Avon Wilderness Park	39,555	30	0.858	Overnight	0.286	0.086	0.00031	0.892
Baw Baw National Park	13,497	132	3.774	Overnight	0.080	0.377	0.00395	0.926
Errinundra National Park	26,811	63	1.801	**Aesthetic /scenic**	0.429	0.180	0.00095	0.809
Grant H.A.	7,416	35	1.001	Learning/ discovery	**0.455**	0.100	0.00191	0.867
Howqua Hills H.A	1,109	260	7.433	Overnight	0.155	0.743	**0.09461**	0.944
Mount Buffalo National Park	30,926	510	14.580	**Aesthetic /scenic**	0.209	1.458	0.00666	0.939
Mount Wills H.A	8,781	38	1.086	Overnight	0.300	0.109	0.00175	0.908
Snowy River National Park	98,463	112	3.202	**Aesthetic /scenic**	0.208	0.320	0.00046	0.935
Walhalla H.A	2,654	123	3.516	**Aesthetic /scenic**	0.214	0.352	0.01871	**0.949**

3.2.2 Distribution of Visitor Experiences by Resort

Park experiences were identified in the five resorts located in the Greater Alpine Region. Table 9 shows the distribution of park experiences by percent among the resorts. Mt. Sterling Resort had the highest percentage of aesthetic/scenic experiences (33%), solitude/escape experiences (9%), trail activity experiences (11%), learning/discovery experiences (9%) and wildlife viewing experiences (4%). Mt. Baw Baw Resort had the highest percentage of social interaction experiences (20%), other physical activity experiences (32%), and overnight stay experiences (24%). Mt. Hotham resort had the highest percentage of crowding/congestion experiences (11%).

Table 9. Percentage of mapped visitor experiences for national parks and historic areas in the Greater Alpine region. Bold/underlined indicates the largest percentage for the experience category.

Landscape Unit	Aesthetic/scenic	Crowding/congestion	Solitude/escape	Social interaction	Trail activity	Other physical activity	Overnight	Learning/discovery	Wildlife viewing
Falls Creek Alpine Resort	22.6	8.6	4.8	18.3	6.5	19.4	13.4	4.8	1.6
Mount Baw Baw Alpine Resort	12.0	4.0	0.0	**20.0**	8.0	**32.0**	**24.0**	0.0	0.0
Mount Buller Alpine Resort	21.3	7.4	7.4	18.5	7.4	22.2	13.9	1.9	0.0
Mount Hotham Alpine Resort	21.2	**10.6**	6.1	16.7	7.6	24.2	7.6	3.0	3.0
Mount Stirling Alpine Resort	**31.0**	4.2	**8.5**	2.8	**11.3**	11.3	18.3	**8.5**	**4.2**
Total	108.1	34.8	26.8	76.3	40.7	109.1	77.2	18.2	8.9
Mean	22.8	7.7	5.9	15.8	7.7	20.2	14.0	4.2	1.8
Max	31.0	10.6	8.5	20.0	11.3	32.0	24.0	8.5	4.2
Min	12.0	4.0	0.0	2.8	6.5	11.3	7.6	0.0	0.0
Range	19.0	6.6	8.5	17.2	4.8	20.7	16.4	8.5	4.2

3.2.3 Distribution of Visitor Experiences by Visitor Node

Park experiences were identified for the 25 visitor nodes located in the Greater Alpine Region that had the largest number of experience attributes. Visitor nodes were buffered with a 1500 m radius around the visitor node to capture the mapped points (see Table 10). The Melboune University Mountaining Club Hut had the highest percentage of aesthetic/scenic experiences (41%), Pickerings Flat the highest percentage of crowding/congetion experiences (28%), Bluff Hut the highest percentage of solitude/escape experiences (16%), Falls Creek Alpine Resort the highest percentage of social interaction experiences (23%), Wallace Hut the highest percentage of trail (track) experiences (19%), Cresta Valley—Buffalo Lodge the highest percentage of (non-hiking) physical activity experiences (40%), View Point Lookout the highest percentage of overnight experiences (33%), Wallace Hut the highest percentage of learning/discovery experiences (15%), and Eurobin Falls the highest percentage of wildlife viewing experiences (14%).

Table 10. Percentage of mapped experiences for 25 visitor nodes containing the largest number of mapped experience attributes. Visitor nodes were circular buffered with a 1500 m radius around the visitor node and points counted within the buffered area. Visitor nodes appear in order from the largest to the smallest number of mapped points. Bold/underlined indicates the largest percentage for the experience category.

Visitor Node	Aesthetic/scenic	Crowding/congestion	Solitude/escape	Social interaction	Trail activity	Other physical activity	Overnight	Learning/discovery	Wildlife viewing
Blackbird Flat	14.0	20.4	4.3	15.7	6.8	5.5	20.4	6.8	6.0
Bluff Hut	30.2	6.3	**15.9**	4.8	11.1	11.1	14.3	4.8	1.6
Cresta Valley - Buffalo Lodge	22.8	0.0	12.3	1.8	10.5	**40.4**	1.8	8.8	1.8
Davons Flat	13.0	23.2	5.3	15.0	6.8	8.2	18.8	4.8	4.8
Eurobin Falls	35.4	6.2	7.7	6.2	3.1	20.0	3.1	4.6	**13.8**
Falls Creek Alpine Resort	24.4	8.9	0.8	**22.8**	4.9	18.7	15.4	4.1	0.0
Frys Flat	17.9	21.4	5.4	14.9	6.0	4.2	21.4	5.4	3.6
Gardeners Hut	9.2	21.5	9.2	4.6	6.2	16.9	24.6	1.5	6.2
Gorge - Echo Point Lookout	17.7	3.8	5.1	15.8	8.2	15.8	22.8	4.4	6.3
Gorge Day Visitor Area	19.1	4.3	3.5	14.9	8.5	18.4	22.0	4.3	5.0
Grossman Mill Site Picnic Area	9.8	4.5	3.8	17.3	10.5	12.0	32.3	3.8	6.0
Lake Catani Camping Ground	11.3	4.3	5.0	17.0	8.5	11.3	32.6	2.8	7.1
Melbourne University Mountaineering Club Hut	**41.3**	1.6	11.1	1.6	9.5	11.1	17.5	3.2	3.2
Monolith	12.7	4.5	4.5	19.4	9.0	14.2	29.1	3.7	3.0
Mount Buffalo Park Office Visitor Centre	6.7	7.9	5.6	15.7	9.0	19.1	28.1	3.4	4.5
Noonans Flat	9.1	24.2	6.8	12.1	7.6	8.3	22.7	3.0	6.1
Pickerings Flat	9.9	**28.4**	4.9	12.3	4.9	8.0	22.8	2.5	6.2
Ropers Lookout	26.9	7.5	4.5	20.9	4.5	17.9	11.9	4.5	1.5
Rover Chalet	21.2	3.0	12.1	9.1	18.2	9.1	16.7	7.6	3.0
Sheepyard Flat	13.3	20.0	4.6	15.0	7.9	7.1	20.0	6.3	5.8
The Horn Precinct	31.4	1.4	10.0	2.9	18.6	21.4	0.0	10.0	4.3
Tunnel Bend Flat	9.6	23.2	7.2	12.0	6.4	10.4	22.4	2.4	6.4
Tunnel Spur	12.3	26.9	5.3	13.5	4.7	8.2	19.9	4.1	5.3
View Point Lookout	11.0	4.8	3.4	16.6	8.3	10.3	**33.1**	4.1	8.3
Wallace Hut	20.6	2.9	11.8	8.8	**19.1**	8.8	8.8	**14.7**	4.4
Total	450.9	281.2	170.0	310.5	218.6	336.7	482.6	125.4	124.0
Mean	15.9	13.6	5.8	13.9	8.0	11.7	21.1	4.8	5.2
Max	41.3	28.4	15.9	22.8	19.1	40.4	33.1	14.7	13.8
Min	6.7	0.0	0.8	1.6	3.1	4.2	0.0	1.5	0.0
Range	34.5	28.4	15.1	21.2	16.0	36.2	33.1	13.2	13.8

3.3 Distribution of Perceived Environmental Impacts by Park

A total of seven environmental impacts were examined in this study. Observed environmental impacts in the Greater Alpine Region, similar to park experiences, are also unevenly distributed among the different national park units. About 67 percent of all mapped impacts were in Alpine N.P. (n=381) followed by Howqua Hills H.A. (11%, n=64) and Mt. Buffalo N.P. (7%, n=39). Table 11 shows the distribution of park impacts by percent among the different park units. Mt. Buffalo N.P. had the highest percentage of track impacts (51%), Grant H.A. the highest percentage of campsite impacts (37%), Avon Wilderness Park the highest percentage of rubbish/litter impacts (22%) and wildlife impacts (26%), Mt. Wills H.A. the highest percentage of vegetation impacts (60%), Walhalla H.A. the highest percentage of water quality impacts (40%), and Howqua Hills the highest percentage of noise impacts (36%).

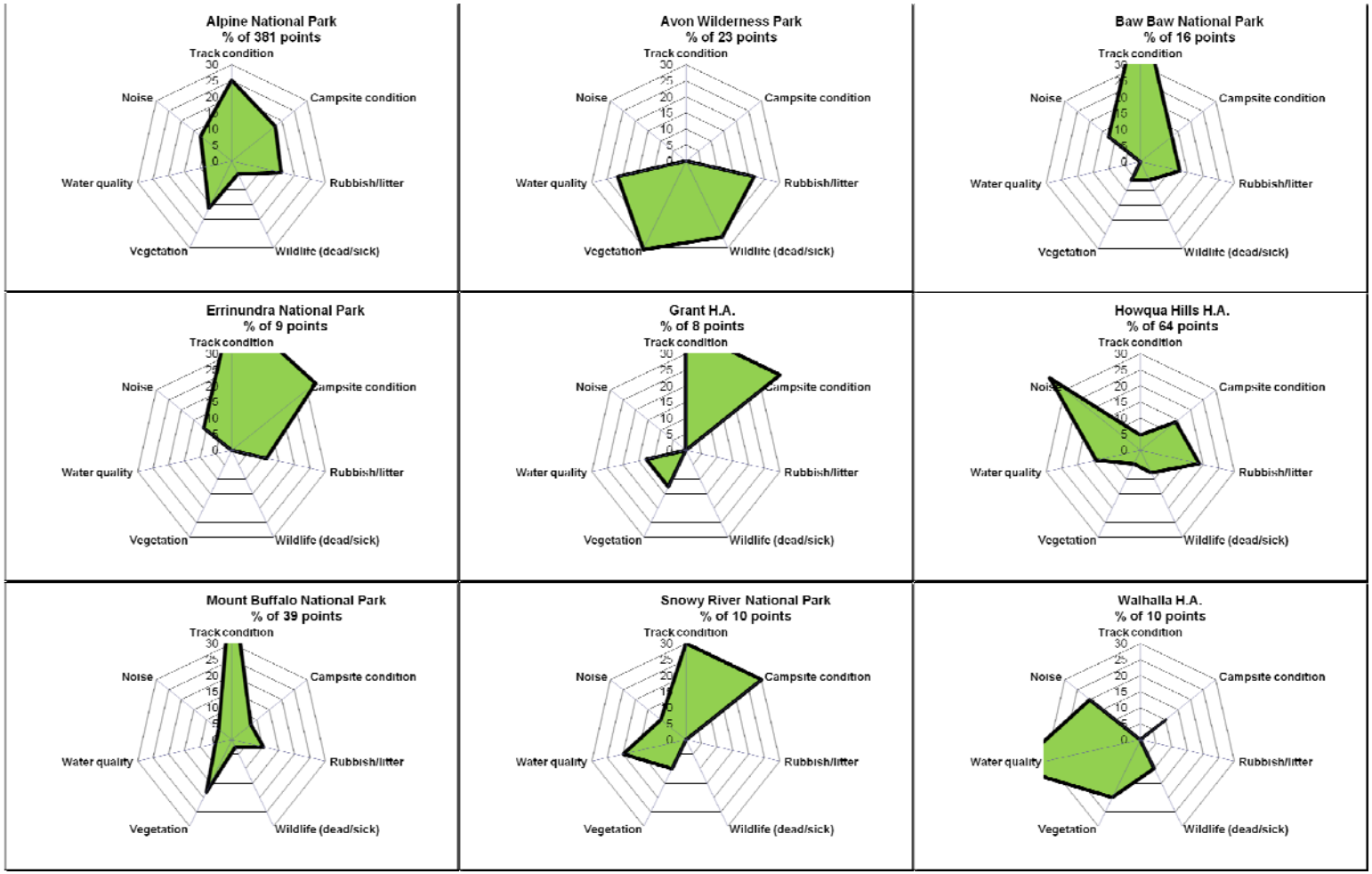
Track condition appears to be the area of greatest impact concern at most parks. While this impact appears negligible at three of the historic areas and the Avon Wilderness Park, this impact represented more than 25% of the impact markers in all other parks. Campsite condition and rubbish were also mapped extensively at many parks. At least a third of impact markers at Grant, Errinundra and Snowy River are related to degraded campsite conditions. Dead or sick wildlife was not mapped extensively at most parks, although this impact was noted in the Avon Wilderness Park. Degraded vegetation was observed in many locations, notably Mount Wills, Avon and Mt Buffalo. Noise impacts were most pronounced at the Howqua Hills Historic Area.

The same information in presented in graphical format using radar charts that provide for visual comparison of the impact profiles (See Figure 3).

Table 11. Percentage of mapped environmental impacts for national parks and historic areas in the Greater Alpine region. Bold/underlined indicates the largest percentage for the experience category.

Landscape Unit	Track condition	Campsite condition	Rubbish/litter	Wildlife (dead/sick)	Vegetation	Water quality	Noise
Alpine National Park	25.2	17.3	15.7	4.5	16.3	8.7	12.3
Avon Wilderness Park	0.0	0.0	**21.7**	**26.1**	30.4	21.7	0.0
Baw Baw National Park	50.0	12.5	12.5	6.3	6.3	0.0	12.5
Errinundra National Park	44.4	33.3	11.1	0.0	0.0	0.0	11.1
Grant H.A.	37.5	**37.5**	0.0	0.0	12.5	12.5	0.0
Howqua Hills H.A	4.7	14.1	18.8	7.8	4.7	14.1	**35.9**
Mount Buffalo National Park	**51.3**	7.7	10.3	2.6	17.9	5.1	5.1
Mount Wills H.A	0.0	20.0	0.0	0.0	**60.0**	20.0	0.0
Snowy River National Park	30.0	30.0	0.0	0.0	10.0	20.0	10.0
Walhalla H.A	0.0	10.0	0.0	10.0	20.0	**40.0**	20.0
Total	243.1	182.4	90.1	57.2	178.1	142.1	107.0
Mean	24.2	16.1	14.9	5.5	15.4	10.1	13.8
Max	51.3	37.5	21.7	26.1	60.0	40.0	35.9
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Range	51.3	37.5	21.7	26.1	60.0	40.0	35.9

Figure 3. Radar charts showing the distribution of perceived enironmental impacts by park in the Greater Alpine region.



Additional diagnostic indices were generated for park impacts as shown in Table 12. A definition and explanation of each index is provided in Appendix 3. Alpine NP had significantly more identified impacts (P0 index, n=381 points) than any other park (67% of all mapped points, P1 index). The frequency of mapped points in Alpine NP was more than 6 times the average frequency of mapped points in other units (F index). The highest density of identified impacts was located in Howqua Hills HA (D2 index) and the higest diversity of impacts was located in Alpine NP (D3 index). Mt. Wills HA had the lowest diversity of mapped experiences (D3 index) and number of mapped impacts (n=5). Track condition, the dominant impact mapped in Baw Baw NP, had significantly more mapped points than the second most frequently mapped park impact as indicated by the D1 index (.75).

Table 12. Diagnostic Indices of Environmental Impacts by Park. Bold/underlined values indicate the largest index value.

Landscape Unit	Hectares	Value Sum Absolute (P0)	Value Sum Percent (P1)	Dominant Value	Value Dominance (D1) Index *0.000 = Min* *1.000 = Max*	Value Frequency (F) Index *1.000 = Mean*	Value Density (D2) Index *Points per Acre*	Value Diversity (D3) Index *0.000 = Min* *1.000 = Max*
Alpine National Park	658,964	**381**	**67.434**	**Track condition**	0.313	**6.743**	0.00023	**0.949**
Avon Wilderness Park	39,555	23	4.071	Vegetation	0.143	0.407	0.00023	0.707
Baw Baw National Park	13,497	16	2.832	**Track condition**	**0.750**	0.283	0.00048	0.757
Errinundra National Park	26,811	9	1.593	**Track condition**	0.250	0.159	0.00014	0.624
Grant H.A.	7,416	8	1.416	Track condition/Camp site condition	0.667	0.142	0.00044	0.645
Howqua Hills H.A	1,109	64	11.327	Noise	0.478	1.133	**0.02329**	0.884
Mount Buffalo National Park	30,926	39	6.903	**Track condition**	0.650	0.690	0.00051	0.761
Mount Wills H.A	8,781	5	0.885	Vegetation	0.667	0.088	0.00023	0.488
Snowy River National Park	98,463	10	1.770	Track condition/Camp site condition	0.333	0.177	0.00004	0.773
Walhalla H.A	2,654	10	1.770	Water quality	0.500	0.177	0.00152	0.756

Chapter 4

4.0 Spatial Distribution of Experiences, Impacts, and Facilities

The spatial distribution of park experiences, perceived environmental impacts, special places, and facilities/services needs (18 variables) were mapped using ArcGIS software. Because the data were collected as points, there are a variety of ways to display the point distributions. For point distributions with large numbers of points, a useful, descriptive map is a "hotspot" map that identifies high densities or clusters of points. For point distributions with a relatively small number of points, the best descriptive map is simply a plot of the points. Hotspot maps are raster images containing grid cells that each have an associated point density. Hotspot maps are often colour-coded to show increasing density of points as increasing colour intensity. Hotspot maps were generated for this data using a point density function (kernel method) with a grid cell size of 500 m and a 2000 m search radius.

4.1 Experience hotspot maps

Figures 4 through 12 show park experience hotspots in the Greater Alpine Region.

- Among other places, aesthetic/scenic hotspots are located around Falls Creek, Mt. Bogong, Howqua Hills, Mt. Hotham, and the Mt. Buffalo NP road corridor.
- The solitude/escape hotspots tend to be spatially co-located with the aesthetic/scenic hotspots.
- The crowding/congestion experience is experience is most apparent in the Howqua Hills and Falls Creek area.
- The learning/discovery experience is most apparent in the region's historic areas and in Errinundra NP.
- Overnight stay experiences are disbursed throughout the region.
- Physical activity hotspots are most apparent around the mountain resorts.
- While the wildlife viewing experience was ubiquitous throughout the region, hotspots occur in Mt. Buffalo NP and in Howqua Hills HA.

4.2 Impact hotspot maps

Figures 13 through 18 show impact hotspots in the Greater Alpine Region while Figure 19 shows the distribution of wildlife impacts points. Figure 20 shows a composite hotspot map of all impacts combined.

- The Howqua Hills area consistently shows the highest concentration of observed impacts while other notable impact areas include Falls Creek and Mt. Buffalo NP.

4.3 Special places hotspot map

Figure 21 shows the distribution of special places in the region. The distribution of mapped special places tend to spatially locate with the positive experience attributes.

4.4 Facilities/services maps

Figure 22 shows the distribution of mapped facilities/services points. Study participants were requested to annotate the facilities/services points to indicate the type of problem or issue with facilities and services in the region. In Figure 23, points that were annotated by respondents were classified into categories related to the substance of the facilities issue (e.g., toilet, track, and campsite).

• The most frequent facilities problems/issues identified by visitors are located in the Falls Creek, Mt. Buffalo, and Howqua Hills areas.

4.5 Additional Maps and Interactive Mapping

There are additional color-coded maps in Appendix 4 that show the distribution of experiences and impacts by park unit. To provide greater flexibility in viewing and analysing the spatial distribution of mapped attributes, two web-based map viewers are available to interactively view the spatial data. Each map viewer provides for the interactive display of one or more map layers using the common Google Maps interface. The following website:

http://www.landscapemap2.org/pvppgis/map

provides a two-dimensional Google Maps interface for displaying the map layers associated with experiences, impacts, special places, and facilities. The same information can also be displayed in the three-dimensional Google Earth web interface (see Figure 4) and the following URL:

http://www.landscapemap2.org/pvppgis/mapge

Figure 4. Screen image of Google Earth map viewer showing the distribution of different experiences and impacts in Mt. Buffalo NP.

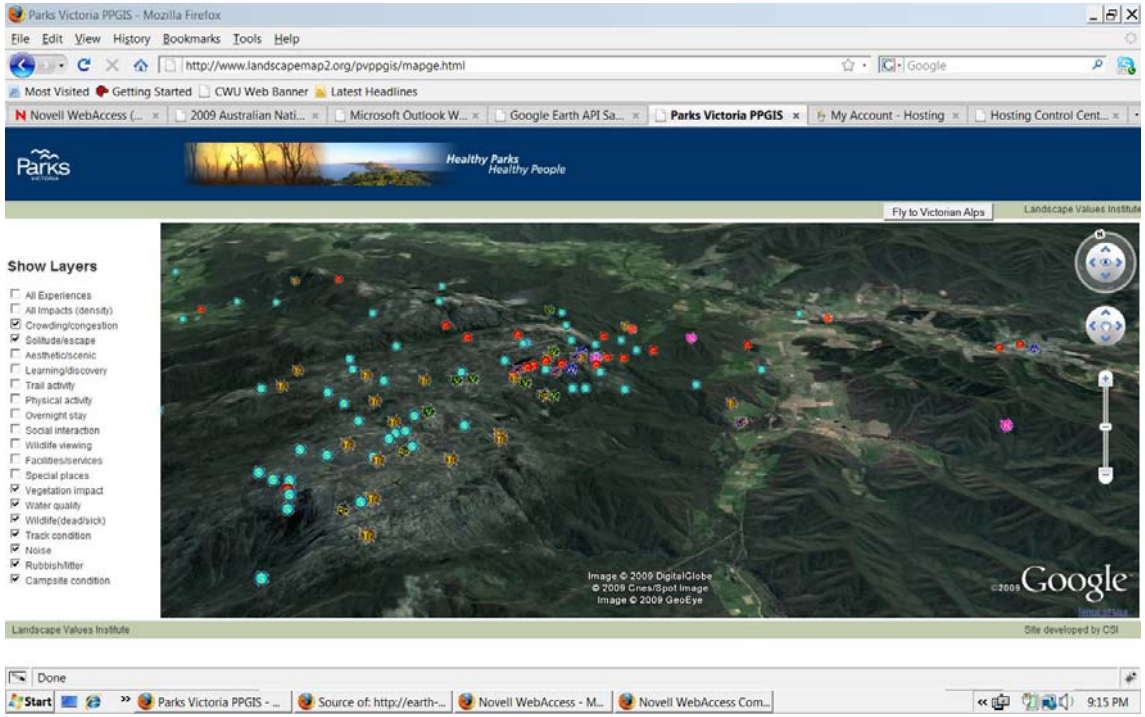


Figure 5. Map of aesthetic/scenic experience hotspots.

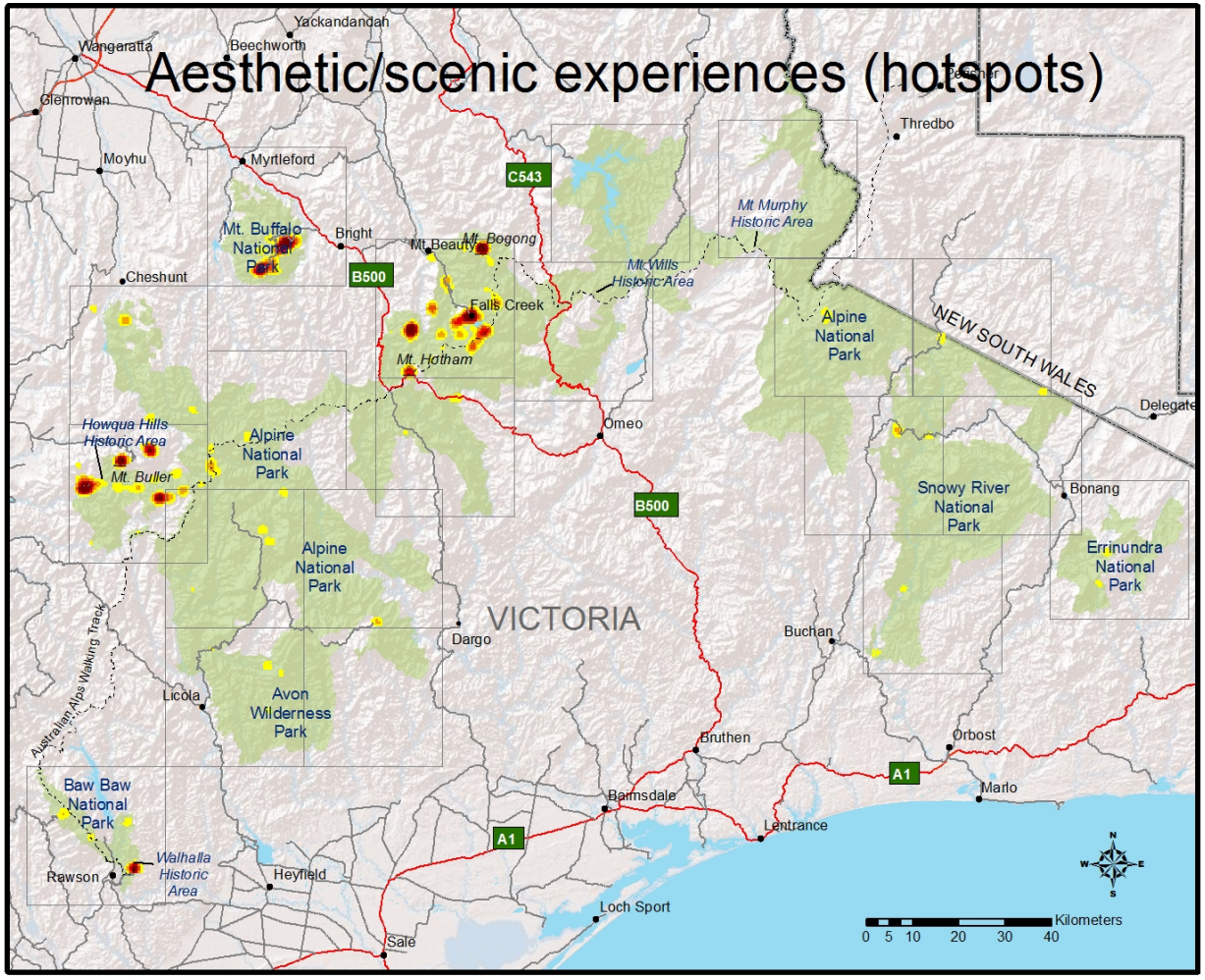


Figure 6. Map of solitude/escape experience hotspots.

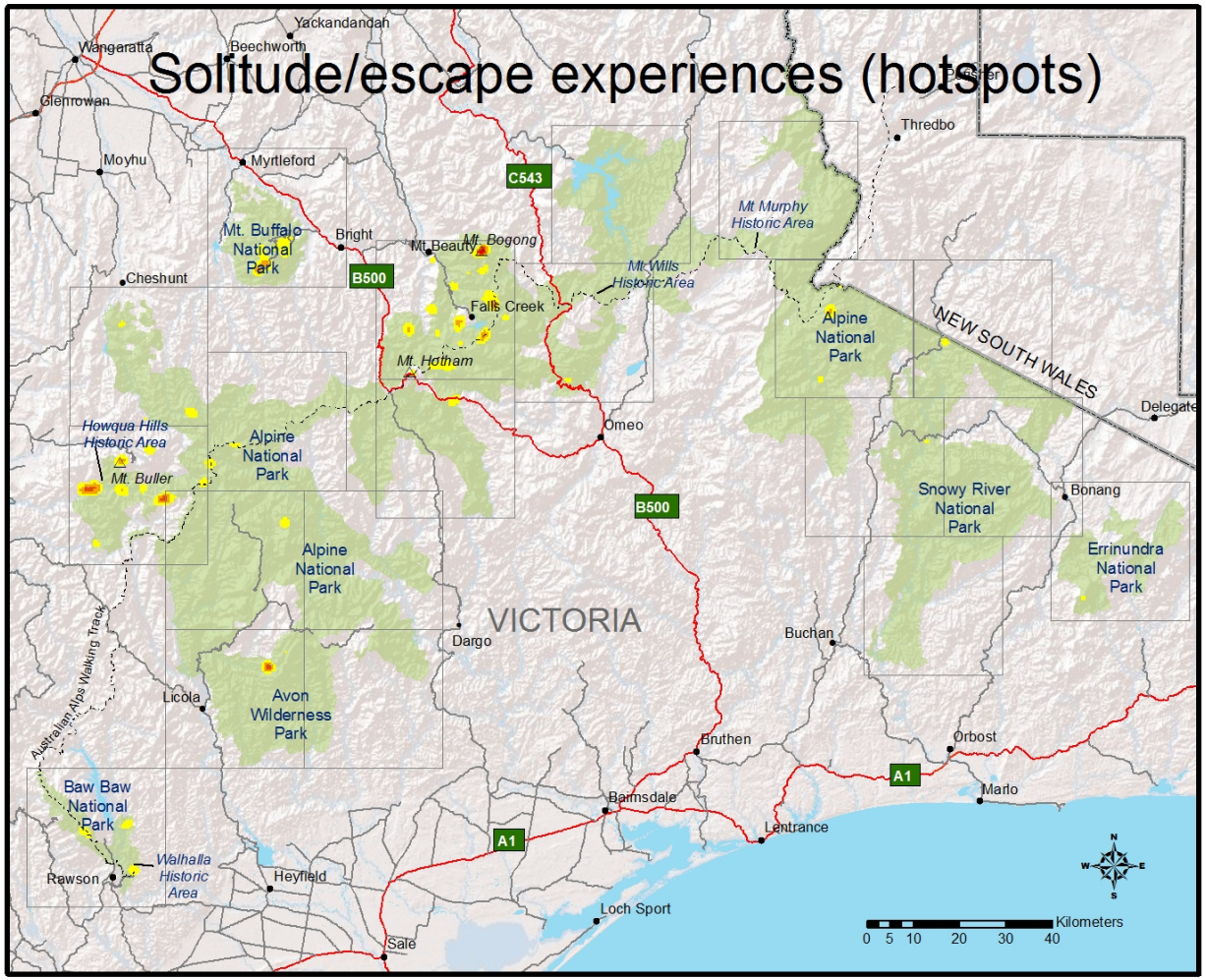


Figure 7. Map of crowding/congestion experience hotspots.

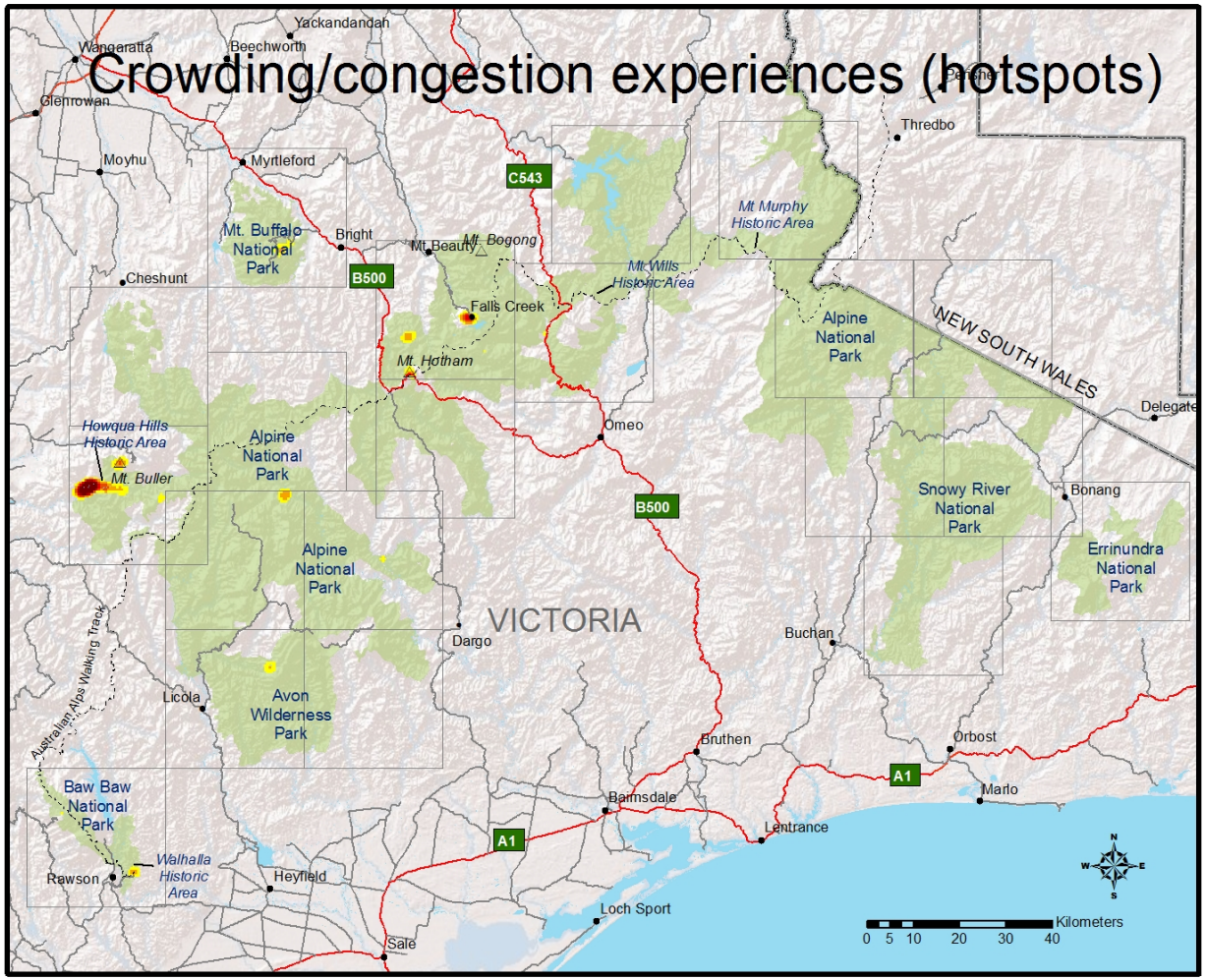


Figure 8. Map of social interaction experience hotspots.

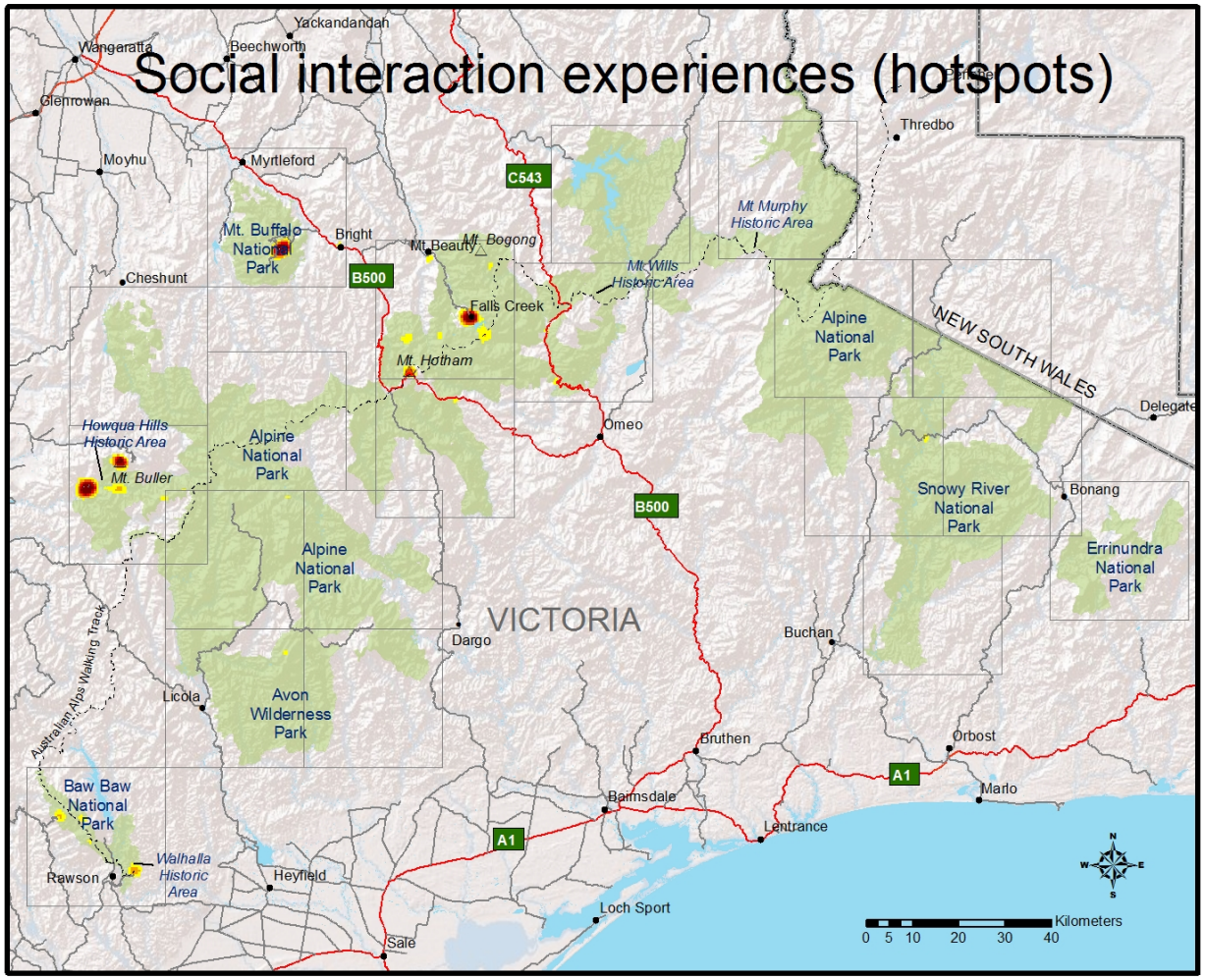


Figure 9. Map of trail-based experience hotspots.

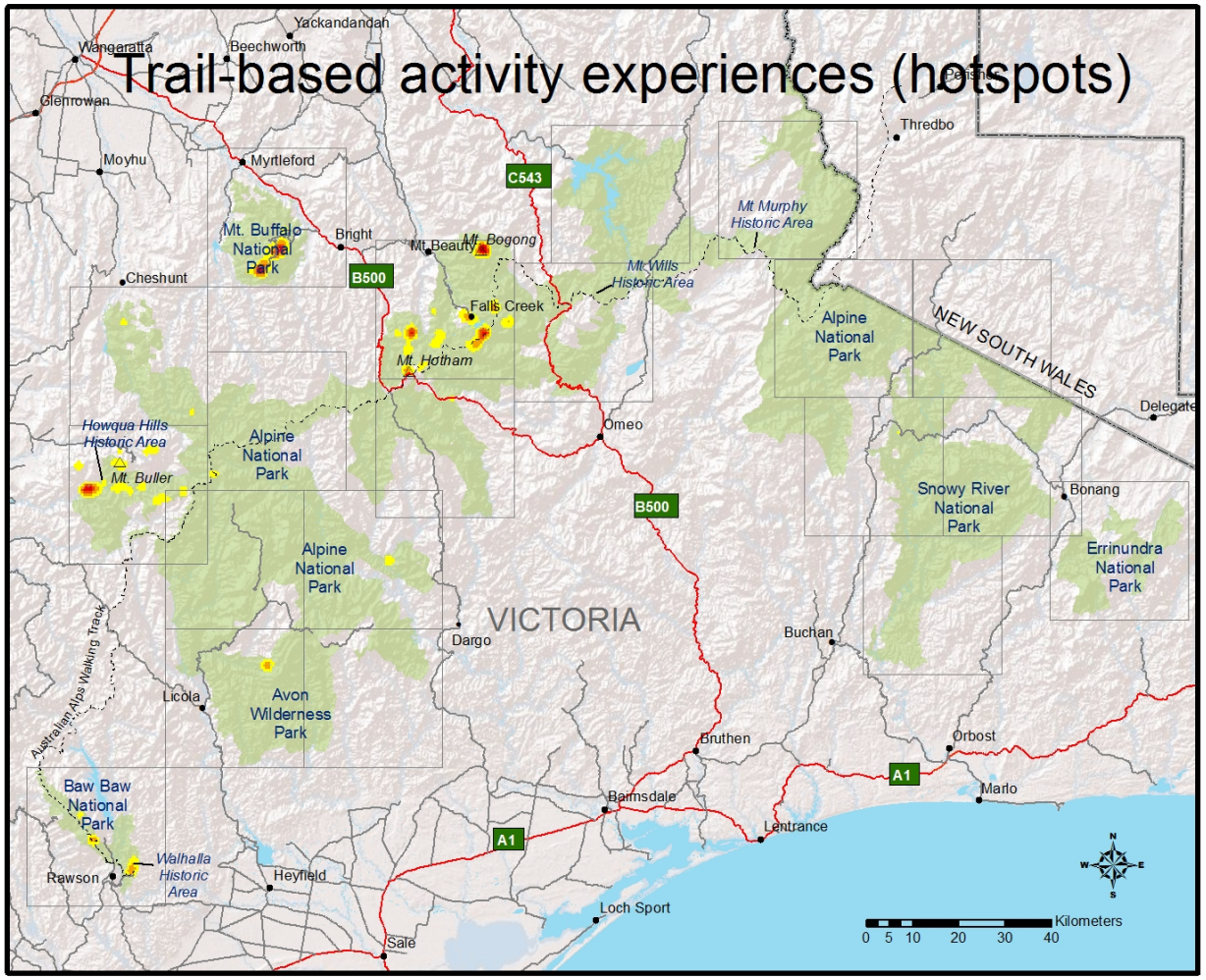


Figure 10. Map of learning/discovery experience hotspots.

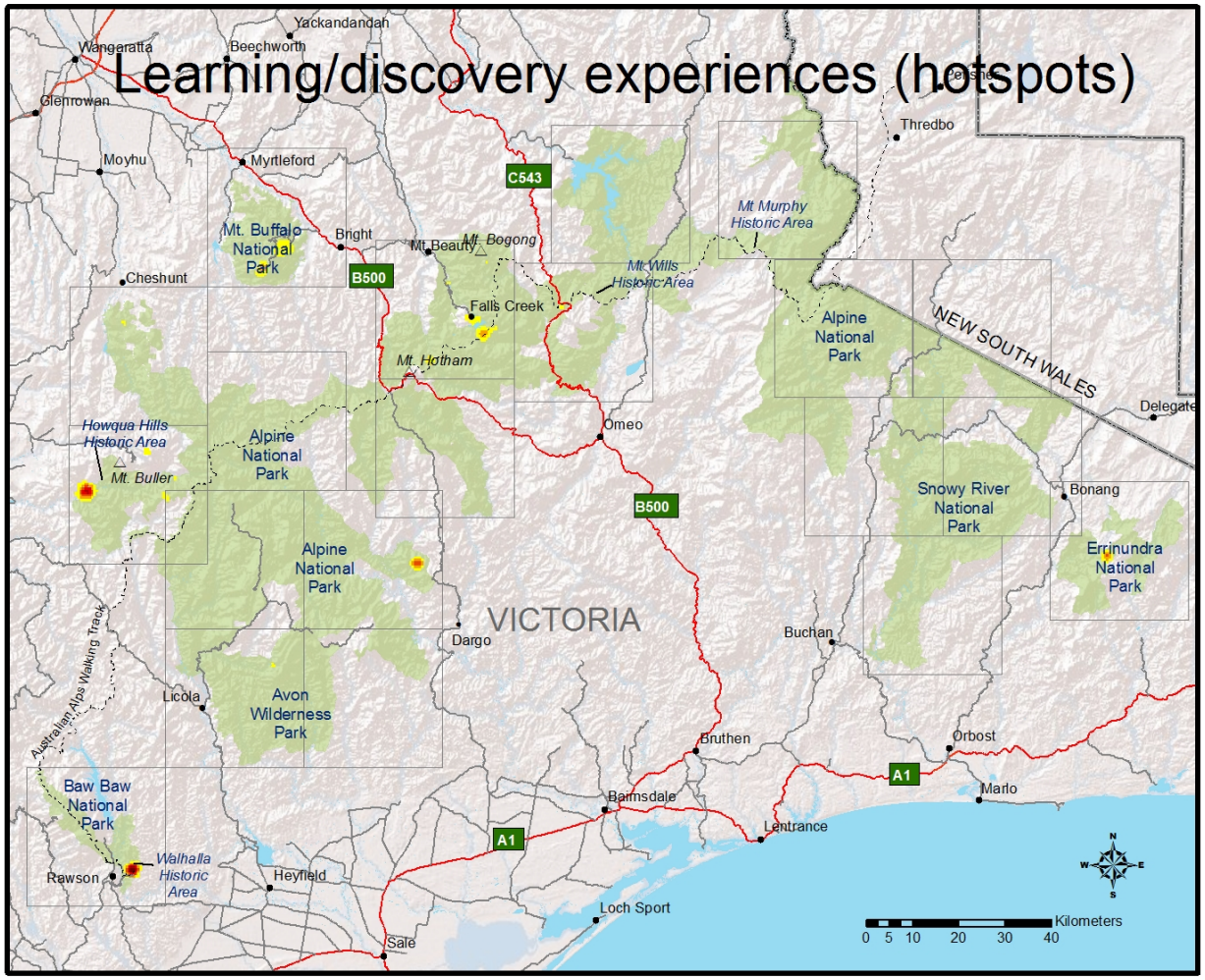


Figure 11. Map of overnight stay experience hotspots.

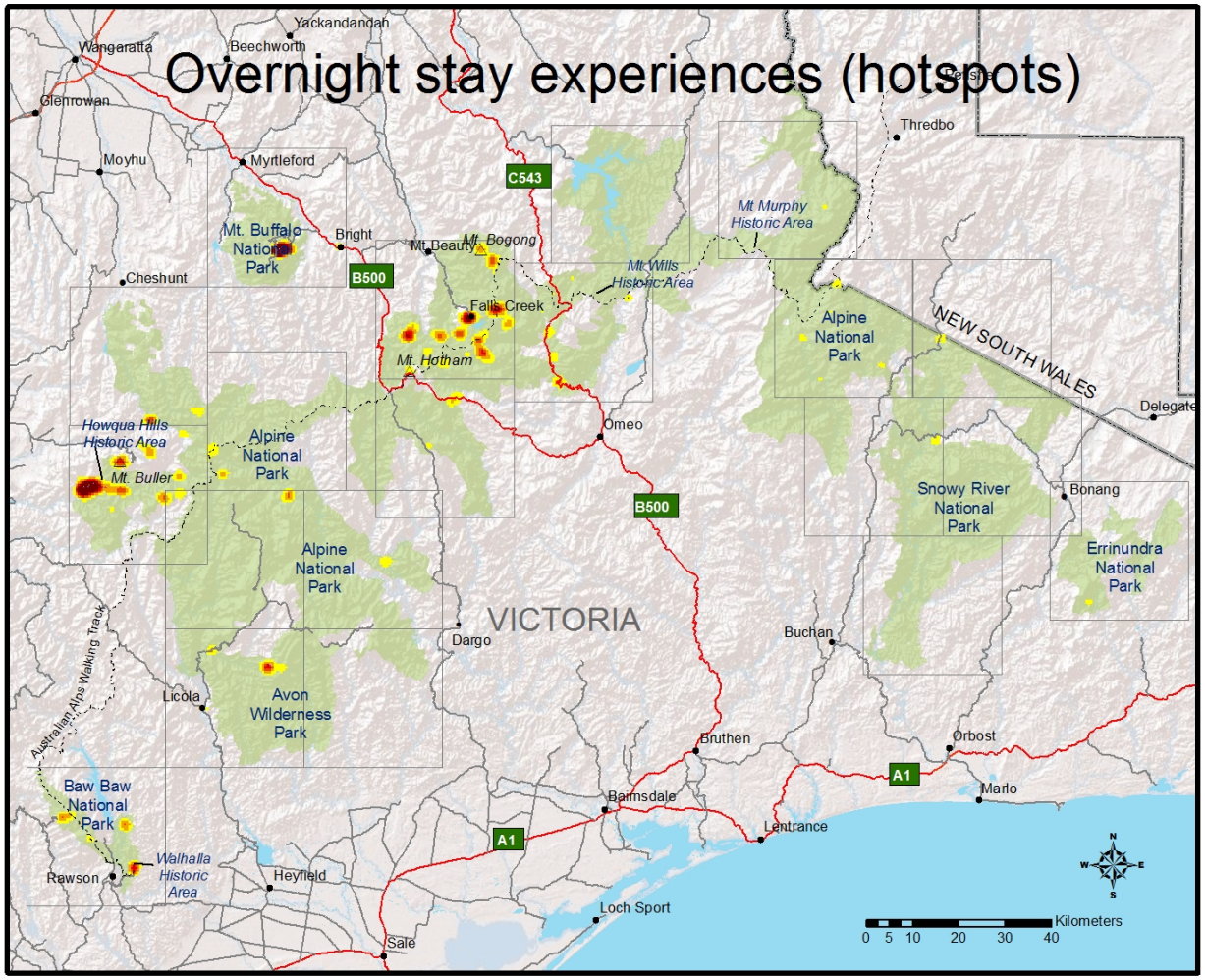


Figure 12. Map of other physical activity experience hotspots.

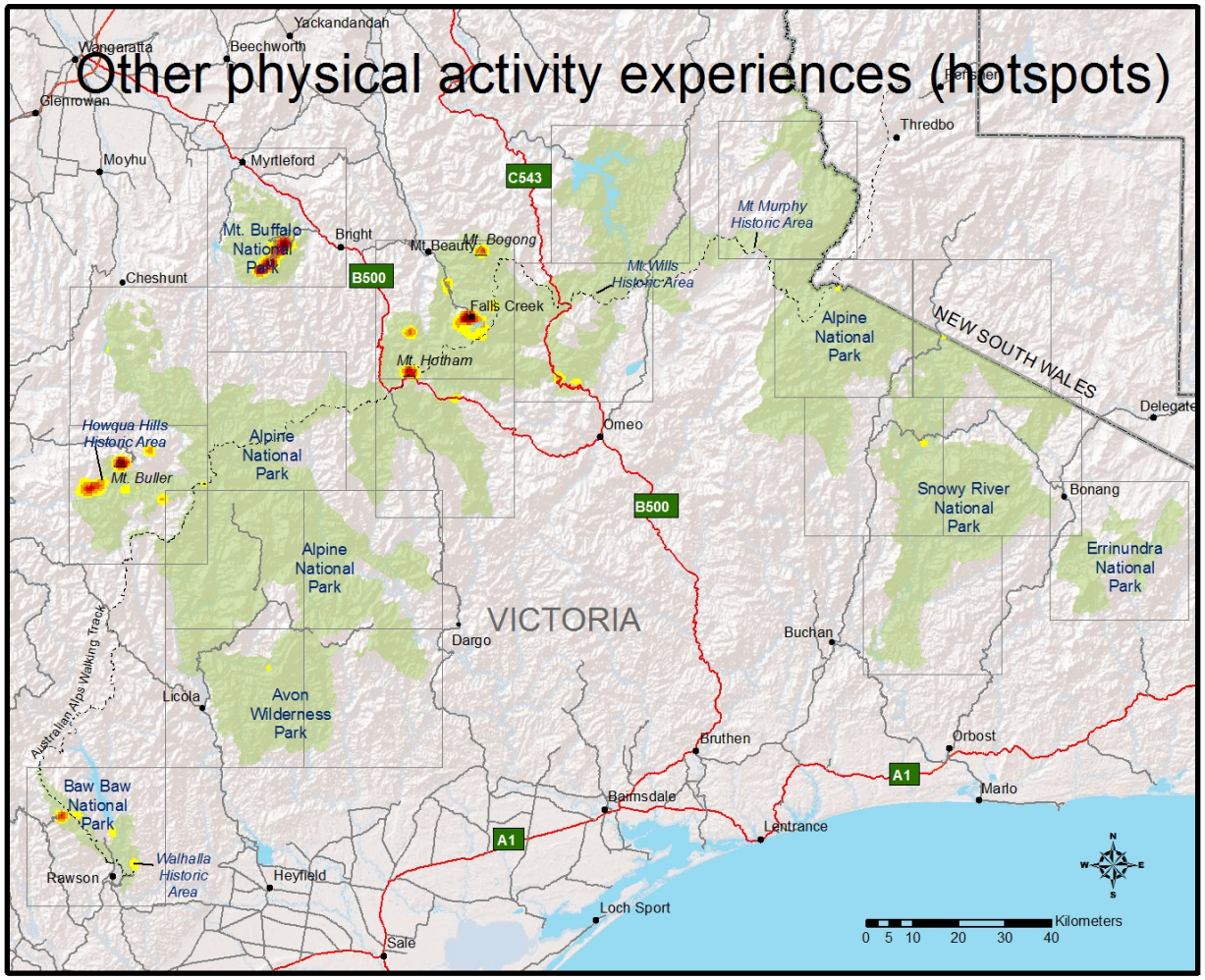


Figure 13. Map of wildlife viewing experience hotspots.

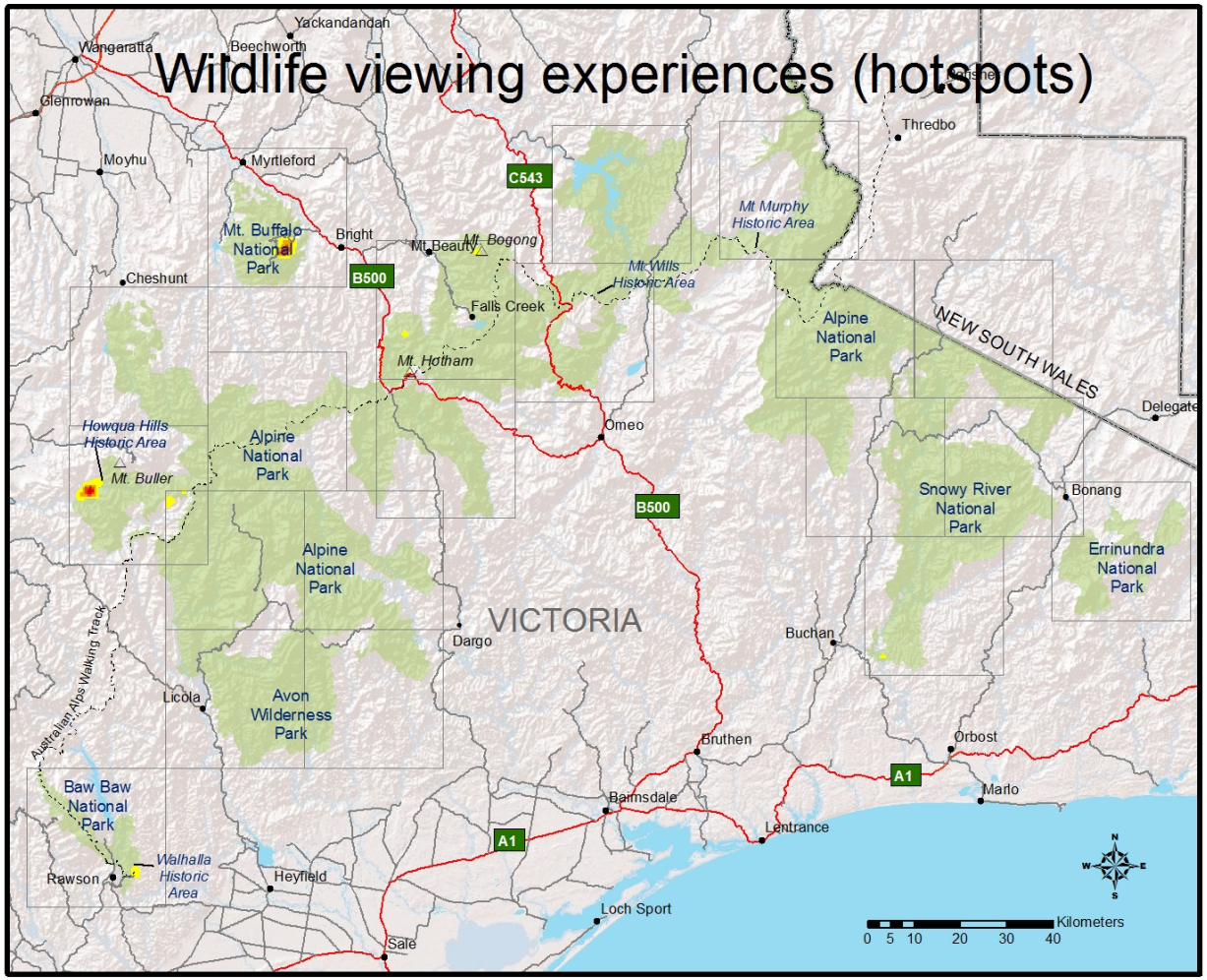


Figure 14. Map of rubbish/litter impact hotspots.

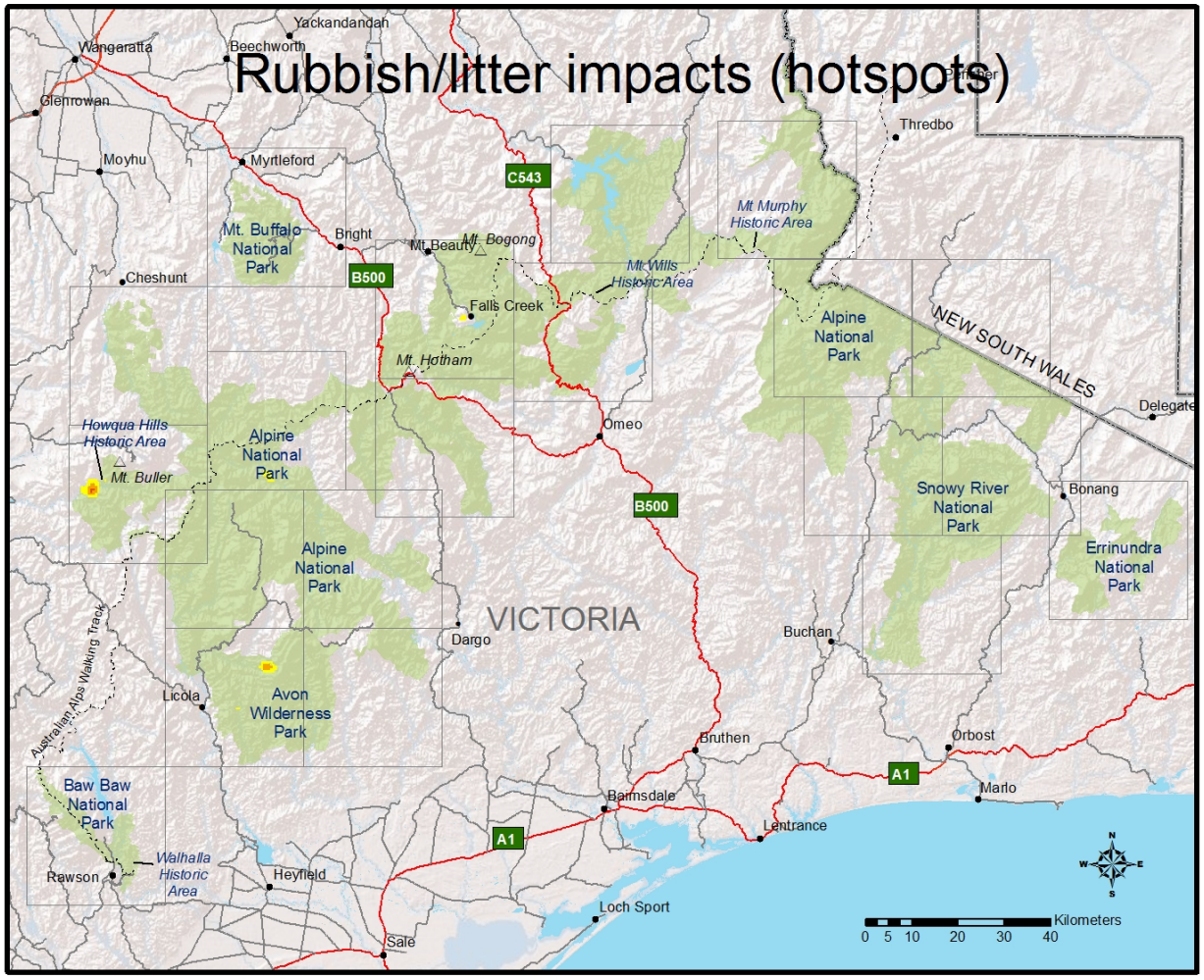

Rubbish/litter impacts (hotspots)
Yackandandah
Wangaratta
Beechworth
Glenrowan
Moyhu
Myrtleford
C543
Thredbo
Mt Murphy Historic Area
Mt. Buffalo National Park
Bright
Mt Beauty
Mt. Bogong
Mt Wills Historic Area
Cheshunt
B500
Falls Creek
Alpine National Park
NEW SOUTH WALES
Mt. Hotham
Delegate
Howqua Hills Historic Area
Mt. Buller
Omeo
Alpine National Park
Snowy River National Park
Bonang
B500
Errinundra National Park
Alpine National Park
VICTORIA
Dargo
Buchan
Australian Alps Walking Track
Licola
Avon Wilderness Park
Bruthen
Orbost
A1
Baw Baw National Park
Bairnsdale
Marlo
Lentrance
A1
Walhalla Historic Area
Rawson
Heyfield
Loch Sport
Sale
N
W
E
S
0 5 10 20 30 40
Kilometers

Figure 15. Map of campsite impact hotspots.

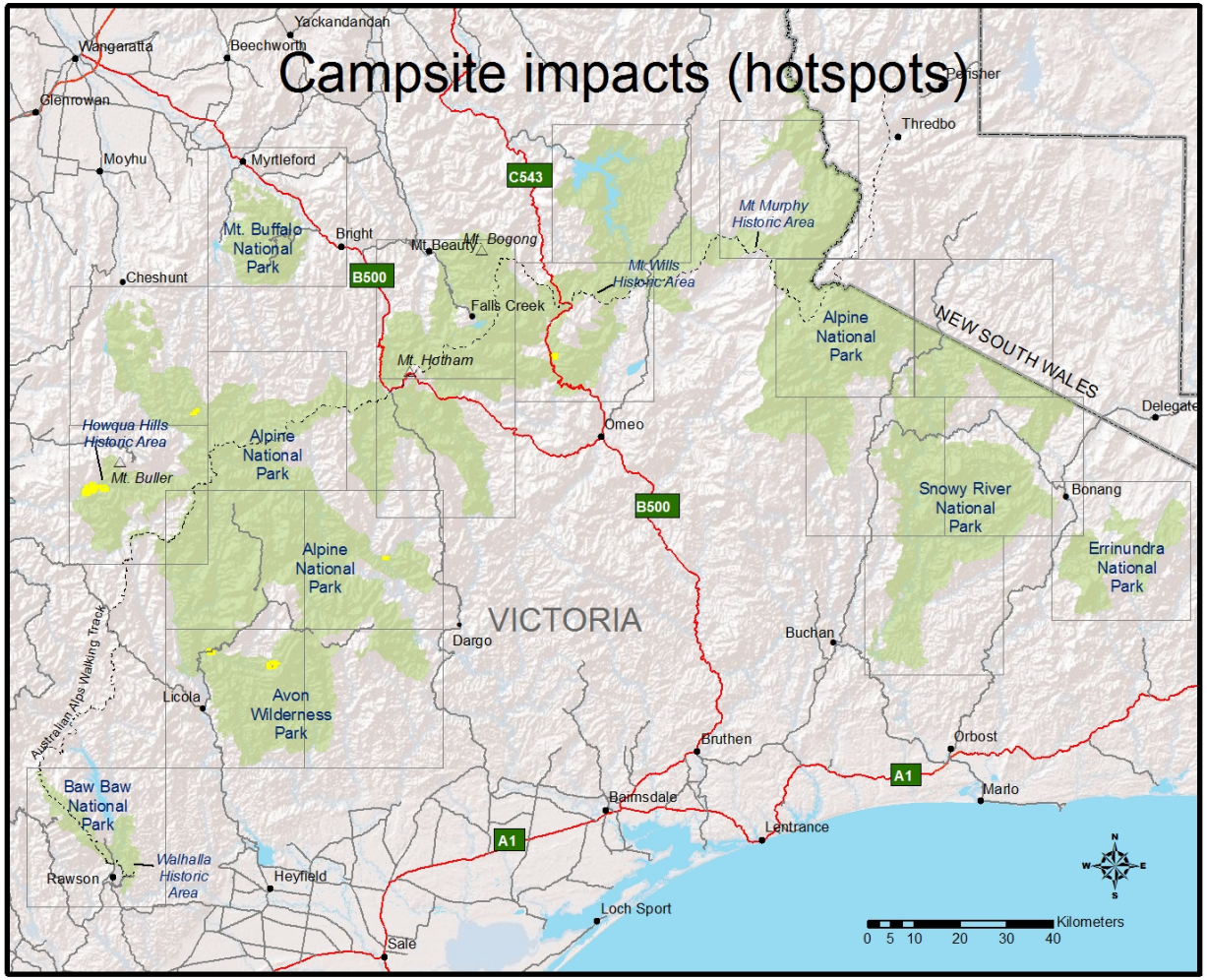


Figure 16. Map of noise impact hotspots.

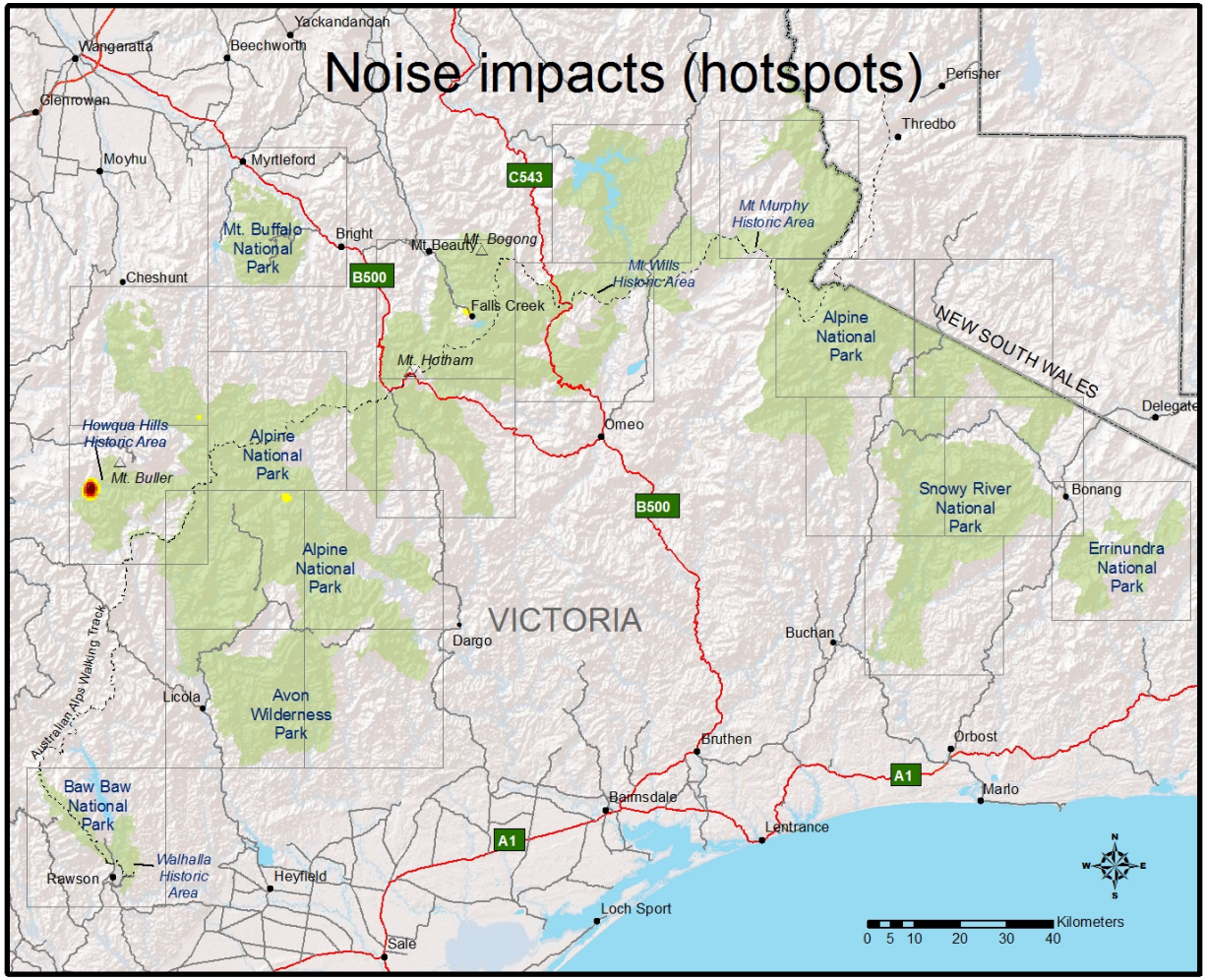


Figure 17. Map of track condition impact hotspots.

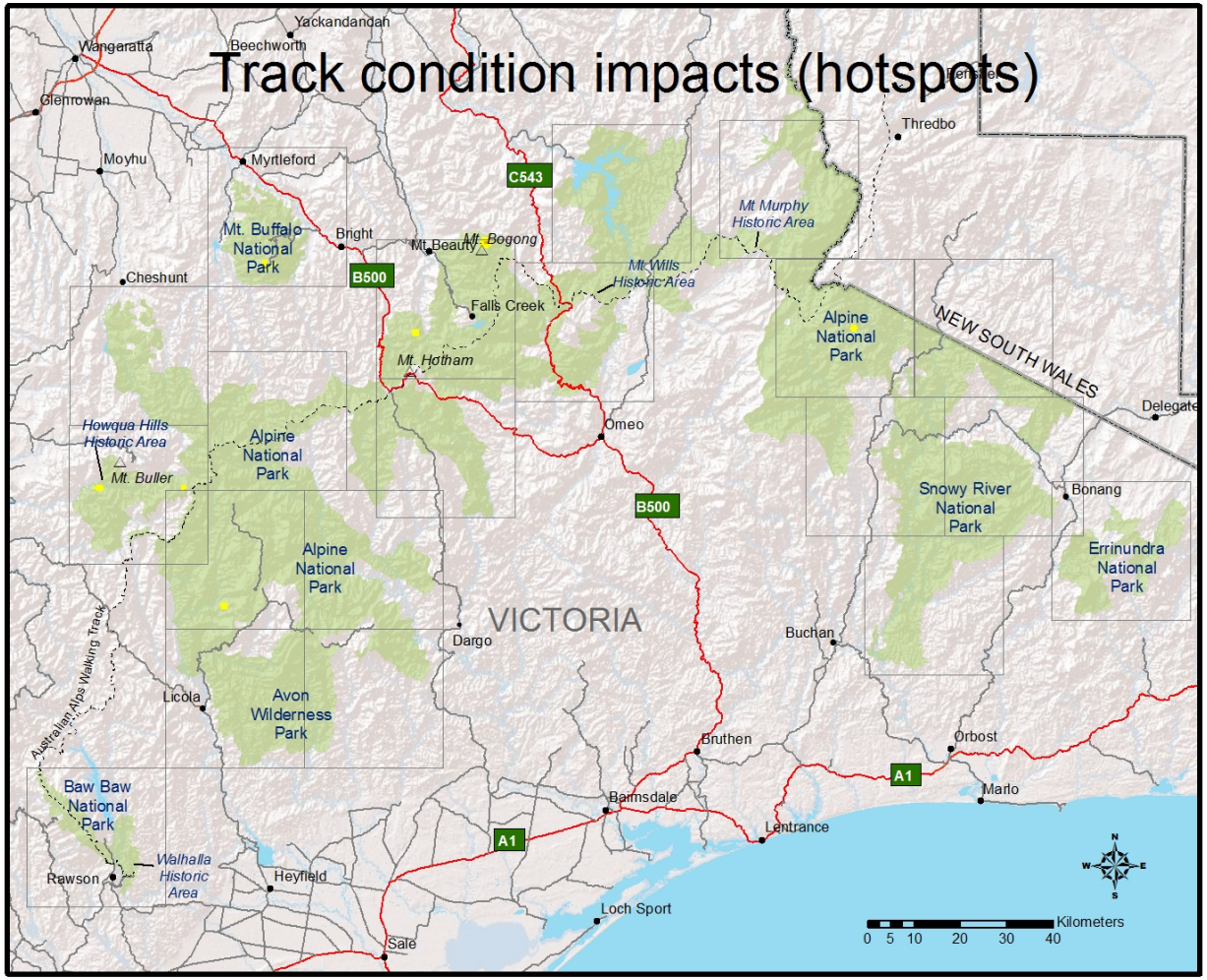


Figure 18. Map of vegetation impact hotspots.

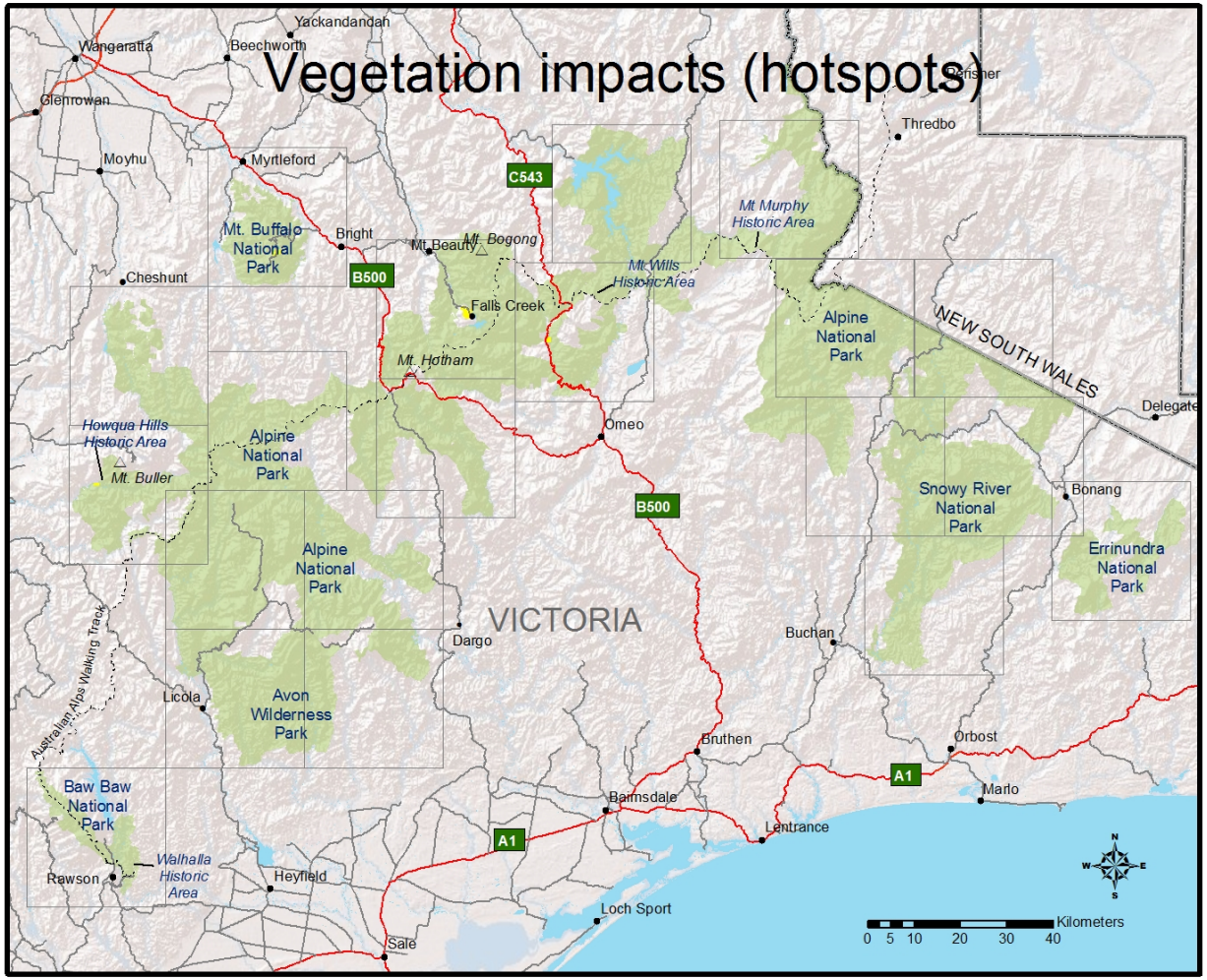


Figure 19. Map of water quality impact hotspots.

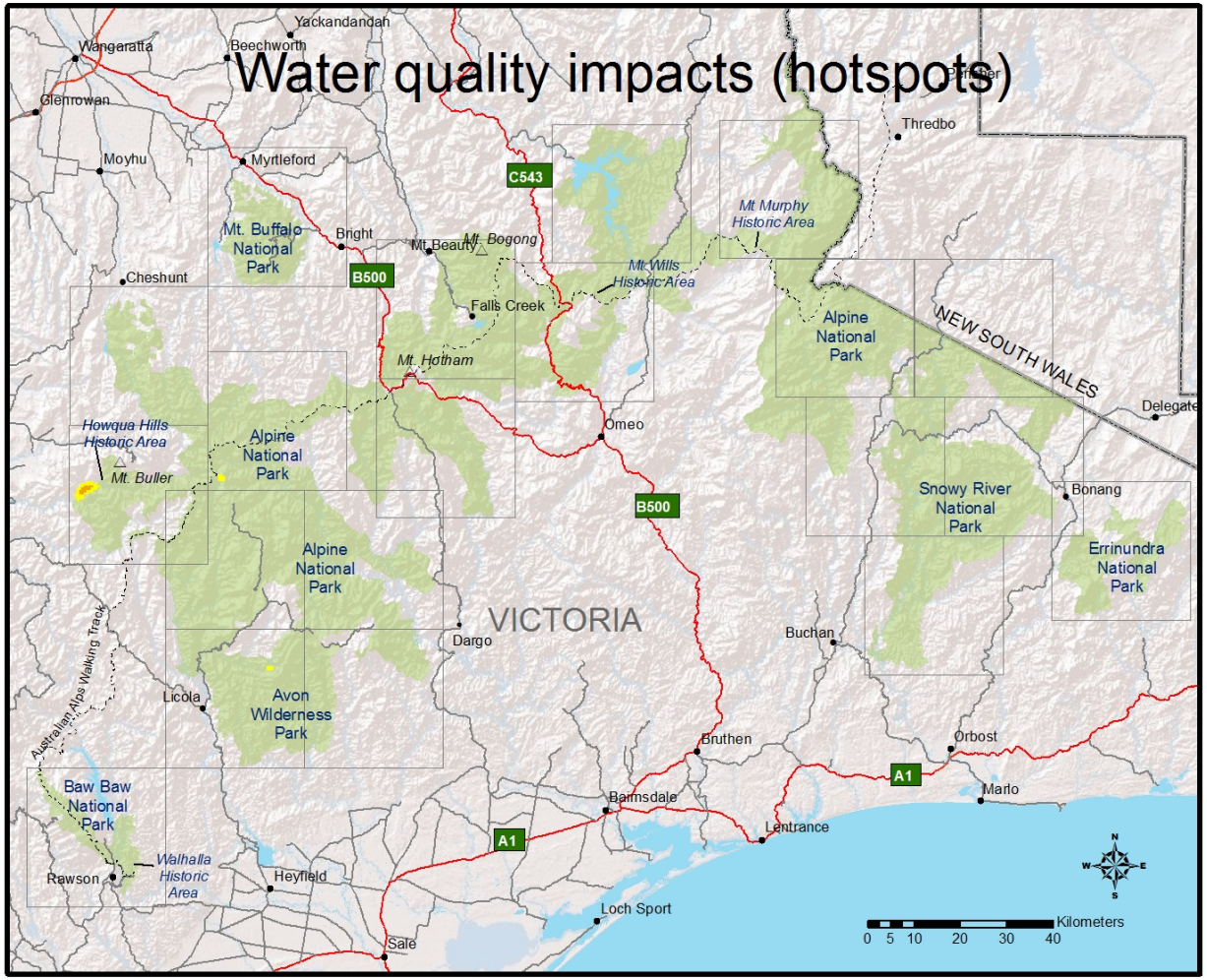


Figure 20. Map of wildlife impacts (points).

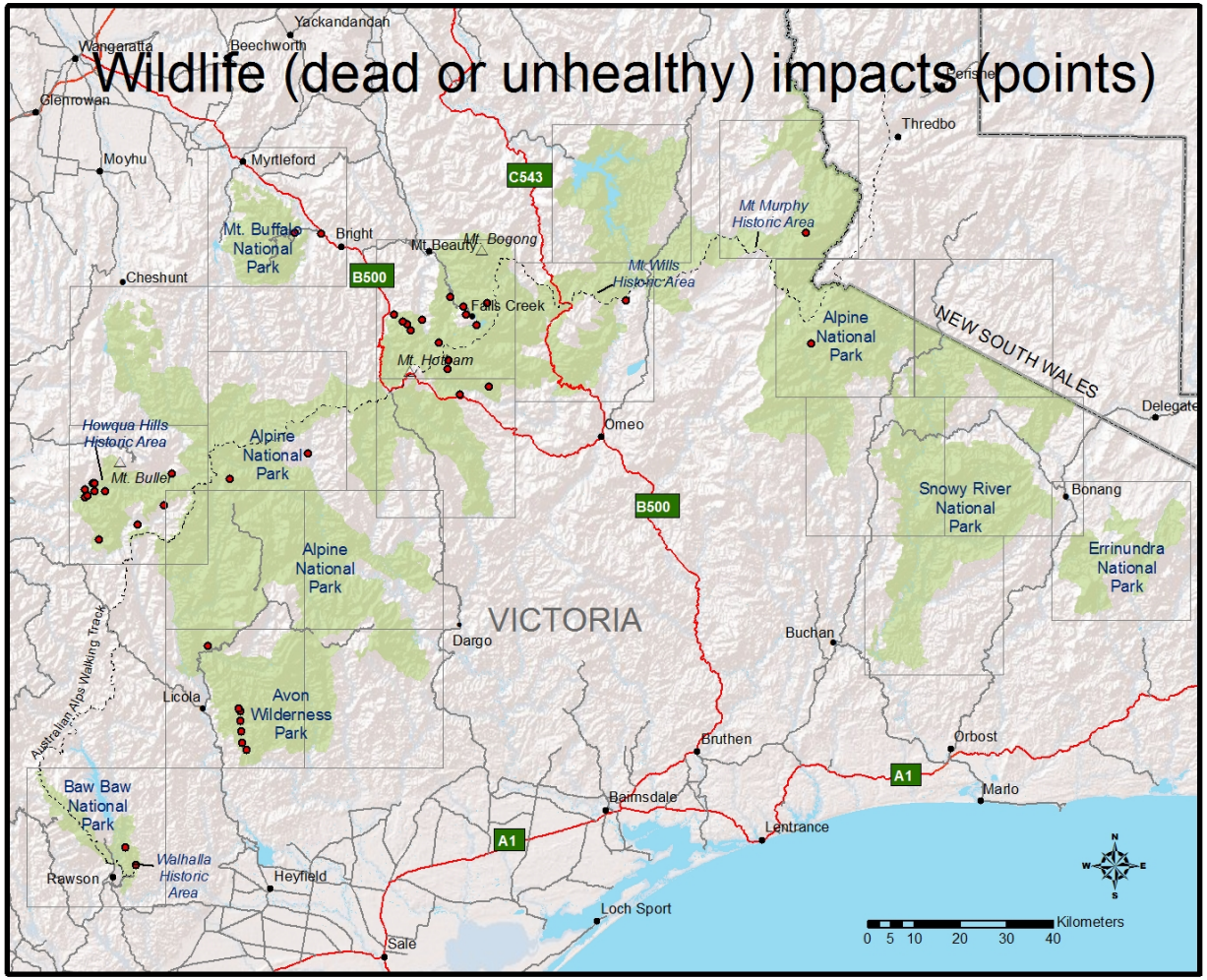


Figure 21. Map of all impacts combined hotspots.

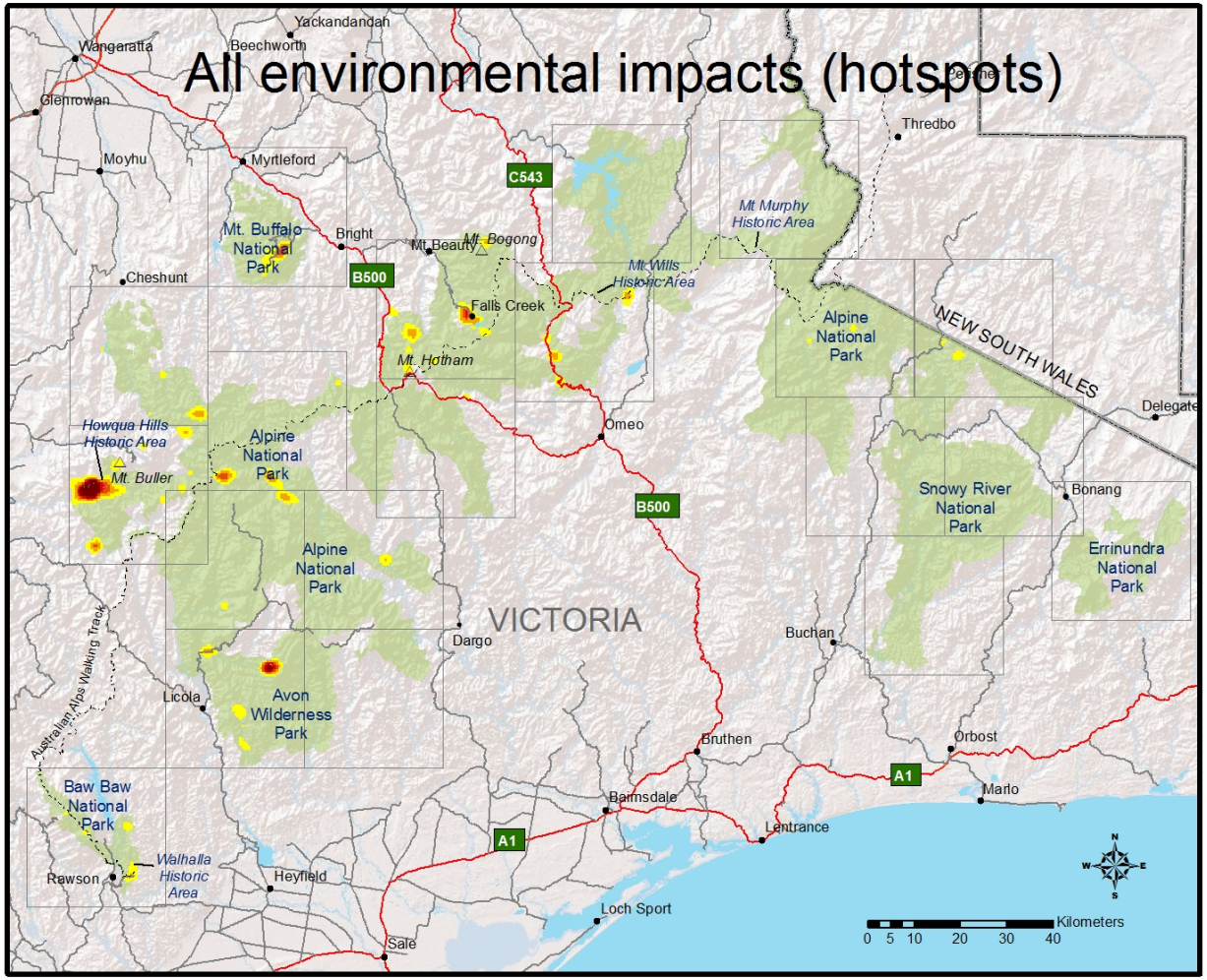


Figure 22. Map of special place hotspots.

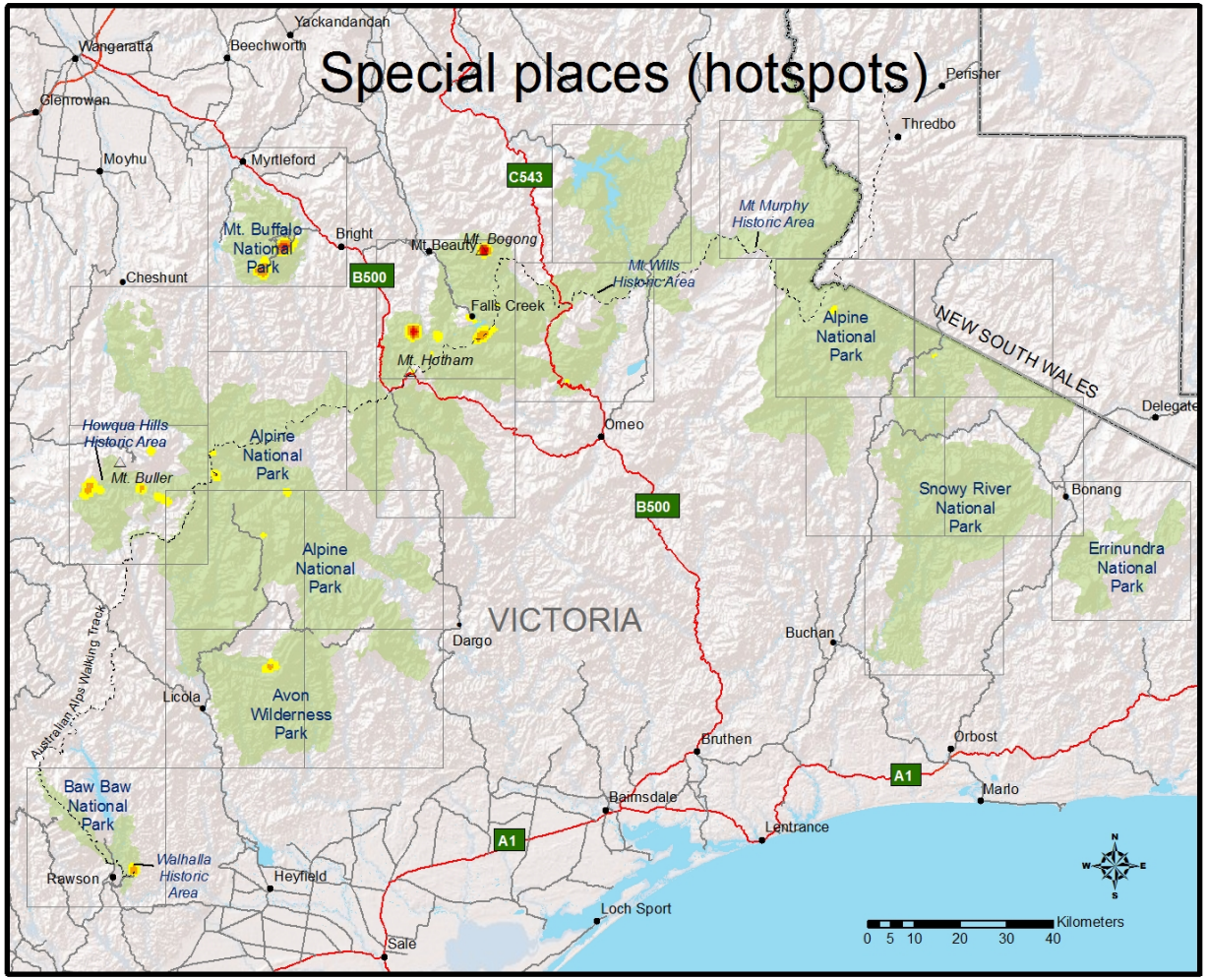


Figure 23. Map of facilities/services (points).

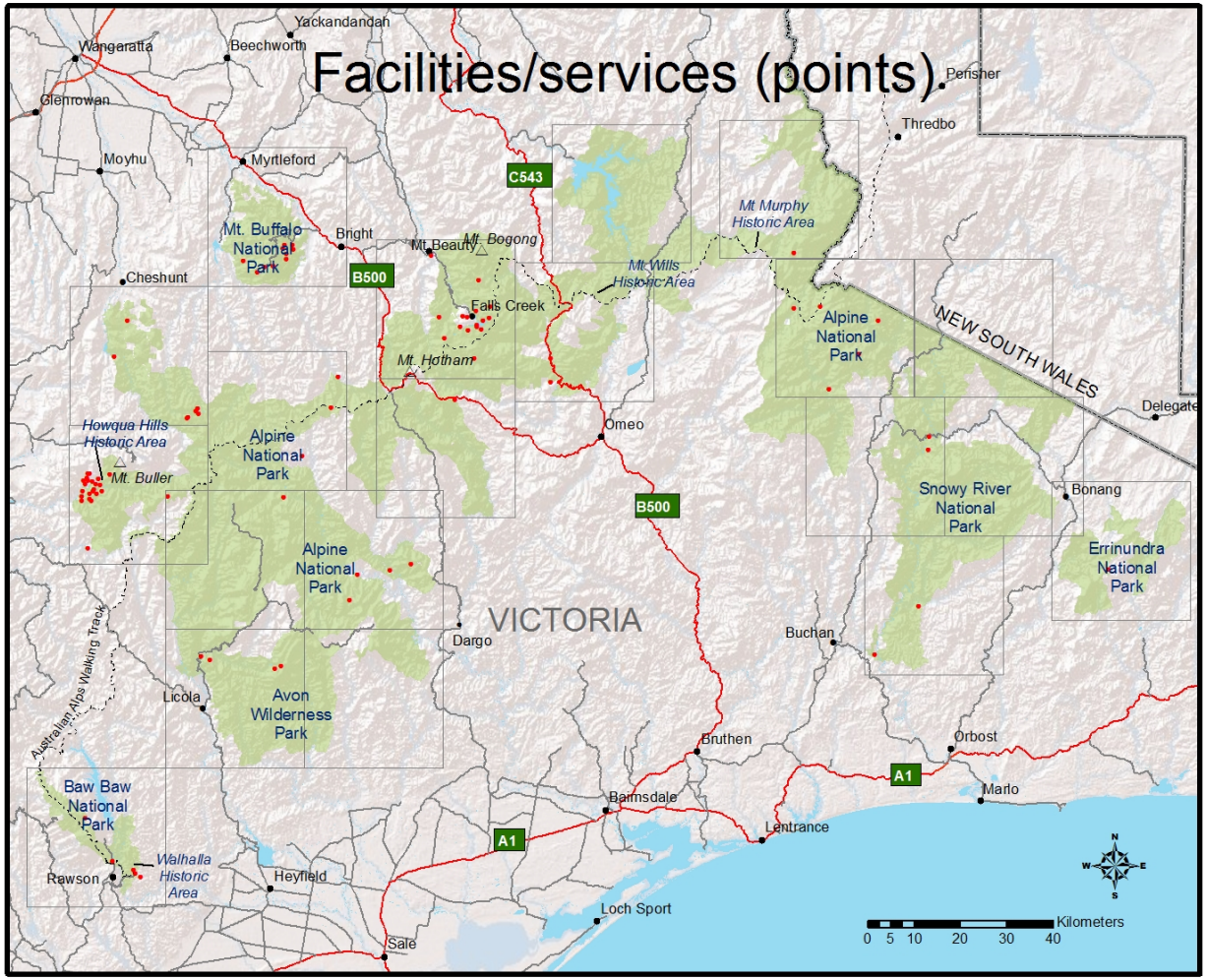
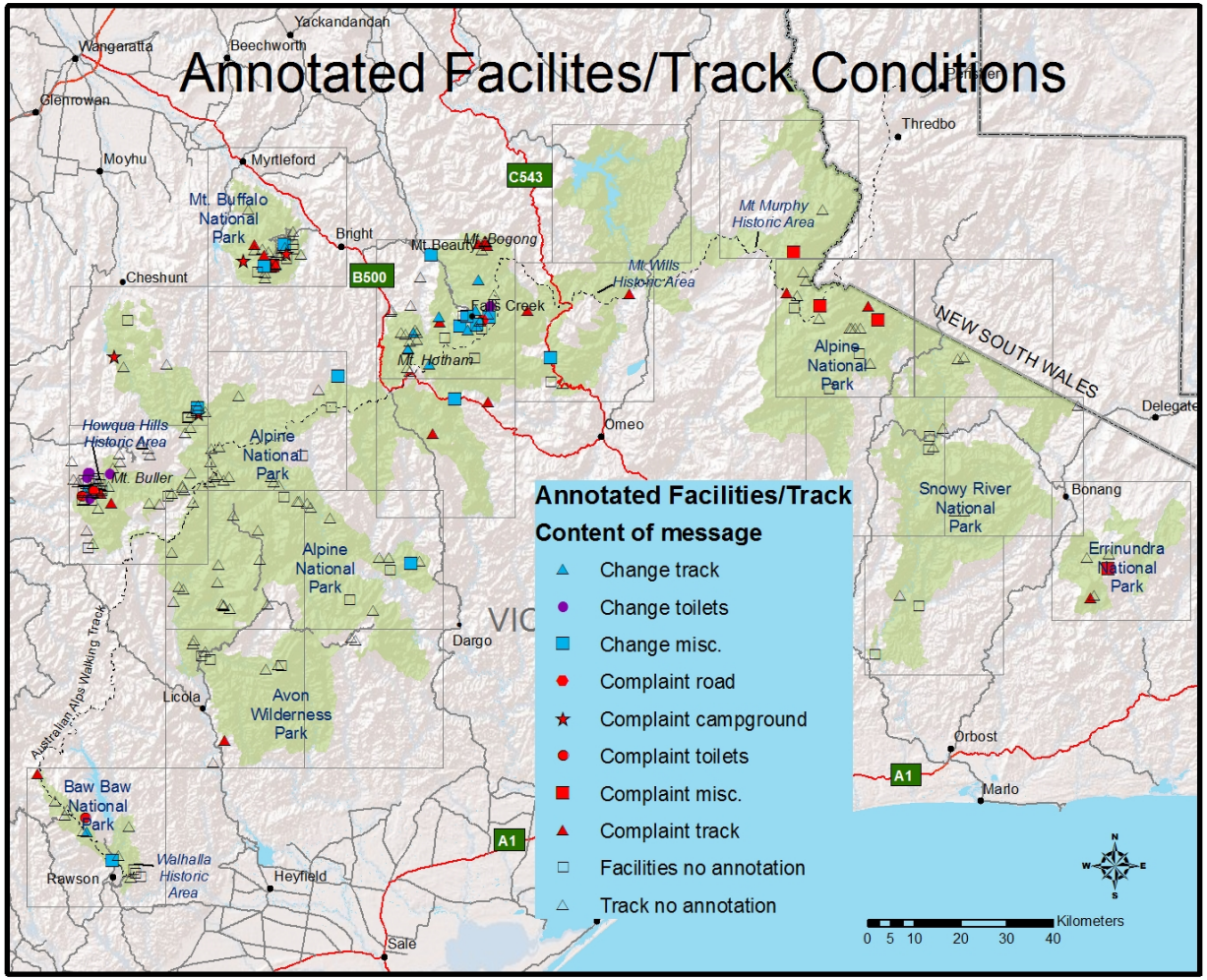


Figure 24. Map of all facilities and track condition points with and without annotation.



Chapter 5

5.0 Overview of Respondents

Participants in the study consisted of 3 sampling groups—visitors contacted in person at park locations described previously, members of the general public that learned about the PPGIS website, and PV staff members. Following completion of the mapping activity, participants were asked 10 sociodemographic questions to help understand the characteristics of the study participants and to examine whether some of these characteristics might be related to the type of experiences and impacts identified in the study.

5.1 Respondent Characteristics

5.1.1 Knowledge of places in Victorian Alps

Table 13 shows most often respondents considered their knowledge of the Victorian Alps to be good. About 80 percent of visitiors participating have average or better knowledge (self-identified) of places in the Victorian Alps. Individuals that voluntarily participated in survey (i.e., volunteer public) are most knowledgeable about places in the Victorian Alps as they were more likely to rate their knowledge of places as excellent and less likely to rate it average. Visitors contacted, however, were less likely to rate their knowledge of places as excellent.

Table 13. Self-identified knowledge of places in Victorian Alps by sampling group.

			Knowledge of places in Victorian Alps					
			Excellent	Good	Average	Low	Poor	Total
Sampling group	Visitor Contact	Count	23	83	79	38	9	232
		%	9.9%	35.8%	34.1%	16.4%	3.9%	100.0%
	Volunteer public	Count	21	33	6	4	3	67
		%	31.3%	49.3%	9.0%	6.0%	4.5%	100.0%
	PV Staff	Count	4	9	3	1	0	17
		%	23.5%	52.9%	17.6%	5.9%	.0%	100.0%
	Total	Count	48	125	88	43	12	316
		%	15.2%	39.6%	27.8%	13.6%	3.8%	100.0%

Residual chi-squared analysis was conducted on all cross tabulations. Where cellular chi-squared values exceed critcal 3.8 ($p<=0.05$, $df=1$) are shaded with green where cell statistics are significantly greater that expected or pink where cell statsistics are less than expected.

5.1.2 Knowledge of the natural environment

About 86 percent of visitors participating had average or better knowledge (self-identified) of the natural environment. Table 14 shows Individuals that voluntarily participated in the survey (i.e., public) considered themselves to be most knowledgeable about the natural environment. Visitors contacted were less likely to rate their knowledge of the natural environment as excellent. The volunteer public were more likely to rate their knowledge of the natural environment as excellent and less likely to rate it average or low.

Table 14. Self-identified knowledge natural places in Victorian Alps by sampling group.

			Knowledge of the natural environment					
			Excellent	Good	Average	Low	Poor	Total
Sampling group	Visitor Contact	Count	17	78	104	29	4	232
		%	7.3%	33.6%	44.8%	12.5%	1.7%	100.0%
	Volunteer public	Count	28	24	12	0	2	66
		%	42.4%	36.4%	18.2%	.0%	3.0%	100.0%
	PV Staff	Count	5	6	4	2	0	17
		%	29.4%	35.3%	23.5%	11.8%	.0%	100.0%
	Total	Count	50	108	120	31	6	315
		%	15.9%	34.3%	38.1%	9.8%	1.9%	100.0%

5.1.3 Number of times visited

Table 15 shows visitors participating in the study have significant experience with the Victorian Alps. The majority of visitors (55%) participating have visited the Victorian Alps more than 10 times. About 4 percent of the visitors only visited the Victorian Alps once. A high proportion of the volunteer public and Parks Victoria staff reside in the Alpine area, conversely, visitors contacted were less likely to live in the Alps.

Table 15. Number of visits to Victorian Alps by sampling group.

		Times visited NPs in Alps						
		1	2-3	4-5	6-7	More than 10 times	Live in Alps	Total
Visitor Contact	Count	10	23	27	29	128	15	232
	%	4.30%	9.90%	11.60%	12.50%	55.20%	6.50%	100.00%
Volunteer public	Count	3	1	2	2	34	23	65
	%	4.60%	1.50%	3.10%	3.10%	52.30%	35.40%	100.00%
PV Staff	Count	0	0	0	0	6	11	17
	%	0.00%	0.00%	0.00%	0.00%	35.30%	64.70%	100.00%
Total	Count	13	24	29	31	168	49	314
	%	4.10%	7.60%	9.20%	9.90%	53.50%	15.60%	100.00%

5.1.4 Gender of study participants

About 60 percent of respondents were male and 40 percent female. PV staff participation was heavily dominated by males. See Table 16.

Table 16. Gender of study participants by sampling group.

			Gender		
			Female	Male	Total
Sampling Group	Visitor Contact	Count	93	138	231
		% within Sampling Group	40.3%	59.7%	100.0%
	Volunteer public	Count	26	39	65
		% within Sampling Group	40.0%	60.0%	100.0%
	PV Staff	Count	3	14	17
		% within Sampling Group	17.6%	82.4%	100.0%
	Total	Count	122	191	313
		% within Sampling Group	39.0%	61.0%	100.0%

5.1.5 Age of study participants

The average age of study participants is in the mid-forties. The volunteer public is older, on average, by about 5 years. See Table 17.

Table 17. Average age of respondents by sampling group.

Sampling Group	Mean age (years)	N	Std. Deviation
Visitor Contact	42.54	230	12.269
Volunteer public	47.62	64	13.760
PV Staff	45.53	17	9.295
Total	43.75	311	12.590

5.1.6 Household size of study participants.

Park visitors appear to be divided between those with children (about 54 percent) and those without (about 46 percent). Table 18 shows the most frequently cited number of people in a household was two for visitor contacts and the volunteer public, and four for Parks Victoria staff.

Table 18. Number of people reported in household by sampling group.

			People in household						
			1	2	3	4	5	6 or more	Total
Sampling Group	Visitor Contact	Count	23	83	38	55	26	8	233
		%	9.9%	35.6%	16.3%	23.6%	11.2%	3.4%	100.0%
	Volunteer public	Count	9	28	9	17	3	1	67
		%	13.4%	41.8%	13.4%	25.4%	4.5%	1.5%	100.0%
	PV Staff	Count	3	4	3	5	2	0	17
		%	17.6%	23.5%	17.6%	29.4%	11.8%	.0%	100.0%
	Total	Count	35	115	50	77	31	9	317
		%	11.0%	36.3%	15.8%	24.3%	9.8%	2.8%	100.0%

5.1.7 Level of formal education of study participants

Table 19 shows a broad distribution in terms of education levels of participants. About 25 percent of park visitors have a bachelor's degree while another 10 percent completed a postgraduate degree. The volunteer public has an even higher level of formal education with about 45 perent having either a bachelor's or postgraduate degree. PV Staff, however, were more likely to have completed some post graduate school course.

Table 19. Self-identified highest level of formal educdation by sampling group.

			Secondary school	High school diploma or certificate	TAFE qualification or similar	University certificate, diploma or some courses towards a degree	University graduate (Bachelors degree)	Some post-graduate school courses	A postgraduate degree (Masters or Doctorate)	Total
Sampling Group	Visitor Contact	Count	48	13	36	36	59	17	24	233
		%	20.6%	5.6%	15.5%	15.5%	25.3%	7.3%	10.3%	100.0%
	Volunteer public	Count	12	2	9	8	17	6	13	67
		%	17.9%	3.0%	13.4%	11.9%	25.4%	9.0%	19.4%	100.0%
	PV Staff	Count	1	0	2	2	8	4	0	17
		%	5.9%	.0%	11.8%	11.8%	47.1%	23.5%	.0%	100.0%
	Total	Count	61	15	47	46	84	27	37	317
		%	19.2%	4.7%	14.8%	14.5%	26.5%	8.5%	11.7%	100.0%

5.1.8 Employment classification of study participants

Table 20 shows park visitors are distributed among multiple employment classifications with the largest employment classifications being professional, scientific, and technical services (14 percent) and other services (17 percent). Volunteer public were more likely to be employed in agriculture, forestry or fishing. PV staff were more likely to be employeed as professional, scientific or technical or in in public administration or safety.

Table 20. Employment category by sampling group.

			Sampling Group			
			Visitor Contact	Volunteer public	PV Staff	Total
Employment category	Accommodation and Food Services	Count	6	2	0	8
		%	2.6%	3.0%	.0%	2.5%
	Administrative and support services	Count	13	1	1	15
		%	5.6%	1.5%	5.9%	4.7%
	Agriculture, Forestry, and Fishing	Count	11	10	3	24
		%	4.7%	14.9%	17.6%	7.6%
	Arts and recreation services	Count	6	3	0	9
		%	2.6%	4.5%	.0%	2.8%
	Construction	Count	28	2	0	30
		%	12.0%	3.0%	.0%	9.5%
	Education and training	Count	28	6	1	35
		%	12.0%	9.0%	5.9%	11.0%
	Electricity, Gas, Water, and Waste Services	Count	6	0	0	6
		%	2.6%	.0%	.0%	1.9%
	Financial and insurance services	Count	10	0	0	10
		%	4.3%	.0%	.0%	3.2%
	Health care and social assistance	Count	18	5	0	23
		%	7.7%	7.5%	.0%	7.3%
	Information media and telecommunications	Count	14	2	0	16
		%	6.0%	3.0%	.0%	5.0%
	Mining	Count	3	0	1	4
		%	1.3%	.0%	5.9%	1.3%
	Other services	Count	40	18	2	60
		%	17.2%	26.9%	11.8%	18.9%
	Professional, scientific, and technical services	Count	33	12	6	51
		%	14.2%	17.9%	35.3%	16.1%
	Public Administration and safety	Count	1	3	3	7
		%	.4%	4.5%	17.6%	2.2%
	Rental, hiring, and real estate services	Count	2	1	0	3
		%	.9%	1.5%	.0%	.9%
	Retail trade	Count	9	1	0	10
		%	3.9%	1.5%	.0%	3.2%
	Transport, Postal and Warehousing	Count	4	0	0	4
		%	1.7%	.0%	.0%	1.3%
	Wholesale trade	Count	1	1	0	2
		%	.4%	1.5%	.0%	.6%
	Total	Count	233	67	17	317
		%	100.0%	100.0%	100.0%	100.0%

5.1.9 Household income of study participants

Park visitors have a very wide range of household incomes ranging from 6 percent of respondents that earn less than 20K annually to about 6 percent that earn more than 180K annually. Table 21 shows the most frequently cited income range for visitor contacts was $40-60,000; the volunteer public and Parks Victoria staff were slightly higher at $60-80,000.

Table 21. Household income by sampling group.

			Sampling Group			
			Visitor Contact	Volunteer public	PV Staff	Total
Household income	$180,001 or more	Count	14	2	1	17
		%	6.4%	3.3%	6.2%	5.8%
	$160,001-180,000	Count	7	2	1	10
		%	3.2%	3.3%	6.2%	3.4%
	$140,001-160,000	Count	12	3	2	17
		%	5.5%	4.9%	12.5%	5.8%
	$120,001-140,000	Count	12	0	0	12
		%	5.5%	.0%	.0%	4.1%
	$100,001-120,000	Count	24	4	0	28
		%	11.0%	6.6%	.0%	9.5%
	$80,001-$100,000	Count	32	8	3	43
		%	14.7%	13.1%	18.8%	14.6%
	$60,001-$80,000	Count	29	13	5	47
		%	13.3%	21.3%	31.2%	15.9%
	$40,001-$60,000	Count	40	12	2	54
		%	18.3%	19.7%	12.5%	18.3%
	$20,001-$40,000	Count	35	12	2	49
		%	16.1%	19.7%	12.5%	16.6%
	$20,000 or less	Count	13	5	0	18
		%	6.0%	8.2%	.0%	6.1%
	Total	Count	218	61	16	295
		%	100.0%	100.0%	100.0%	100.0%

5.1.10 Relationship between number of mapped attributes and knowledge of the region

The number of mapped park experiences, impacts, special places, and facilities is significantly related to one's knowledge of places in the region which is also related to the number of times visiting national parks in the region. In general, the greater the self-reported knowledge of places in the region, the greater the number of mapped attributes. See Table 22. A one-way ANOVA statistical test confirmed that individuals identifying "good" or "excellent" knowledge of places mapped significantly more experiences, impacts, facilties, and special places than individuals reporting "low" or "average" knowledge of places. Futher, one's self-identified knowledge of places is significantly correlated with the number of park visits (Spearman's rho=.61, $p \leq .05$). Similar results were found between the number of park visits and the number of mapped attributes with more visits associated with larger numbers of mapped attributes.

Table 22. Number of mapped attributes by self-identified knowledge of places in Vic Alps.

Type of observations	Knowledge of places	Number of individuals	Mean number of mapped observations	Std. Deviation	Std. Error
Experiences	Poor	12	4.25	1.603	.463
	Low	43	7.40	5.201	.793
	Average	88	9.88	7.222	.770
	Good	125	16.62	10.082	.902
	Excellent	48	17.94	12.164	1.756
	Total	316	13.22	9.950	.560
Impacts	Poor	12	2.83	6.807	1.965
	Low	43	.37	.787	.120
	Average	88	.74	1.160	.124
	Good	125	2.46	4.085	.365
	Excellent	48	4.75	8.025	1.158
	Total	316	2.06	4.507	.254
Facilities/services	Poor	12	.25	.452	.131
	Low	43	.05	.213	.032
	Average	88	.08	.272	.029
	Good	125	.34	.843	.075
	Excellent	48	.54	1.288	.186
	Total	316	.26	.769	.043
Special places	Poor	12	.25	.452	.131
	Low	43	.35	.897	.137
	Average	88	.50	1.072	.114
	Good	125	1.47	1.847	.165
	Excellent	48	2.46	2.315	.334
	Total	316	1.15	1.764	.099

5.1.11 Relationship between park experiences and household income

Park experiences do differ somewhat by household income (Chi-square = 37.8, $p \leq .05$). Lower income individuals/families tend to experience more overnight stays and more solitude while experiencing less social interaction. Higher income individuals/families engage in more trail (bushwalking) in particular. Individuals/families in the middle income category have the highest level of learning/discovery experiences. See Table 23.

Table 23. Mapped park experiences by household income.

			Income categories			
			$20,000 -60,000	$60,000 - 100,000	$100,000+	Total
category	aesthetic	Count	303	270	222	795
		%	21.9%	20.4%	20.2%	20.9%
	crowding	Count	65	91	70	226
		%	4.7%	6.9%	6.4%	5.9%
	learning	Count	93	103	57	253
		%	6.7%	7.8%	5.2%	6.6%
	overnight	Count	277	223	191	691
		%	20.0%	16.8%	17.4%	18.1%
	physical	Count	161	153	154	468
		%	11.6%	11.5%	14.0%	12.3%
	social	Count	96	115	82	293
		%	6.9%	8.7%	7.5%	7.7%
	solitude	Count	192	163	120	475
		%	13.9%	12.3%	10.9%	12.5%
	trail	Count	133	133	145	411
		%	9.6%	10.0%	13.2%	10.8%
	wildview	Count	64	74	59	197
		%	4.6%	5.6%	5.4%	5.2%
	Total	Count	1384	1325	1100	3809
		%	100.0%	100.0%	100.0%	100.0%

5.1.12 Relationship between impacts and sampling group

The types of perceived impacts differ by sampling groups. PV staff identified proportionately more than double the number of campsite impacts and significantly more track condition impacts. Visitors identified proportionately more noise, rubbish, water, and wildlife impacts. See Table 24.

Table 24. Number and percentage of impacts by sampling group.

			Sampling Group			
			Visitor contact	Volunteer public	PV Staff	Total
Impact	campsite	Count	42	42	25	109
		%	12.7%	14.0%	23.6%	14.8%
	noise	Count	53	43	13	109
		%	16.0%	14.3%	12.3%	14.8%
	rubbish	Count	60	46	13	119
		%	18.1%	15.3%	12.3%	16.1%
	track	Count	72	62	32	166
		%	21.8%	20.6%	30.2%	22.5%
	vegetation	Count	48	50	15	113
		%	14.5%	16.6%	14.2%	15.3%
	water	Count	37	37	6	80
		%	11.2%	12.3%	5.7%	10.8%
	wildlife	Count	19	21	2	42
		%	5.7%	7.0%	1.9%	5.7%
	Total	Count	331	301	106	738
		%	100.0%	100.0%	100.0%	100.0%

5.1.13 Relationship between experiences and sampling group

The park experiences of visitors differ somewhat from PV staff. Park visitors identified proportionately more social interaction and less solitude experiences than PV staff. PV staff identified fewer wildlife viewing and social experiences than visitors but more solitude experiences as did the volunteer public. See Table 25.

Table 25. Number and percentage of experience points by sampling group.

			Sampling Group			
			Visitor contact	Volunteer public	PV Staff	Total
Experience	aesthetic	Count	577	277	88	942
		%	20.4%	20.3%	23.5%	20.6%
	crowding	Count	173	72	24	269
		%	6.1%	5.3%	6.4%	5.9%
	learning	Count	181	108	23	312
		%	6.4%	7.9%	6.1%	6.8%
	overnight	Count	493	264	55	812
		%	17.4%	19.4%	14.7%	17.8%
	physical	Count	355	144	47	546
		%	12.6%	10.6%	12.5%	12.0%
	social	Count	256	92	18	366
		%	9.1%	6.7%	4.8%	8.0%
	solitude	Count	297	198	63	558
		%	10.5%	14.5%	16.8%	12.2%
	trail	Count	310	135	51	496
		%	11.0%	9.9%	13.6%	10.9%
	wildview	Count	185	74	6	265
		%	6.5%	5.4%	1.6%	5.8%
	Total	Count	2827	1364	375	4566
		%	100.0%	100.0%	100.0%	100.0%

5.1.14 Relationship between facilities and sampling group.

PV staff identified proportionately more concerns with park facilities/services than park visitors. See Table 26.

Table 26. Number and percentage of facilities/services attributes by sampling group.

			Sampling group			
			Visitor contact	General public	PV Staff	Total
category	Facilities	Count	40	28	19	87
		%	15.9%	17.8%	29.7%	18.4%
	Special	Count	211	129	45	385
		%	84.1%	82.2%	70.3%	81.6%
	Total	Count	251	157	64	472
		%	100.0%	100.0%	100.0%	100.0%

5.1.15 Relationship between park experiences and gender

Park experiences differ overall by gender (Chi-square=28.3, $p \leq .05$), but the differences by experience category are not large. Women tend to identify less crowding experiences than men. See Table 27.

Table 27. Mapped park experiences by gender.

			Gender		
			Female	Male	Total
Experience	aesthetic	Count	346	534	880
		%	22.4%	20.1%	20.9%
	crowding	Count	64	181	245
		%	4.1%	6.8%	5.8%
	learning	Count	117	169	286
		%	7.6%	6.3%	6.8%
	overnight	Count	274	474	748
		%	17.8%	17.8%	17.8%
	physical	Count	168	338	506
		%	10.9%	12.7%	12.0%
	social	Count	142	190	332
		%	9.2%	7.1%	7.9%
	solitude	Count	175	345	520
		%	11.3%	13.0%	12.4%
	trail	Count	178	279	457
		%	11.5%	10.5%	10.9%
	wildview	Count	79	153	232
		%	5.1%	5.7%	5.5%
	Total	Count	1543	2663	4206
		%	100.0%	100.0%	100.0%

5.1.16 Relationship between park experiences and level of formal education

There were significant differences (Chi-square=43.6, $p \leq .05$) between park experiences and level of formal education. Those with secondary or high school education had more trail experiences and less wildlife viewing . Those with Tafe or university certificate education had more wild life viewing. See Table 28 below.

Table 28. Mapped park experiences by level of formal education.

			Level of formal education			
			Bachelors Degree or higher	Tafe or university certificate	Secondary or high school	Total
category	aesthetic	Count	202	257	430	889
		%	20.8%	21.2%	20.8%	20.9%
	crowding	Count	49	70	128	247
		%	5.1%	5.8%	6.2%	5.8%
	learning	Count	75	82	129	286
		%	7.7%	6.7%	6.2%	6.7%
	overnight	Count	192	211	359	762
		%	19.8%	17.4%	17.4%	17.9%
	physical	Count	89	151	268	508
		%	9.2%	12.4%	13.0%	12.0%
	social	Count	82	84	168	334
		%	8.5%	6.9%	8.1%	7.9%
	solitude	Count	126	155	245	526
		%	13.0%	12.8%	11.9%	12.4%
	trail	Count	88	120	258	466
		%	9.1%	9.9%	12.5%	11.0%
	wildview	Count	66	85	81	232
		%	6.8%	7.0%	3.9%	5.5%
	Total	Count	969	1215	2066	4250
		%	100.0%	100.0%	100.0%	100.0%

5.1.17 Relationship between park experiences and age

Park experiences differ overall by age group (Chi-square=34.6, $p \leq .05$), but the differences by experience category are not large. Younger individuals identify more physical experiences than older age groups. See Table 29.

Table 29. Mapped park experiences by age category.

			Age categories			
			up to 30 years	31 - 49 years	50+ years	Total
Experience	aesthetic	Count	118	449	313	880
		%	22.9%	20.8%	20.6%	21.0%
	crowding	Count	35	132	78	245
		%	6.8%	6.1%	5.1%	5.8%
	learning	Count	24	137	122	283
		%	4.7%	6.3%	8.0%	6.7%
	overnight	Count	81	380	292	753
		%	15.7%	17.6%	19.2%	17.9%
	physical	Count	78	260	164	502
		%	15.1%	12.0%	10.8%	12.0%
	social	Count	49	171	106	326
		%	9.5%	7.9%	7.0%	7.8%
	solitude	Count	60	260	200	520
		%	11.6%	12.0%	13.1%	12.4%
	trail	Count	44	234	180	458
		%	8.5%	10.8%	11.8%	10.9%
	wildview	Count	27	136	66	229
		%	5.2%	6.3%	4.3%	5.5%
	Total	Count	516	2159	1521	4196
		%	100.0%	100.0%	100.0%	100.0%

5.1.18 Relationship between environmental impacts and household income

There is no significant relationship (Chi-square =19.7, $p \geq .05$) between the number of perceived environmental impact and income groups, however, those with high incomes reprted more wildlife impacts.. See Table 30.

Table 30. Mapped environmental impacts by household income.

			Income categories			
			20,000 -60,000	60,000 – 100,000	100,000+	Total
Impact	campsite	Count	28	42	25	95
		%	14.8%	16.3%	14.2%	15.2%
	noise	Count	26	33	21	80
		%	13.8%	12.8%	11.9%	12.8%
	rubbish	Count	31	39	33	103
		%	16.4%	15.1%	18.8%	16.5%
	track	Count	38	74	35	147
		%	20.1%	28.7%	19.9%	23.6%
	vegetation	Count	37	40	22	99
		%	19.6%	15.5%	12.5%	15.9%
	water	Count	20	23	24	67
		%	10.6%	8.9%	13.6%	10.8%
	wildlife	Count	9	7	16	32
		%	4.8%	2.7%	9.1%	5.1%
	Total	Count	189	258	176	623
		%	100.0%	100.0%	100.0%	100.0%

5.1.19 Relationship between environmental impacts and gender

There is no significant relationship between the number of perceived environmental impacts (chi-square=3.6, $p \geq .05$) and gender. See Table 31.

Table 31. Mapped environmental impacts by gender.

			Gender		
			Female	Male	Total
Impact	campsite	Count	19	77	96
		%	11.9%	15.2%	14.4%
	noise	Count	22	71	93
		%	13.8%	14.0%	13.9%
	rubbish	Count	23	84	107
		%	14.4%	16.6%	16.0%
	track	Count	36	118	154
		%	22.5%	23.3%	23.1%
	vegetation	Count	32	77	109
		%	20.0%	15.2%	16.3%
	water	Count	18	56	74
		%	11.2%	11.0%	11.1%
	wildlife	Count	10	24	34
		%	6.2%	4.7%	5.1%
	Total	Count	160	507	667
		%	100.0%	100.0%	100.0%

5.1.20 Relationship between environmental impacts and level of formal education

There is a significant relationship (Chi-square=21.1, p=.05) between the number of perceived environmental impacts and level of formal education. Those individuals with Tafe or university certificate were less likely to report vegetation impacts. See Table 32.

Table 32. Mapped environmental impacts by level of formal education.

			Level of formal education			
			Bachelors Degree or higher	Tafe or university certificate	Secondary or high school	Total
category	campsite	Count	19	26	52	97
		%	16.5%	14.0%	14.1%	14.5%
	noise	Count	10	28	55	93
		%	8.7%	15.1%	14.9%	13.9%
	rubbish	Count	23	36	49	108
		% within educrecode	20.0%	19.4%	13.2%	16.1%
	track	Count	18	45	91	154
		% within educrecode	15.7%	24.2%	24.6%	23.0%
	vegetation	Count	21	19	70	110
		% within educrecode	18.3%	10.2%	18.9%	16.4%
	water	Count	14	24	36	74
		% within educrecode	12.2%	12.9%	9.7%	11.0%
	wildlife	Count	10	8	17	35
		% within educrecode	8.7%	4.3%	4.6%	5.2%
	Total	Count	115	186	370	671
		% within educrecode	100.0%	100.0%	100.0%	100.0%

5.1.21 Relationship between environmental impacts and age

There is no overall significant relationship between the number of perceived environmental impacts (chi-square=15.2, $p \geq .05$) and age category. However, individuals below 30 years of age did observe proportionately more track conditions than older age groups and less vegetation impacts. See Table 33.

Table 33. Mapped environmental impacts by age category.

			Age categories			
			up to 30 years	31 - 49 years	50+ years	Total
Impact	campsite	Count	7	53	36	96
		%	12.7%	14.5%	16.6%	15.0%
	noise	Count	9	53	30	92
		%	16.4%	14.5%	13.8%	14.4%
	rubbish	Count	6	65	30	101
		%	10.9%	17.8%	13.8%	15.8%
	track	Count	21	80	53	154
		%	38.2%	21.9%	24.4%	24.1%
	vegetation	Count	2	62	37	101
		%	3.6%	16.9%	17.1%	15.8%
	water	Count	6	38	22	66
		%	10.9%	10.4%	10.1%	10.3%
	wildlife	Count	4	15	9	28
		%	7.3%	4.1%	4.1%	4.4%
	Total	Count	55	366	217	638
		%	100.0%	100.0%	100.0%	100.0%

5.1.22 Relationship between mapped experience and impact attributes

The relationship between mapped attributes (experiences and impacts) was explored using bivariate correlations between the number of mapped experiences and perceived environmental impacts. A number of significant relationships were apparent: Aesthetic and solitude experiences (r=.64), trail and overnight (r=.51), physical and overnight (r=.56), crowding and noise (r=.61), solitude and overnight (r=.62), track and campsite conditions (r=.65), campsite and rubbish conditions (r=.58), rubbish and wildlife (.50), and noise and rubbish (.64).

Chapter 6

6.0 Conclusions and Recommendations

This study was the first public participation GIS effort in Australia with the goal of identifying visitor experiences and perceived environmental impacts. As a pilot effort, the project had mixed results. The positive aspects of the research project included: 1) an acceptable response rate from visitors contacted to participate (50%), 2) a PPGIS website that was robust and continuously available for mapping, 3) general respondent agreement that the PPGIS website was easy to use, and 4) results that provided basic descriptive information about the distribution of visitor experiences and perceived environmental impacts in the region.

There are multiple areas where future implementation of a PPGIS project with similar goals could be improved.

Sampling: The response rates from Parks Victoria staff were disappointing. One of the project objectives was to compare the perceptions of impacts from professional and management staff with visitors to the park. The research literature indicates that park managers often observe impacts that visitors do not. With the low participation rate of PV staff (about 25%), the comparative results are only suggestive of potential differences between the groups. PV staff identified proportionately more track and campsite impacts than visitors while visitors identified more sensitivity to noise, rubbish, wildlife, and water impacts. This could be valuable data if Parks Victoria was to develop a community monitoring program in that focus on impacts such as noise, rubbish, wildlife and water impacts may be appropriate. However, the small PV sample prevents any definitive conclusions.

The visitor sampling effort was concentrated during two periods—Australia Day long weekend and Easter School Holidays—and while attempts were made to spatially stratify the data collection, weather conditions and fire events contributed to greater populations using parks in the January period compared to April. As a result the sample is geographically focused on the western reach of the Alpine region. Ideally, the sampling effort would be more spatially and temporally stratified and would include more residents that live in the region, not just those that visit the parks (in this study only 15.6% of the sample resided in the region).

The sampling for this particular study provides a snapshot of park experiences in peak periods. However, that also means results should be viewed in that context. For example, while Howqua Hills may appear to have a noise and crowding problem at Australia Day weekend, it is not to suggest the problem exists throughout the rest of the year.

Sampling was the major expense associated with this study and it is suggested that future PPGIS studies consider the use of panels or training local residents to conduct the interviews. This study used professional interviewers based in Melbourne and the large geographic area meant this approach was not cost effective.

Research questions: The list of spatial attributes and survey questions appear reasonable and respondents were able to map all attributes. However, in the future, the spatial attributes would benefit from refinement. For example, the vegetation impact should include invasive species (i.e., weeds) in the marker definition. Review of the additional comments provided by respondents suggests invasive weeds was an issue respondents were very concerned about but the impact was defined as "I observed dead or unhealthy vegetation" meaning observation of pest plants were unlikely to be mapped. Also, the web interface should more strongly encourage annotation of mapped attributes, especially facilities as only about half of the facilities markers were annotated by respondents. Not having

specific information as to whether the marker indicated the facility or service needed to be better maintained, changed or added, limits the usefulness of such information. Comments shown in Appendix 5 suggests a number of study participants indicated they would have liked more map markers (the application provided 6 markers per attribute). In the future, an option can be included to increase the number of available markers, or to replenish the markers for each map tile.

This study can inform similar future studies that should begin with a discussion of the application of such data with both planners and managers. The mapping of some attributes are likely to be more useful than others. For example, wildlife viewing appears to be a ubiquous activity but other the limited marketing potential, the value of such information, given the results, may be of limited use. Another issue that should be discussed in terms of methodology is ground truthing results. Although it is suggested that our spatial knowledge is improving through more frequent use of tools such as Google Earth, this proposition remains untested. Our intention was to compare visitor data with PV staff data but it was not possible due to the low PV sample. An additional complication was people mapping areas from previous experiences. Although surveyors told respondents to map experiences from that trip, it was obvious from the response patterns that people mapped areas from previous trips. This then puts into question the accuracy of some data, as an impact that existed 2 years ago, may not currently exist.

In this study, respondents were interested in expressing preferences for resource management options: cattle, fire management, and logging. Although this particular study was focused on experiences, impacts, and facilities, it would be possible to include several resource management markers where participants could indicate preferences for resource management outcomes in the region. Anchoring the survey with some questions that respondents really want to provide feedback about, is a proven strategy to increase response rate.

The survey questions provided basic demographic information to determine the representativeness of the sample but lacked questions that would be useful for relating to the experience and impact variables. In particular, survey questions should be included that provide greater opportunity for visitor segementation including motivations for visiting and measures of satisfaction with the visit. These variables would provide greater context for understanding the identified experience and impacts.

Analysis: This report provides basic descriptive information about the spatial location of different park experiences, perceived impacts, facilities issues and describes how the mapping of these attributes may be related to respondent characteristics. Additional analysis that relate the mapped attributes to management zones, levels of protection (LOP) and levels of service (LOS) may provide additional insight about the choice of particular strategies in terms of the level of management and service offered. It may also be worthwhile to undertake analysis to determine whether the mapped experiences provide a pattern analogous to a recreation opportunity spectrum (ROS) map for the study region. The challenge with this analysis is that an ROS map does not currently exist for the region and would first need to be created. However, it is recommended that further investigation of an experience opportunity spectrum be conducted and that ROS, LOS and LOP layers form a basis of comparison.

Conclusion: This report provides Parks Victoria with an overview of visitors to their Alpine Parks; the experiences they have; and the impacts they have observed. It shows while may experiences, such as enjoying scenery and overnight experiences are in common to many sites within the region, there are distinct experiences offered by different park units, particularly the historic sites. The experience of solitude was important to many park visitors and able to be fulfilled at many different sites. With the exception of Howqua Hills, crowding was not a noticeable problem at these parks. In terms of impacts, again the different park units show different patterns of impacts. Track condition was the most prevalent issue, although water quality and vegetation degradation were also issues at a number of parks. There were a number of significant relationships between the types of experiences and impacts reported. For example relationships existed between aesthetic and solitude experiences;

solitude and overnight; trail and overnight experiences; physical and overnight; crowding and noise; track and campsite conditions; campsite and rubbish conditions; rubbish and wildlife; and noise and rubbish. It is hoped this report can provide insights for planners developing the Greater Alpine National Parks Management Plan by improving their understanding of the types of visitors patronizing these parks and the experiences they are having at the different park units; the impacts likely to be occurring in various areas; and the extensive additional comments they have provided

REFERENCES

Dillman, D. 2000. *Mail and Internet Surveys. The tailored design method*. 2nd Ed. Wiley. New York, NY.

AUTHORS

Greg Brown
Dr. Greg Brown is Associate Professor and Director of the Center for the Environment at Central Washington University (U.S.A.) and adjunct Senior Lecturer in the School of Natural and Built Environments, University of South Australia, Mawson Lakes, SA 5095 email: greg.brown@unisa.edu.au

Delene Weber
Dr. Delene Weber is a Senior Lecturer in the School of Natural and Built Environments and a member of the Barbara Hardy Centre for Urban Ecology at the University of South Australia, Mawson Lakes, SA 5095 email: delene.weber@unisa.edu.au

Appendix 1: Summary of On-Site Surveying

Survey Period	Dates	Park Unit	Areas surveyed	Surveyors	# of emails recorded	# of non-usable	Total	Completed Surveys	Response Rate
Australia Day Long Weekend	24/01/09-26/01/09	Howqua Hills Historic Area	Sheepyard Flat, Pickerings Hut, Merrijig, Devon's Flat, Tunnel Bend, Noonan's Flat, Eight Mile, Fry's Hut	B. Gaylard H. Glover	121	45 undeliverable; 8 could not access/ navigate site	204	172	84%
	24/01/09 - 25/01/09	Alpine National Park	Bogong High Plains: Wallace Hut, Mt Nelse, Pretty Valley, Falls Creek	V. Dixon	78				
	25/01/09 – 26/01/09	Mt Buffalo National Park	Lake Catani, The Horn, Gorge area	V. Dixon	52				
Easter School Holidays	4/04/09	Errinundra National Park	Goongerah Camping Ground	V.Dixon	5	39 undeliverable; 3 could not access / navigatesite	280	76	27%
	4/04/09 – 5/04/09	Snowy River National Park	Balley Hooley, McKillops Bridge, Buchan Caves	V. Dixon	33				
	8/4/09 – 13/04/09	Snowy River National Park	Buchan Caves, Buchan St Caravan Park, Lakes Entrance, Bruthen, Buchan Rodeo, Nowa Nowa	H. Glover B. Gaylard	199				
	9/04/09 – 11/04/09	Snowy River National Park	Lakes Entrance VIC, Omeo VIC, Victoria Falls campground	B. Marsden	52				
	11/4/09	Walhalla Historic District	Walhalla main street and valley	B. Marsh	33				
Summary	24/01/09-13/04/09	4 National Parks, 2 historic areas			579	95	484	248	51%

Appendix 2: Variable Descriptors and Survey Questions

Descriptions of the variables investigated that were provided to participants

Your experiences in the Victorian Alps

Scenic/aesthetic appreciation—I experienced pleasing sights, sounds, and/or smells.
Crowding/congestion—I experienced crowding and congestion with other visitors.
Solitude/tranquility/escape—I experienced solitude, tranquility, and escape from social pressures.
Social interaction—I experienced positive social interaction with family, friends, or other visitors.
Physical activity/adventure—I experienced physical activity and/or adventure (e.g., bushwalking, bicycling, skiing, rock-climbing).
Learning—I experienced learning about nature, culture, or heritage.

Observed environmental impacts in the Victorian Alps

Track condition—I observed degraded track conditions (e.g., erosion, excessive water/mud, overgrown vegetation).
Campsite condition—I observed degraded campsite conditions (e.g., damaged and/or trampled vegetation, litter/rubbish, damaged camp facilities).
Litter/rubbish—I observed litter and/or rubbish.
Wildlife—I observed sick or dead wildlife (including roadkill).
Vegetation—I observed dead or unhealthy vegetation (e.g., trees, shrubs, grasses).
Water quality—I observed degraded water quality (e.g., poor taste, color, or quantity).
Noise—I observed annoying, excessive, and/or unnatural noises (e.g., from cars, airplanes, off-road vehicles, or other visitors).

Special places in the Victorian Alps

Special places—I value these places because they are special to me. Please double click on the map marker to write why the place is special to you.

Survey questions that followed the PPGIS exercise

Please tell us about yourself
The following questions are intended to tell us a little about you. This information will only be used to compare the responses of different groups of people, and you will not be identified in any way. However, if for some reason there is a question you do not want to answer, just leave it blank.
Click your mouse in the circles to indicate your responses to the following nine questions.
Top of Form

1. How long have you lived in your community?

Years

2. How would you rate your knowledge of places in the Victorian Alps? (Please check one response.)

- Excellent
- Good
- Fair
- Poor

1. **How would you rate your knowledge of the natural environment (e.g., plants, trees, wildlife)?** (Please check one response.)

- ☐ Excellent
- ☐ Good
- ☐ Fair
- ☐ Poor

4. About how many times have you visited national parks in the Victorian Alps? (Please check one response.)

- ◉ 1 time only
- ☐ 2-3 times
- ☐ 4-5 times
- ☐ 6-10 times
- ☐ More than 10 times
- ☐ I live in the Victorian Alps

5. What is your gender?

- ☐ Male
- ☐ Female

6. What is your age?

☐ Years

7. How many people live in your household? *(Including yourself)*

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6 or more

8. What is the highest level of formal education you have completed?

- ☐ Less than high school
- ☐ High school diploma or certificate
- ☐ Trade, apprenticeship, or non-university certificate or diploma
- ☐ Some college or university courses (no degree)
- ☐ College or university graduate (Bachelors degree)
- ☐ Some postgraduate school courses
- ☐ A postgraduate degree (Masters or Doctorate)

9. Of the following employment categories, please check the one that best describes you.

- ☐ Agriculture

- ○ Tourism
- ○ Government
- ◉ Education
- ○ Professional Services
- ○ Commercial/retail
- ○ Tradesman
- ○ Homemaker
- ○ Retired
- ○ Unemployed
- ○ Student
- ○ Other

10. Which category best describes your pre-tax household income last year?

- ○ $20,000 or less
- ○ $20,001-$40,000
- ○ $40,001-$60,000
- ○ $60,001-$80,000
- ○ $80,001-$100,000
- ○ $100,001 or more

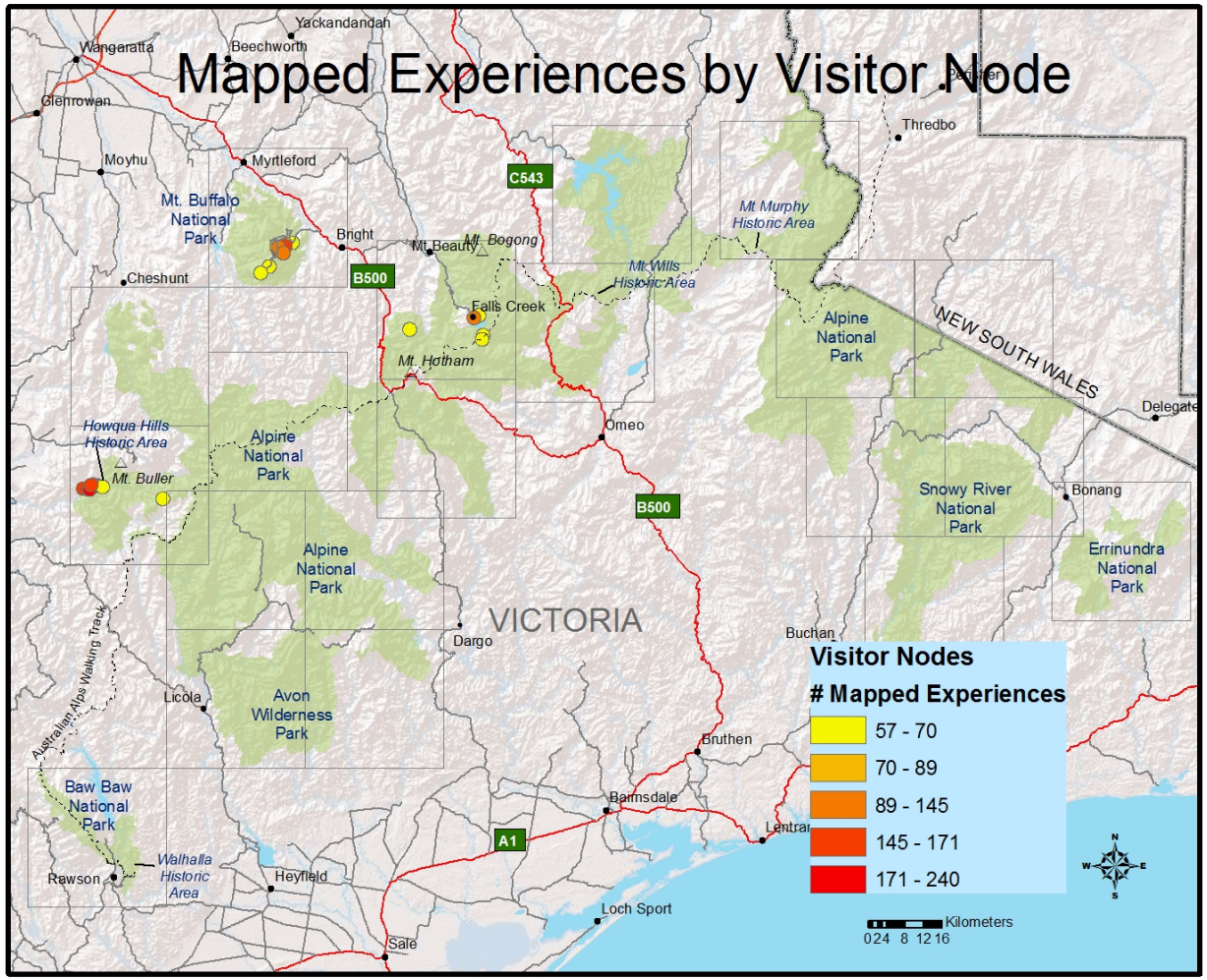
If you have any comments about management of the national parks in the Victorian Alps, you can write them here.
(up to 250 words maximum)

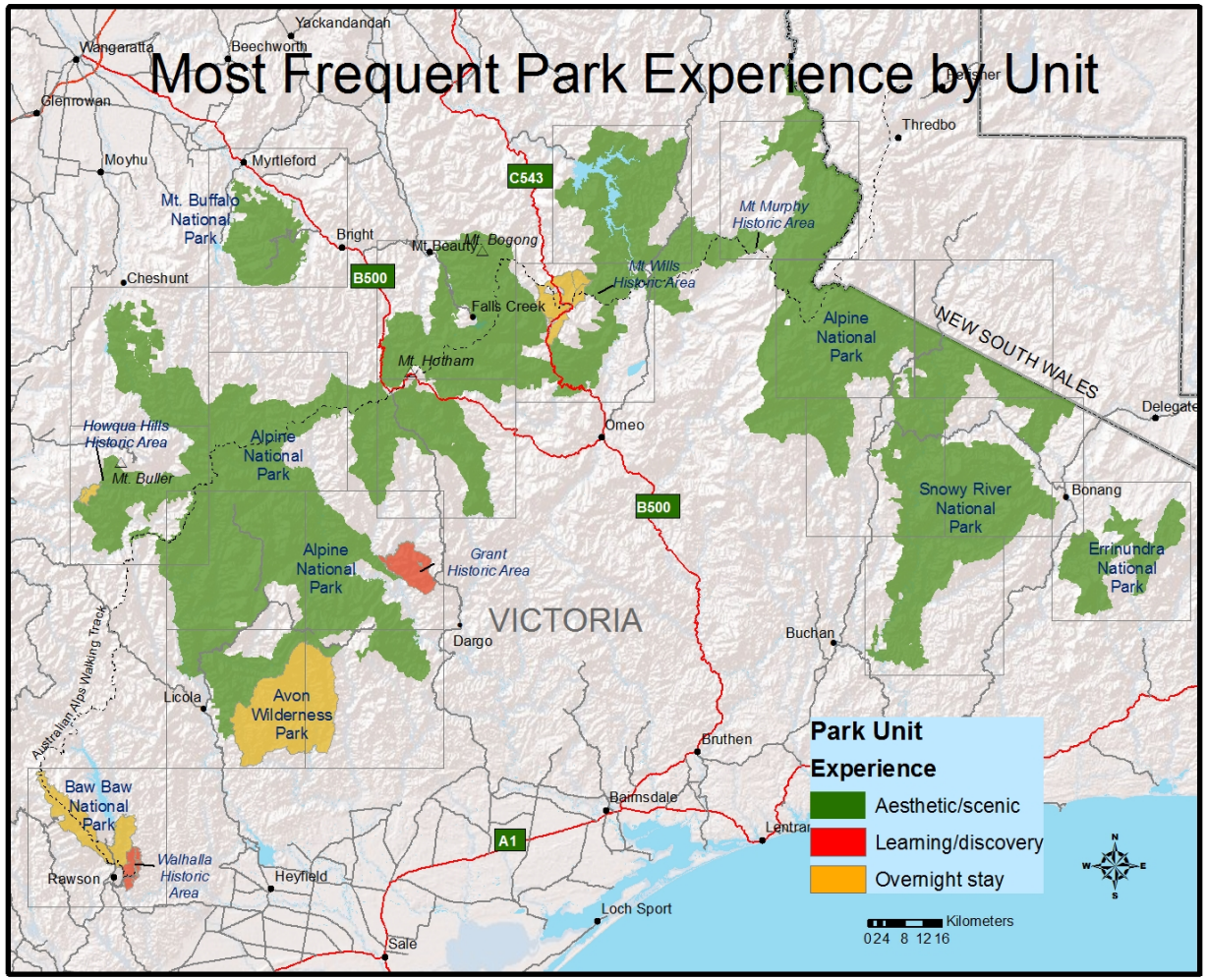
Appendix 3: Definitions of landscape metrics useful for landscape analysis.

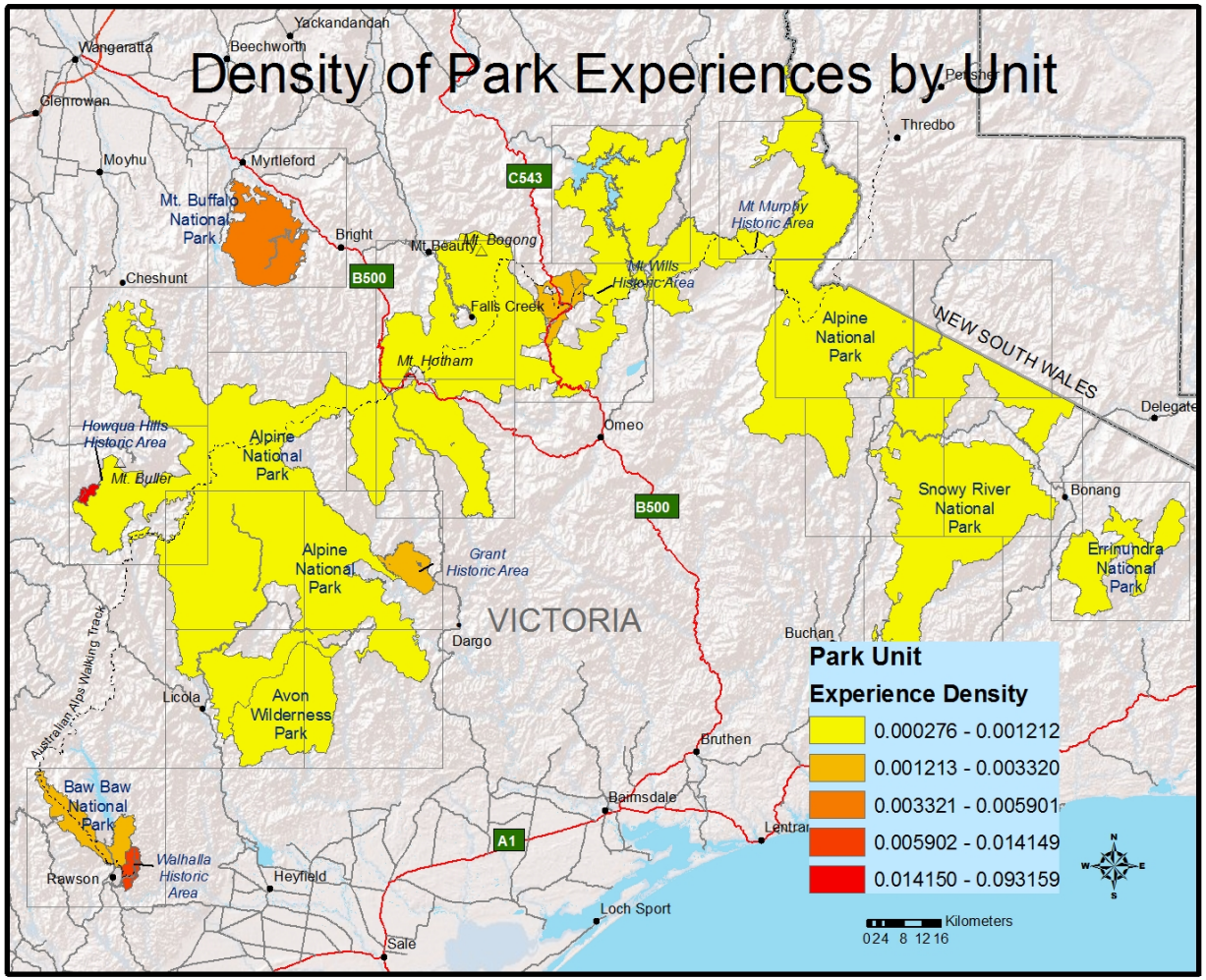
Definition	Calculation	Usefulness	Limitations
Value Sum Absolute (P0)—the total count of all landscape points located within a landscape unit.	Sum all the landscape value points within the landscape unit. Ranges from 0.000 to no set upper range. $P0 = \sum p_i$ where: p_i = number of landscape value points mapped within landscape unit *i*	Indicates the most valued landscape unit by comparing value sums across landscape units	Larger landscape units may have higher point counts simply by virtue of the larger landscape unit
Value Sum Percent (P1)—the percent of mapped value points in a landscape unit relative to the total number of mapped landscape values across all units.	Sum of all landscape values within landscape unit divided by the total number of landscape values mapped. $P1 = \frac{\sum p_i}{P}$ where: p_i = number of landscape value points mapped within landscape unit *i* P = total number of mapped landscape value points	Reveals the landscape units with the highest proportions of all mapped landscape values.	
Dominant value (D)—the landscape value with largest count of point locations within the landscape unit	By definition, the landscape value with largest count of points within the landscape unit $D = \max\left(\sum v_i\right)$ where: v_i = number of mapped landscape value points for a given value v in a given landscape unit *i*	Shows the dominant landscape value within a landscape unit	A landscape unit can have multiple values close in total count and a focus on the dominant value would mask small differences.
Value dominance index (D1)—an index that quantifies the dominance relationship between the dominant landscape value within the landscape unit and the next most common value,	Calculates the difference between the landscape value with the highest point count and the next highest point count (second rank) within a landscape unit and expresses as a percent of the highest point count. The index can range between 0.000 (no difference) to 1.000 where there is only one landscape value located in the landscape unit $D1 = \frac{\max\left(\sum v_i\right) - \max\left(\sum v_i\right)^{(2)}}{\max\left(\sum v_i\right)}$ where: v_i = number of mapped landscape value points for a given value v in a given landscape unit *i*	Shows whether the dominant value is distinct or only slightly more common than another landscape values in the landscape unit	Only examines the difference in the top two values in a landscape unit. An evenness index should be used when counts between all landscape values are important.
Value density index (D2)—an index that measures the relative density of landscape values per landscape unit by area	Sum of all landscape value points per landscape unit divided by the number of acres or hectares in the unit. $D2 = \frac{\sum p_i}{h_i}$	All factors being equal, larger landscape units would have more landscape values mapped. This index complements the F	Does not indicate whether values are diverse or uniform within the landscape unit.

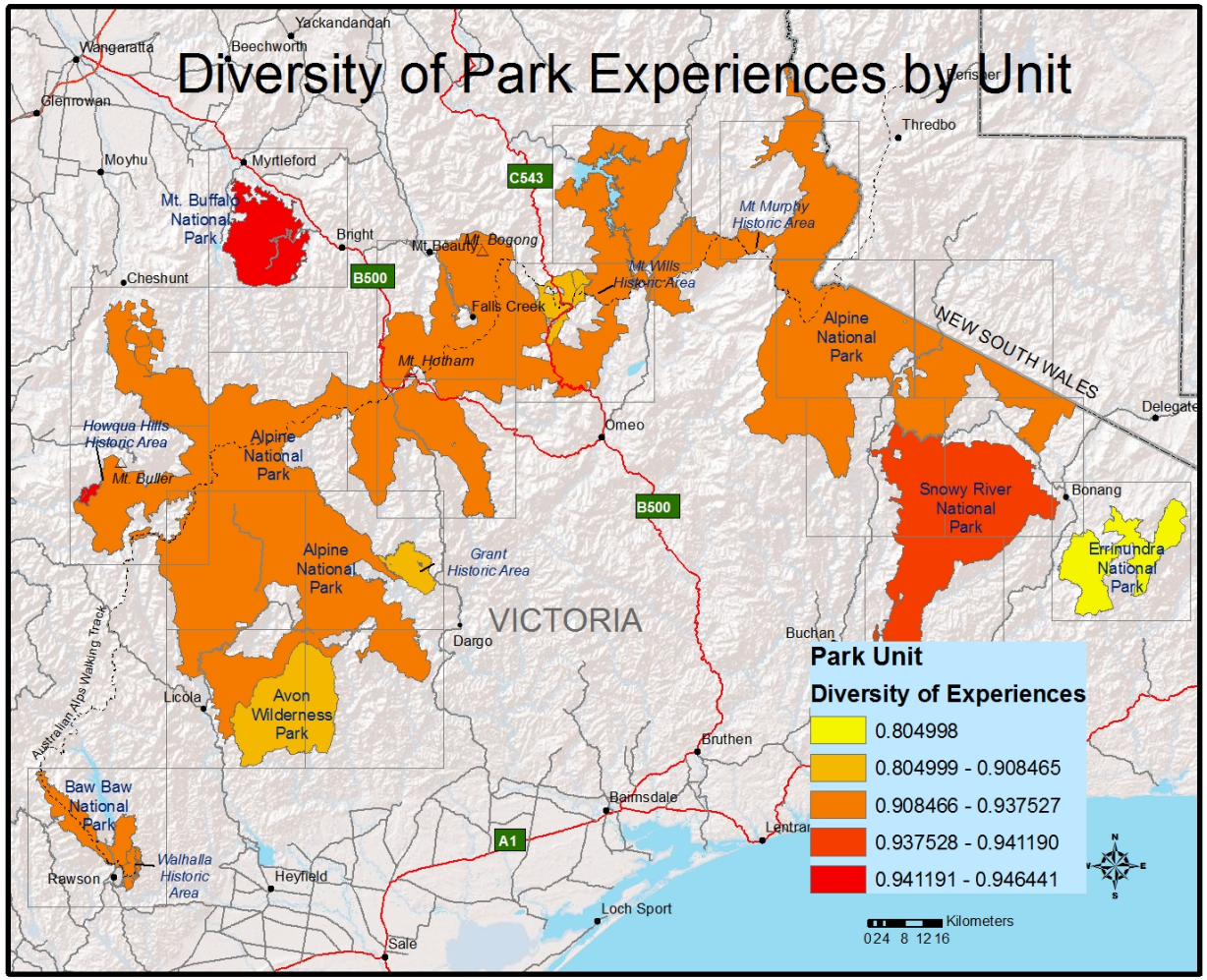
	where: p_i = number of landscape value points mapped within landscape unit *i* h_i = number of hectares within landscape unit *i*	index by removing the influence of the size of the landscape unit.	
Value frequency index (F)—the relative frequency of landscape values within a landscape unit compared to the average frequency of mapped landscape values across all landscape units.	The sum of all landscape value points within a landscape unit boundary divided by the mean number of landscape values mapped for all other landscape units. Has no set upper range. $F = \frac{\sum p_i}{\frac{1}{n-1}\sum_{j=1}^{n-1}\overline{X}j}$ where: p_i = number of landscape value points mapped within landscape unit *i* n = total number of landscape units excluding $\overline{Xj}$ = mean number of landscape values per landscape unit j	Shows whether a given landscape unit, has greater relative frequency of values (F> 1.0) or less frequency of values (F<1.0) than the average number of mapped landscape values across all landscape units	
Value diversity index (D3)—is the standard Shannon diversity index used in ecological studies calculated for the different landscape values located within a landscape unit.	$D3 = -\sum_{i=1}^{v} p_i \ln p_i$ where: p_i = the proportional abundance of the *i*th landscape value = (n_i/N). n_i = the number of mapped landscape values in the *i*th landscape value category N = the total number of all mapped landscape values ln = natural logarithm v = the number of landscape value categories The calculated diversity index may be normalized to a scale ranging between 0.000 and 1.000 where higher index values indicate higher value diversity within the landscape unit.	High diversity scores could indicate multiple, competing interests for the same landscape unit.	Does not fully indicate the potential for conflict because some landscape values may be complementary rather than competitive.

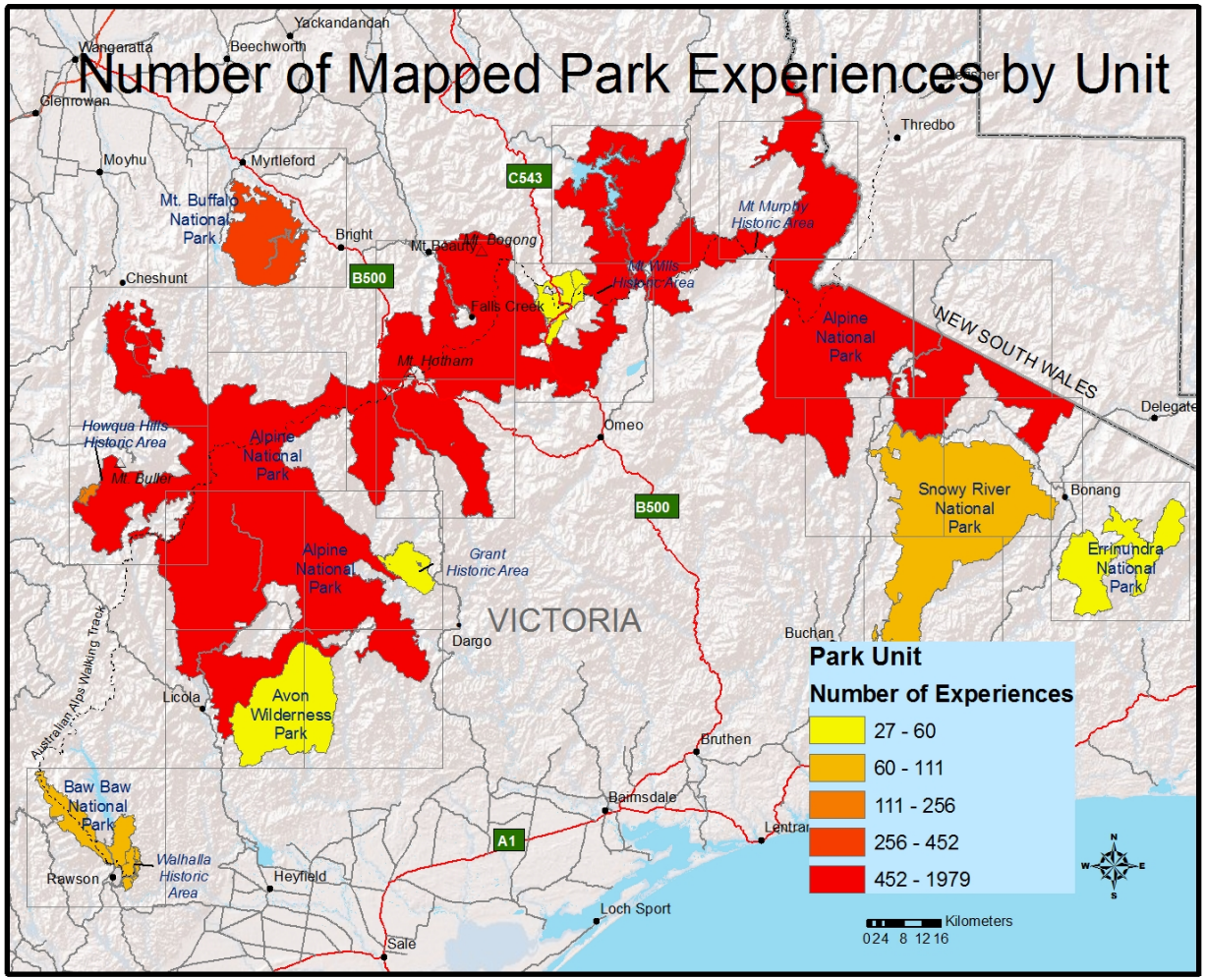
Appendix 4. Additional Maps of Experience and Impact Distributions.

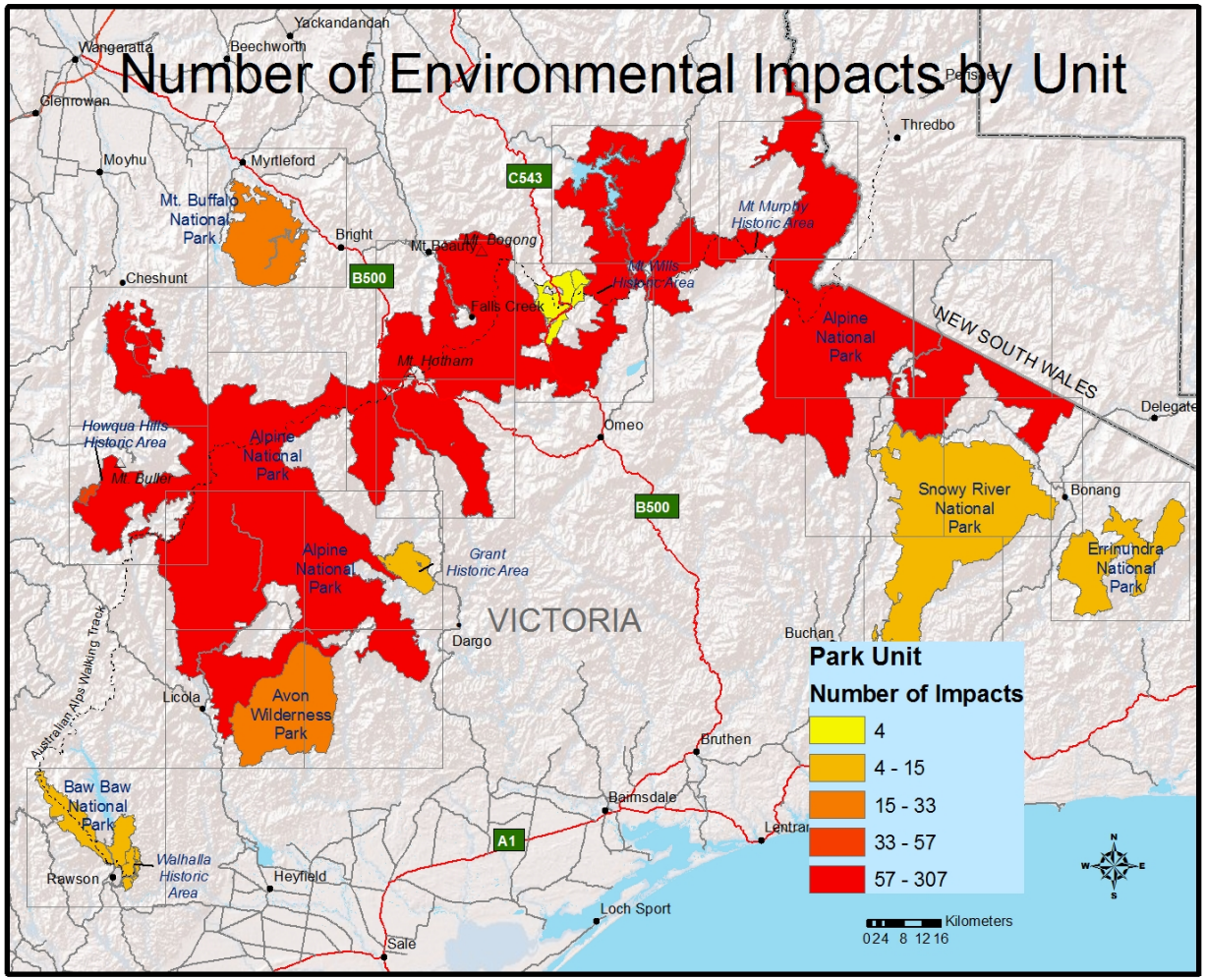


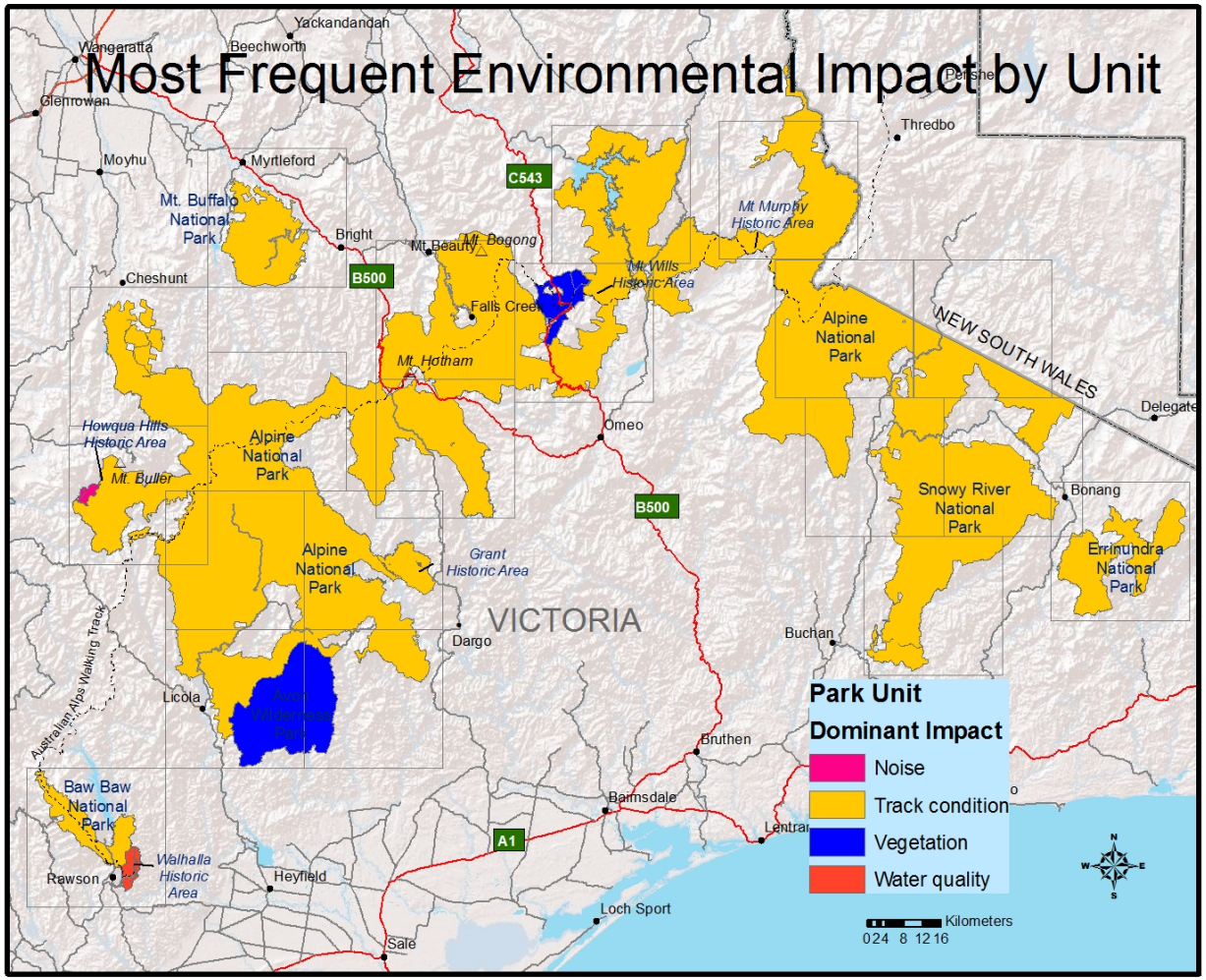

Most Frequent Park Experience by Unit
Yackandandah
Wangaratta
Beechworth
Glenrowan
Moyhu
Myrtleford
Mt. Buffalo National Park
Bright
Mt Beauty
Mt. Bogong
C543
B500
Cheshunt
Falls Creek
Mt. Hotham
Mt Murphy Historic Area
Mt Wills Historic Area
Alpine National Park
NEW SOUTH WALES
Thredbo
Delegate
Howqua Hills Historic Area
Mt. Buller
Alpine National Park
Omeo
B500
Snowy River National Park
Bonang
Errinundra National Park
Alpine National Park
Grant Historic Area
VICTORIA
Dargo
Buchan
Australian Alps Walking Track
Licola
Avon Wilderness Park
Bruthen
Park Unit Experience
Aesthetic/scenic
Learning/discovery
Overnight stay
Baw Baw National Park
Walhalla Historic Area
Rawson
Heyfield
Bairnsdale
A1
Lentra
Loch Sport
Sale
Kilometers
0 2 4 8 12 16
N
W
E
S

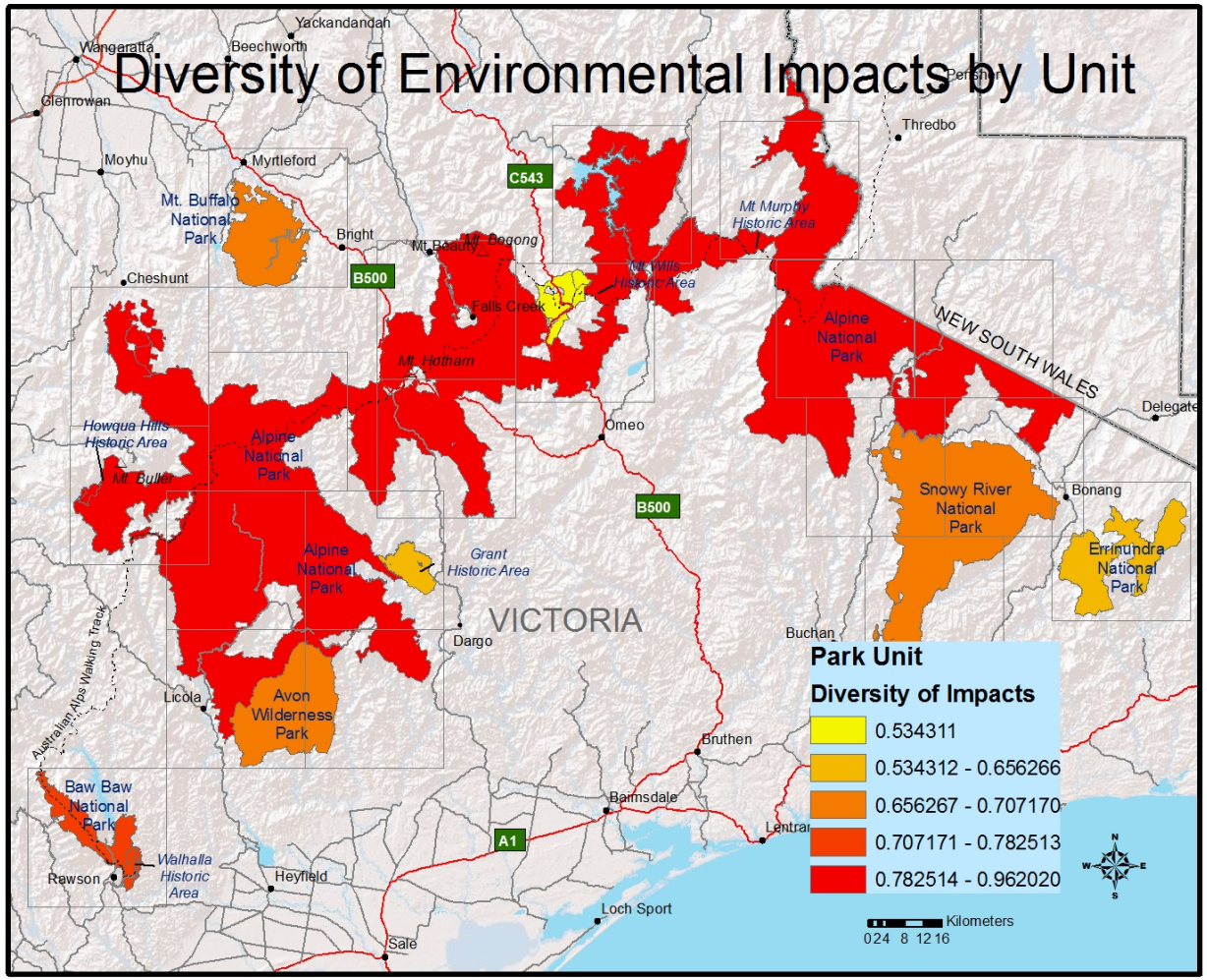

Density of Park Experiences by Unit
Yackandandah
Wangaratta
Beechworth
Glenrowan
Moyhu
Myrtleford
Mt. Buffalo National Park
Bright
Mt Beauty
Mt. Bogong
C543
B500
Cheshunt
Falls Creek
Mt. Hotham
Mt Wills Historic Area
Mt Murphy Historic Area
Thredbo
Alpine National Park
NEW SOUTH WALES
Delegate
Howqua Hills Historic Area
Mt. Buller
Alpine National Park
Omeo
B500
Snowy River National Park
Bonang
Errinundra National Park
Grant Historic Area
Alpine National Park
VICTORIA
Dargo
Buchan
Australian Alps Walking Track
Licola
Avon Wilderness Park
Bruthen
Baw Baw National Park
Walhalla Historic Area
Rawson
Heyfield
Bairnsdale
A1
Lentra
Loch Sport
Sale
Park Unit
Experience Density
0.000276 - 0.001212
0.001213 - 0.003320
0.003321 - 0.005901
0.005902 - 0.014149
0.014150 - 0.093159
Kilometers
0 2 4 8 12 16


Diversity of Park Experiences by Unit
Yackandandah
Wangaratta
Beechworth
Glenrowan
Moyhu
Myrtleford
Mt. Buffalo National Park
Bright
Mt Beauty
Mt. Bogong
C543
B500
Cheshunt
Falls Creek
Mt. Hotham
Mt Murphy Historic Area
Mt Wills Historic Area
Alpine National Park
NEW SOUTH WALES
Thredbo
Delegate
Howqua Hills Historic Area
Mt. Buller
Alpine National Park
Omeo
B500
Snowy River National Park
Bonang
Errinundra National Park
Grant Historic Area
Alpine National Park
VICTORIA
Dargo
Buchan
Australian Alps Walking Track
Licola
Avon Wilderness Park
Bruthen
Baw Baw National Park
Walhalla Historic Area
Rawson
Heyfield
Bairnsdale
A1
Lentra
Loch Sport
Sale
Park Unit
Diversity of Experiences
0.804998
0.804999 - 0.908465
0.908466 - 0.937527
0.937528 - 0.941190
0.941191 - 0.946441
Kilometers
0 24 8 12 16


Number of Mapped Park Experiences by Unit
Yackandandah
Wangaratta
Beechworth
Glenrowan
Moyhu
Myrtleford
Mt. Buffalo National Park
Bright
Mt Beauty
Mt. Bogong
Cheshunt
B500
C543
Falls Creek
Mt Hotham
Mt Murphy Historic Area
Mt Mills Historic Area
Alpine National Park
NEW SOUTH WALES
Thredbo
Delegate
Howqua Hills Historic Area
Mt. Buller
Alpine National Park
Omeo
B500
Snowy River National Park
Bonang
Errinundra National Park
Grant Historic Area
Alpine National Park
VICTORIA
Dargo
Buchan
Australian Alps Walking Track
Licola
Avon Wilderness Park
Bruthen
Baw Baw National Park
Walhalla Historic Area
Rawson
Heyfield
Bairnsdale
A1
Lentra
Loch Sport
Sale
Park Unit
Number of Experiences
27 - 60
60 - 111
111 - 256
256 - 452
452 - 1979
Kilometers
0 2 4 8 12 16


Number of Environmental Impacts by Unit
Yackandandah
Wangaratta
Beechworth
Glenrowan
Moyhu
Myrtleford
Mt. Buffalo National Park
Bright
Mt Beauty
Mt. Bogong
Cheshunt
B500
C543
Falls Creek
Mt Hotham
Mt Murphy Historic Area
Mt Mills Historic Area
Alpine National Park
NEW SOUTH WALES
Thredbo
Delegate
Howqua Hills Historic Area
Mt. Buller
Alpine National Park
Omeo
B500
Snowy River National Park
Bonang
Errinundra National Park
Grant Historic Area
Alpine National Park
VICTORIA
Dargo
Buchan
Australian Alps Walking Track
Licola
Avon Wilderness Park
Bruthen
Baw Baw National Park
Walhalla Historic Area
Rawson
Heyfield
Bairnsdale
A1
Lentra
Loch Sport
Sale
Park Unit
Number of Impacts
4
4 - 15
15 - 33
33 - 57
57 - 307
Kilometers
0 2 4 8 12 16
N
W
E
S


Most Frequent Environmental Impact by Unit
Yackandandah
Wangaratta
Beechworth
Glenrowan
Moyhu
Myrtleford
Mt. Buffalo National Park
Bright
Mt Beauty
Mt. Bogong
C543
B500
Cheshunt
Falls Creek
Mt. Hotham
Mt Wills Historic Area
Mt Murphy Historic Area
Alpine National Park
NEW SOUTH WALES
Thredbo
Delegate
Howqua Hills Historic Area
Mt. Buller
Alpine National Park
Omeo
B500
Snowy River National Park
Bonang
Errinundra National Park
Grant Historic Area
VICTORIA
Dargo
Buchan
Australian Alps Walking Track
Licola
Bruthen
Baw Baw National Park
Walhalla Historic Area
Rawson
Heyfield
Bairnsdale
A1
Lentra
Loch Sport
Sale
Park Unit
Dominant Impact
Noise
Track condition
Vegetation
Water quality
Kilometers
0 2 4 8 12 16
N
W
E
S


Diversity of Environmental Impacts by Unit
Yackandandah
Wangaratta
Beechworth
Glenrowan
Moyhu
Myrtleford
Mt. Buffalo National Park
Bright
Mt Beauty
Mt. Bogong
Cheshunt
B500
C543
Falls Creek
Mt Hotham
Mt Murphy Historic Area
Mt Mills Historic Area
Alpine National Park
NEW SOUTH WALES
Thredbo
Delegate
Howqua Hills Historic Area
Mt. Buller
Alpine National Park
Omeo
B500
Snowy River National Park
Bonang
Errinundra National Park
Grant Historic Area
Alpine National Park
VICTORIA
Dargo
Buchan
Australian Alps Walking Track
Licola
Avon Wilderness Park
Bruthen
Baw Baw National Park
Walhalla Historic Area
Rawson
Heyfield
Bairnsdale
A1
Lentra
Loch Sport
Sale
Park Unit
Diversity of Impacts
0.534311
0.534312 - 0.656266
0.656267 - 0.707170
0.707171 - 0.782513
0.782514 - 0.962020
Kilometers
0 2 4 8 12 16
N
W
E
S

Appendix 5. Additional Comments from Survey Respondents.

A total of 224 additional comments were received via the survey or email. They have been collated into the following five categories:

1. General Comments on Experience and Resourcing (77 comments/ 34% of total comments)
   a. Overall Satisfaction (n=34)
   b. Staffing, Funding and General Resourcing (n=36)
   c. General/Miscellaneous (n=7)

2. Natural Resource Management (45 comment / 20% of total comments)
   a. Cattle (n=7)
   b. Logging (n=4)
   c. Weeds (n=9)
   d. Water quality (n=3)
   e. Fire (n=19)
   f. General (n=3)

3. Facility Management (57 comments / 26% of total)
   a. Campground management (n=16)
   b. Toilets (n=6)
   c. General facilities (n=14)
   d. Trails Related (n=21)

4. Visitor Management (31 comments / 14% of total)
   a. General (n=8)
   b. Conflict related (n=15)
   c. Interpretation (n=8)

5. Comments on the Survey (14 comments / 6% of total)

1. General Comments on Experience and Resourcing

a. Overall Satisfaction

- These are a great asset to not only the local community, but to all Australians. Please maintain them and maintain the special places that exist within. problem - especially the Falls Creek SES - getting rid of them of the high plains is very important. We need to re-focus on maintaining wild places, and managing for this as well as catering for an increase in park visitors.

- We have been visiting Pickerings Hut on the Howqua river every Australia day weekend for 56 years. My grandparents knew Norm Pickering and his wife well, and helped to build the hut in the 1950's. They and their family and friends have spent every Australia day weekend there ever since. It has become an important tradition, and one that we hope can continue. It is such a beautiful part of the world, and as our family has spread to different cities, states, even countries, its a weekend that we can all get together and spend time at a place that is very special to all of us. We float down the river on our lilo's, bushwalk, play cards, swim, and relax. Although we realise how lucky we are to have the privilege of staying at Pickerings hut, we hope each year that it wont be our last.

- I have spent a fair bit of time running courses for an outdoor organization in the Snowy River National Park (and others) with young adults in Years 9 & 10. I have found this place to be enthralling, and very difficult from which to tear myself... There is certainly time and space within those ranges to find oneself, and to comprehend the true meaning of solitude. I am very disappointed by the low water level of the Snowy River. In my humble opinion, the sacrifices that the surrounding environment pay for having the dam at Jindabyne are far too high.

- management of the parks is a complex scientific and political exercise - hard to get right but lots to do. I welcome the general approach being taken.

- I'm very impressed with the overall care that is taken by Parks Victoria.

- Loved our recent stay at Mount Buffalo. Wish the chalet was open and functioning

- In general I have no problems with the areas I visit or I would not keep going back so keep up the good work.

- PV does a great job!

- Overall very happy with maintenance, facilities etc in Victorian national parks

- Generally the park was well presented and well looked after - we had a great time!

- I enjoy visiting national parks and doing activities such as hiking, rock climbing and ski touring.

- The Victorian Alpine National Parks are special places to many people and high in historic and social value.Recognition of these values in the management of the national parks will help to acknowledge and strengthen community connection to the parks.

- Good work keep it up

- My wife and I found management to be warm, friendly, diligent and knowledgeable with our site and the encompassing area. We were approached regularly and their regular patrols showed authority as well as security for all campers. I was at Lake Catani and found rangers encouraging interested people

to go on 'bush tucker walks', as well as learning about the history of the area. In my opinion, having some of the Aboriginal peoples work for Parks Victoria is an awesome idea as they naturally promote ownership and responsibility of the land. Thankyou for your professional courtesy.

- The sites I have visited so far are very adequate and well looked after by visitors and parks staff. Mt Buller Village is great for recreation.
- generally find the National Parks to be very well run. The rangers I meet are always friendly and freely offer advice on camping locations and track conditions. I think that the issue of fuel reduction burning and collection of firewood needs to be addressed.
- We live in Perth and I have recently bought an apartment in Falls Creek to develop the distance runners that I coach. I think the trails are fantastic and appear to be well looked after. I think a big growth area in the summer will be with endurance athletes coming to Falls Creek and hopefully more tourists given the plans to seal the top road.
- Well managed and clean! My compliments and congratulations to all.
- I love being in the alps it has great views. And it is a great experience!!
- Mt Buffalo is divine, very well run, had a wonderful weekend.
- From what we have experienced we feel the parks are managed very well.
- We really enjoy the parks and think they are very well managed.
- From what I have seen so far so good. Camping accessible by car will keep me coming back.
- Stunning
- In general the management is excellent
- We typically visit the Vic Alps for 4WD/camping holidays, and for snow skiing (usually at Falls Creek). We commend the Victorian authorities for enabling such good access to the Alpine Parks (as compared to NSW), but as members of a 4WD club and trained off-road drivers, we would encourage even greater access to the Parks. We enjoy our time in the Parks, for their cleanliness and freshness, the feel of the bush and majesty of the High Country, and being able to leave behind the hustle and bustle of the 'burbs for a while.
- I love the Alpine area and hope to continue to spend time in the region.
- I along with my family love visiting your parks. The effort you put into presenting and maintaining them is excellent. I have no hesitation in recommending friends and family to go a visit them
- I have focused primarily in the lower Snowy River working for an outdoor recreation company; it is an absolutely beautiful area (if slightly over-used), and I am truly blessed to be able to work there.
- I am from India, I have been in Australia from past 2yrs, alpine national park was one of the beautiful spot that I have ever visited, I feel that the management is good.
- I love the designated camping areas and the amenities you provide for us. There is always lots of information available to people wanting to experience our wonderful bush, to keep both us and the environment safe! Thanks

- I have been going up to fryers flat, sheepyard for the past twenty years and its fabulous every year i try and get 7 to ten days to sit on the hawqua river.I will have my ashes placed there it is wonderful to get away because there i am not a business owner and the best thing is there is no mobile reception.I love it and will continue to be there every year until i die.

- You are all doing a Fantastic Job, any time I have come across National Parks staff member, they have always gone out of there way to help out and even give away a couple of secrets to finding the best locations and experiences! It really comes across that you believe in what you are doing. Our National Parks are in good hands, if you continue to operate like this! :-)

- Brilliant system - thanks for the opportunity

b. Staffing, Funding and General Resourcing

- I think over the main holidays that popular camp sites should be patrolled more often.

- More policing of the areas for the hoons on motorbikes and four wheel drives, supply more bins or bigger ones so on public holidays there isn't rubbish left around.

- More ranger visibility in the parks at peak times.

- More resources are needed to maintain and develop the park - that needs addressing.

- The lack of promotion of these parks & the forests of this region & the lack of facilities (camping, walks, information) considering so many tourists pass through the area could be greatly improved.

- Underfunded, undermanaged, overgrown, undergrazed, overcooked, over run by feral animals and feral people and weeds. Ban motorbike and mudtrucks (oversized 4WDs with super huge wheels driven by drunk people with equally small brains and XXX. Bring back alpine grazing to try to put an end to the biannual high country wildlife bbq.

- Rangers need to be showing a presence during the weekends and holiday periods, not only on week days.

- When and where I see management, it is excellent. Not much opportunity for interaction with visitors it would seem. A shame it can't be more visible.

- The parks are gorgeous. Parks Victoria don’t have sufficient staff.

- There could be a greater ranger presence in the park to deter vandalism and bad behaviors. We have been camping in Victorian parks over the past 30 years and until recently have rarely been visited by local rangers.

- I think the staff do a good job but could use more finance and staff. Some roads could be opened to more traffic. For instance car rally vehicles and bicycles, on a used pays system if need be.

- Management is a bit of a juggle.

- We were very disappointed when we visited Mt Baw Baw last year that we were required to hire chains for our tyres, yet there was no snow on the roads and conditions were excellent. It was also disappointing that we needed to buy taboganning passess to let the kids have a taboggan. It ended up being a very, very expensive day trip and we are unlikely to go again.

- Parks Victoria suffers from underfunding and understaffing in many areas, which makes it extremely difficult for them to reach the standards the public expects of them with regard to pest plant and animal eradication, protection of endangered species of fauna and fauna, fire management, water quality, park roads, walking tracks, containment of soil pathogens, research, policing and enforcement of relevant legislation, habitat maintenance and/or enhancement, revegetation, acquisition of private land contiguous to parks when it comes on the market, visitor services, involvement of Indigenous and local communities and volunteers in park improvements. Some or all of these tend to be underdone in the Victorian Alpine Parks area, as indeed they are in other Parks Victoria-administered parks in other parts of the State. In short they need more money and staff as well as a willing army of volunteers.

- An increase in funding and staff is urgently required. The focus needs to be on; Pest plant and pest animal control, provision of quality visitor services including accommodation and camping, and an increase in permanent staff

- More funding for tackling big, difficult issues is needed.

- Need to see more staff out.

- Parks Victoria do a generally good job under difficult circumstances trying to balance many competing needs. Management of ski resorts is pretty appalling but seems to dominate over Park conservation values.

- Staff are spread a little thinly- the east alps is the largest area of alpine national park and yet has the smallest workforce, to much middle management and not enough people on the ground making a difference

- Land Management in the Alps is poor / neglected due to lack of funding, policy improvement and limited use off modern land management practises, including use modern technology to help with management. The Victorian Alpine National Park is too large an area for only around 40 people to manage. During peak visitor periods Rangers are so overloaded they cannot get around to check most camping areas and patrol work on PV land is limited to only a couple of key areas i.e. Howqua Hills, Wonnangatta station, Bogong High plains (around Falls Creek) and Sheepyard Flat. The use of helicopter patrols during key visitor periods could greatly assist PV staff.

- Staff do a fantastic job with limited resources. Significant increases in staff and funding needed to maintain existing amenities and develop new infrastructure to allow access to the park and recreational use.

- I think money spent on management is very important!!!!

- I would like to see a greater range of parks passes being made available eg. a monthly holiday pass that covers camping and national parks entry across multiple parks. South Australian Parks have a wide range of passes. Something similar to this would make it easier.

- I have been a visitor to our National Parks for over 50years as a sailor,walker and skier.I care about our enviroment and am an avid supporter of its conservation however I am also a realist and to put Australian skiing where it should be and to rescue some of the dollars that are being spent overseas ...PUT A LIFT ON MT MACKAY

- The Alps are a great place to visit out of ski season and this doesn't appear to be marketed very well; especially the excellent accommodation rates that allow for a cheap, luxurious weekend break. Then again this could be a good thing too as the quietness is part of the charm out of season too!

- Keep them free.

- maybe if a parks officer could walk through the camp sites at various times, probably school holidays, long weekends and aske campers for ideas to improve the parks conditions.

- I think Parks Vic are doing a great job with the lack of resources that they have. Parks Vic workers in my opinion are completely under paid for what they are expected to do. I would like to see both Federal and State Governments place a higher financial priority on our Parks and the staff that are entrusted to manage them. I do think as a State that we have not invested in our High Country. For example towns such as Mansfield, Bright, Mount beauty, Orbost should all at least have a state of the art parks Vic information centres. These centres should be tied in with the local councils information centre. Lets take the information entre in the Grampians as a case. Why don't we have several more of these in Victoria?

- Non-existent. What management? I come from NSW, where although you pay a fee, the NPWS are very active in marketing and managing their park, promoting its use and providing good facilities.

- I would like to see more active ranger presence, to keep the undesirables in line with a bit of authority. A shady replacement for the willow trees that have been cut down along the banks of the rivers. The area no longer has the lovely serene look and atmosphere of years ago.

- We need more money & more trained staff to properly manage our parks. Tourism is of major importance to the sustainability of many of our rural & regional towns & visits to national parks are encouraged where appropriate by tourism bodies. The Alpine Park is unique in the World with respect to fauna & flora & management is especially important, particularly in areas easily damaged by over-use and exotic animals & plants.

- Inadequate infrastructure and ranger support in parks in Snowy River nad Errinundra NPs

- The only comments Id like to express is that the overwhelming feeling is that NPWS are preserving the environment and not conserving it. There is a real distinction between the two. One is the lock out mentality and the other is proactive management. The real purpose of NPWS was lost years ago when they lost their management skill and reverted to beauacracy instead.

- i mainly stay in the Buchan area of the map and I have found the management in that area non caring when there is no on there after 4.30p

- I am a bushwalker, cyclist, motorcyclist and car camper. To date I feel the management has accommodated all pursuits I do rather well, considering the sometimes conflicting views - there should be more consideration of others in our activities between interest groups, as there is space

for a broad range of activity. That balance can be difficult to find. This survey is good.

- Funding of the different parks is not equal and needs to be looked at. It is unfair that the more popular parks that attract international tourists attract greater amounts of funding while other parks that are just as significant and have lots of potential (given the same amount of funding) simply miss out and are always overlooked.

c. General /Miscellaneous

- The population growth of Australia needs to be addressed by Government as this has a direct impact on Park Management. It is becoming increasingly difficult for people to escape or gain solitude in our parks. Some areas are being loved to death.

- My only disappointment with National Parks management relates to the memorial plaque to Vallejo Gantner which was placed on a rock face just north of the Macalister Springs to Mt Howitt track, overlooking the Devil's Hollow. This plaque has no right to remain in the Alpine National Park, regardless of how much funding the Myer Foundation might provide; others have been removed, and so should this one.

- Its a tough job.

- get rid of them [Parks Victoria]!

- We mainly visit for skiing, but occasional summer trip as well.

- Keep track access open to the public to allow full use and enjoyment of the parks for the best quality experience. Access should never be only for the young, fit and "on foot". In my experience the bushwalking/green lobby are very intolerant of ALL other users and will always lobby for their removal, with some success I might add . They are very influential, not due in part that many senior parks management people came directly from the VNPA. Surveys have shown bushwalkers to be a minor user group, yet they demand the most say. STOP CHARGING THE PUBLIC TO ACCESS WHAT HAS BEEN PAID FOR AND IS OWNED BY THE PUBLIC. Too many NP's (more and more) have toll booths where essentially money is charged to pay the wage of the collector. National Parks are NOT only about driving along bitumen roads to bitumen carparks with a couple of facilities and an educationally signposted boardwalk a few hundred metres into the bush. That is NOT the only park experience the public deserve. Thank you

- I believe it is important for the general public to have access to the areas of National Park. I would like to see some of the areas improved and beautified, especially around the Rocky Valley Dam and Mt Mackay areas. These are not pristine, damage has been done it would be good to improve these areas and allow development of them to allow more enjoyment of these areas

2. Natural Resource Management

a. Cattle

- One thing that the so called government should be looking at is putting the cattle back in the bush as since they were taken out we have had nothing but bush fires there. The cattle don't destroy the bush it's all these so called four wheel drives and motorbikes that don't give a damn about the bush that go and ruin it for the cattlemen and their families that has had cattle in the high country for generations before the greenies came along that sit behind a desk all day and think they know what's best for the bush.
- Let the farmers put their cattle back in the bush before it's too late and we don't have any where to go and enjoy it all.

- There has been a noticeable increase in plant species regeneration since the cattle were removed from the High Plains. However Blackberries and Scottish Thistle are rapidly emerging as a big threat - Parks Vic need to deal with this problem now ! - not when it has taken over the High Plains ! They are a major problem around Bogong Village and are racing up the hill. Also DSE need to recognise that Falls Creek Village is a community , which needs to be able clear trees and undergrowth within the Village to reduce the fire risk etc. The controls placed upon the Village are frequently unmanageable and unworkable.
- Side issue - cattle should be allowed to graze in particular areas of the Alpine National Park for two reasons 1/ reduce fire hazards and 2/ more eyes on the ground for observation thoughout the park.
- If a track to a popular spot such as Cobberas No. 1 is not made or marked then much damage is done to the general environment. Cowombat Flat and the general area are better for not having any cattle, however the brumbies need to be dealt with. Unfortunately they are unlikely to be eradicated, but surely some containment of their numbers could be organised.
- The amount of Sambar Deer has increased on a large scale. This is good as they are helping, though no where near as effective as cattle, reduce the grass - fire fuel. Cattle should be put back into the high country and sambar deer should be open to control by hound hunters as they are doing in NSW. 150 years of cattle in the high country has not done anywhere near the damage as the human has. I spend around 30 -40 days a year in the high country. The places I marked on your map have been the places I have spent time in the last 5 weeks. I have also worked with alpine pest and week service in the ANP spraying weeds etc. This should be increased and not just be a window dressing exercise where if you can not see it from the road it does not matter. It does matter! Without cattle to keep a lot of these weeds down we must invest more man hours and labour costs into spraying by back packs and quad bikes to effectively control the problem.
- If they only got off their backsides and went and had a look at what the cattle do for the environment then they can comment on wether they destroy it or not. They should spend some time there over the holiday period and look at all the motorbikes who go off the tracks and destroy the bush that the cattle get blamed for. Believe me i have seen them for myself as a cook for a trail ride company for three years around MtStirling, Razorback Hut and Pineapple Flat and also camping with family and friends at Fry's Flat and other areas in the district that ruin it for all who have respect for the environment.

b. Logging

- the current logging regime that deliberately "ringbarks" the errinundra n.p. & snowy river n.p. is a national disgrace. Also the delay in protecting goolengook & other iconic old growth forest areas in far east gippsland (brown mountain, hensleigh creek, bungywarr etc) in national parks is taking far too long & allowing vicforests to log them in some instances!
- Save this beautiful area and don't allow any further timber harvesting.
- No more clearfelling our forest heritage.
- So many places out here are getting logged to oblivion before they can get protected. We hope someone does something before it is too late.

c. Weeds

- I am saddened to see the increasing infestation of weeds and number of tracks (sometimes motor bike tracks)at the most accessible areas within the parks
- Weed management and pest animals are real problems that need addressing.
- Have seen and heard that the program for management of weeds in the parks has degraded due to lack of funding. If this is the case, then national parks must be unpopular neighbours with those people who have properties that share boundaries with national parks. It would also impact badly on Victoria's and Australia's environment overall.
- Weed and pest animals are a growing concern related to the lack of appropriate government funding. Land Management practises do need improving and requires more access to technical advice, use of modern technology to assist with completing projects and more Alpine district staff. Due to lack of staff most high visited areas, including camp sites, are rarely patrolled by Park Rangers. The result is damage to park infrastructure i.e protected historic huts, camp sites

rubbished, and also people miss-using firearms in campsites. Trail bikes and off-road vehicles are a tool of vegetation & track/road distruction particularly around Wonnangatta station/camping area. I have personal witnessed motorised vehicles driving off a maintained track bashing their way through the bush and driving up river beds.

- Most creeks & rivers are degraded through weed infestations, bank erosion from historical grazing practices, parks vistors driving up and down banks, and deer or horse wallowing.
- I would like to think something or more could be done about the blackberrys, they seem to be getting worse every year. myself and mates of mine would be happy to help but wouldnt know how to start.
- English broom erradication efforts should be increased tenfold. Deer Hunting Areas should be extended in the Alpine National Park to include a much greater proportion of the Cobberas Tingaringy Unit... Fallow Deer Should be included in species of deer which are legally hunted in the Alpine National Park Deer Hunting Areas.
- Concerned at the spread of introduced weed species since the fires. Agree with the priority of directing effort of weed control to newly introduced species, but more funding must also be directed to controlling the established weeds as well. Do not agree that weeds such as Blackberries are already filling there full ecological niche. GIS mapping of weeds in the alps should be undertaken especially in areas that have been burnt by bush fires and ecological burn, So that their spread can be monitored and control coordinated. Also believe there should be no more growth in Ski resorts allowed as they are a direct threat to the habitat of endangered alpine species,
- Weeds are a major problem - blackberry at river level in the upper reaches of the Murrray; a variety elsewhere. Park fees in NSW are outrageous for the Kosciusko Park and should never reach that level in Victoria. There should be joint management of alpine regions that cross the border to limit the variable approaches of NSW and Victoria. Parks Victoria does a great job and hopefully can resist pressure to burn inappropriately in the alpine areas.

d. Water Quality

- Water quality in summer at Falls Creek sometimes suspect.
- The removal of cattle from the higher elevations has seen improved water and vegetation quality from my 15 years of walking in the area. 4wd tracks should be closed permanently in the higher elevations. I.e. track beyond lovichs hut to howitt carpark. Further development of ski resorts should be stopped immediately.
- keep cows out - i dont like to see fat cows polluting and making water and springs unfit for drinking - do they make any difference in high country fires? i doubt it it disturbs me immeasurably that we do not see the same animals that we see in places like mt field in tasmania - surely pademelons, bandicoots, quolls, wallabies etc belong in our high country too - i expect they are not there because of rabbits, cows, foxes and cats - until our national parks are again thriving with native animals then the parks service is failing in their role - we need to make absolute priority of cat and fox eradication so that these animals may be re-introduced into these areas - they must be destroyed by what ever means is available be it disease that domestic animals need to be immunised against or continual and systematic manual destruction weeds are still a major issue and unless the national parks are funded accordingly to remove all vermin and introduced plants from national parks and then restock with native fauna from wherever they still range then we may as hand the high country over to the cow lobby, loggers and goat herders to use in a profitable way

e. Fire Related

- There should have been more effort to save natural assets such as stands of ancient snow gums in the fires of 2003 and 2006. There should be a register of natural assets to be protected from fires as well as built assets. Much of our natural heritage was destroyed by fire in the alpine parks, making them much less attractive to visit for many years. Also pls note: no employment category of 'retired"

- I would like to have better updates on total fire ban days. We stayed at fry's hut on Australia day weekend and sign for total fire ban was out 2/3 days BUT at sheepyards flat sign as removed after day 1.

- The fire danger information sheet should include which Victorian Fire area we are in.
- So called "fuel reduction" burns in wet national parks are also a worry.
- Mitchells flat was extremely overgrown with fewer campsites and a fire hazard. Need better communication system when total fire ban in place (at Fry's we did not know if it second day of camping fire ban was reduced or not - travellers said Mansfield/sheepyard no ban yet sign at Fry's still advised fire ban).
- Parks Vic also needs to work closely with DSE to reduce fire risks.
- There should be a register of natural assets to be protected from fires as well as built assets. Much of our natural heritage was destroyed by fire in the alpine parks, making them much less attractive to visit for many years.
- Our concern chiefly relates to bush fire safety and I was staggered to see and hear that road side reserves cannot be cleared of fuel. This may have been a contributor to the current fires. The CFA must have the power over local councils to mitigate dry fuel buildup, particularly where idiot smokers can throw their live butts into the roadside. I saw this happen during the 03 fires at Hotham. Drivers smoking drivers must use their ash trays. How about a campaign just on this.
- I am disappointed about the foresight not being shown by the bureaucrats in adopting efficient fire management plans in relation to backburning etc. Why are we locking up large parts of native Victoria to stop the majority of users when only bushwalkers whom are a very very small percentage have access , what about the majority . There seems to be a lot of shiny bums in offices and not enough rangers etc in the over seeing of our parklands. 4 WD and motorbike access needs to be increased for the masses and more rangers on the ground to police the actual parks .track grading improvement for general access and fire fighting puposes. One big fire has destroyed more flora & fauna than all the current and past park users together. They are beautiful parks , let everyone enjoy them . have a nice day
- I think more of the parks should be opened up this would help in managing the undergrowth and therefore reduce the risk of bushfire in the future.
- I've visited many areas of these National Parks so many times I can't count. Even though, your maps are great I still found it hard to pinpoint areas. Basically my involvement has been through hiking in the many areas time & time again, cross country sking in Mt Stirling, Mt Bullar, Bluff Hut & Mt Hotham areas, extended overnight horse riding out from Licola, Walhalla, Mr Stirling, Dargo high plains, Tawango to Falls Creek, Tawonga over Mt Bogong, Pretty Valley etc, all around Sheep Yard Flats etc & so many other places that I don't actually know the names or remember. Also white water rafting on the Mitta Mitta & part of Weed eradication programs. Always as an involved participant & not a passive visitor just viewing the scenery. On my last ride I did over Mt Bogong, 12 years ago, my friends & I commented that due to the massive build up of fuel, that when a fire struck it would be disastrous & unfortunately it was. I was able to compare the terrain & regrowth on my recent ride there in January '09, some very very slow & some adequate in the life span of the fragile flora. In my opinion burn offs are part of nature & MUST be done. Hope this helps. I may be contacted for further info if necessary [phone number provided]
- Due to the high bushfire risks I think there is too much fallen trees(fuel).this should be allowed to be removed wherever they are.some trees though should be left in strategic locations for

insects etc but surveys must be done and calculated per acre or hectare and kept in check.all bush areas running close to towns and residences should have special attention and a good livable balance kept between flora ,fauna and population.

- Considering the recent disastrous bush fires in Victoria, I would advocate some sort of burning off program be instituted. Surely wildlife, vegetation and humans would have a better chance of surviving a small controlled burn off than a raging uncontrollable bushfire.

- A mosaic of fuel reduction burns need to happen throughout the high country to reduce the damage from wildfire. The post fires and flood damage to the banks and tribs of the macalister river north of licola is evidence that we need to reduce fuel loads to slow wildfire down.

- Let the cattle back into the high country to keep down the grass and fuel loads.

- Our only issue over Australia Day weekend was the total fire bans. There was a sign leading in to the Fry's Hut area stating it was a total fire ban but then the ranger stated it wasn't. With kids this is a hard situation as you can't even boil a kettle.....perhaps greater attention to what is and isn't allowed in a pamphlet would be helpful as we didn't want to risk doing the wrong thing.

- none I think they are being managed very well. other than I live not to far away from some of the parks I always worry about bushfires, and I believe that more controlled burn offs should be done

- The key issue at Falls Creek was of course the impact of the fires, and some weed problems. Being a recreational snow field obviously means there is a lot of human impact.

- I enjoy the high country but I hope that lessons are learned from the Bushfires of late and that up keep of firetrails, selective clearing and back burning are considered for there merit.

f. General

- We have noticed the chopping down of willow trees along the rivers which has left the areas unsightly, if such a devastation must be done then other appropriate trees should replace the ones cut down. The shady trees add beauty and were a refuge not only to man but also wild life.

- Feral horses are a major and increasing problem. The public needs to be informed of the damage they are causing for effective control measures to take place. Greater promotion of natural values and indiginous heritage would deepen our knowledge/appreciation of the Alps (seems a lot of focus on European history and pioneering). Some great remote walking tracks in the Alps but need better maintenance, these are a real asset to tourism in Victoria and the wellbeing of our global community.

- The parks are an islands of natural uniqueness and should be enjoyed by not overexploitation. (The agricultural areas of Australia have done the overexploitation very well). Generally the parks need to be left in as much of a natural state as possible.

3. Facility Management

a. Campground management

- Booking system at Buffalo - can't book Friday nights although often campsites are vacant - very annoying. We really like informal stay facilities eg JB hut - allows equitable access to the high country.

- Generally good. Cows AND horses create terrible problems with flies, esp. at camp sites. Hotham Central has terrible visual impact on surrounding areas - compare with Davenport/DPV style which is a lot better. Hope that dry stone track at Feathertop can be replicated in other high traffic areas.
- Even though Pickering and Sheepyard can get quite busy there are enough camp sites. More camp sites would take away that lovely feeling of closeness to the river and the bush.
- More opportunities for service based camping as areas such as Talbotville were extreemly congested
- I think a few more camping sites would be good but need to be near water. The fireplaces provided are great. Some basic facilities such as toilets would reduce the impact of human pollution
- in places like Walhalla they need camping site marked out on the sides of the road not make a camping ground that only takes 15 camp sites that is not enough

- Very good overall, good work. In some spots, would be great to have two different campsites (away from each other): one to drive-in, one to walk-in. Example: Great Ocean Walk Thanks for providing us with so many beautiful places to escape to...
- In some areas, eg. the high plains, there were limits to the number of nights one could stay, & in peak I think this is a good idea, but didn't seem to be enforced
- I take my young family to camp at the Lake Catani site, Mt Buffalo. There are not enough established fire places throughout the camp site. Consequently those sites that do have them are in great demand. The current booking system allows one person to book out all the better sites as soon as booking opens 1 Sept annually. This is not fair or reasonable for other users. Some sites could be better maintained by removing large tree roots and leveled (as some are) from the areas intended for tent use.
- Again not enough markers for camping in this area. The Crosscut Saw and adjacent ridge is, I think, about the most spectacular walking in Victoria and camping on Mount Buggery both dry weather and in the snow is superb and the sunrises are, again, spectacular!

- There are popular areas/sites for camping/recreation which become congested and degraded at peak times. But the vast majority of the Victoria Alps is remote, wild and beautiful.
- Our main concern is that they do not get overdeveloped by commercial interests. We have had bad experiences over New Year etc at Wilson's Prom due to campers drinking too much and making a lot of noise. I hope that the management crack down on this strongly as camping is a great family activity and this sort of behaviour can really put families off. This does not seem to be a problem at Mt Buffalo. A problem at Mt Buffalo this summer was that the bins were not emptied often enough and when we had three total fire ban days in a row and were cooking in the hut the smell was very unpleasant near there due to the overflowing bins (made worse by the hot weather.)
- I liked the online booking system
- We stayed at the Buchan caves camping area which was not included in the study. The staff there were very helpful and friendly. The park needs patrols at night time during peak periods. Over Easter, noise by groups who played loud music and drank alcohol spoilt our stay.
- Consider different uses for different areas. For example: many areas must be devoid of small native mammals due to foxes, cats and other pest species. Would it be so bad to have a campground in one of these areas where campers could have their dogs with them? Could be quite the money spinner I would imagine. There are already campgrounds where horses are allowed ... ? Just an idea.
- better camper management at peak times (Only at peak times eg Australia Day)

b. Toilets

- The toilets were over used as it was a very busy weekend and they needed some treatment due to smell etc.

- lime or similar could be left to allow toilets to stop smelling (campers can apply toilets). a very good crowd was camping with animals – excellent

- Drop toilets at Fry's were smelly (needed lime). Craigs hut was too busy and rubbish left near toilets and info board. Campers at Fry's well behaved.

- I believe Parks Vic does a great job. One improvement I would like to see is a decent toilet at Tawonga Huts - like some of the other terrific waterless toilets we encountered elsewhere.
- Went to sheep yard flats good place not to fond of the stinky drop loos tho beautiful spot cheers
- Pls build toilets at Lake Tali Karng. thanks.

c. General Facilities

- Accommodation is too expensive for what is provided. eg Cape Conran; A lot of the places we have visited you dont have a map to cover, but they are national parks eg: mitchell river national park, wilsons prom. etc. A big bug bear is the banning of use of generator (we have a very low noise one and that would allow us to stay much longer on our stays without power), restriction of it running in daylight hours or certain hours wouldnt be a problem just need to re-charge the battery to enable running our fridge for days on end.
- I would like to see the Buffalo Chalet re invigorated with funds. It is a valuable and historic asset to the national park and brings families together in a wonderful environment throughout the seasons. It is an absolute shame to see it just left there and the fact that the Cresta Ski lift ,having been wiped out by the fire is now not operating has also meant there is no attraction to go up to the area. Families that are not necessarily just there for the skiing could go up to the Chalet and participate in many activities including skiing if they wish. Now they either do not go at all or visit Hotham which is not the same. The Buffalo Chalet and the environment around the Chalet provided a unique and aesthetic environment for artists to stay and take walks as well as more physical activities. We have several friends who paint landscapes and we look for places we can stay overnight this area used to have it all but now because there are no longer the facilities we travel to Tasmania instead. Victoria's Alpine area at Mount Buffalo has lost out to Tasmania's excellent tourism plan and environmental protection and planning.
- The idea of a roving ice man is excellent for the area, and have noticed recently that fire pits are being put in at some areas which I also believe is a great idea,(any chance of flushing toilets?).
- Facilities at Federation Hut were great after being rebuilt after the fires.
- The fireplaces provided are great. Generally the parks need to be left in as much of a natural state as possible but in saying that some basic facilities such as toilets would reduce the impact of human pollution
- Need some tourist accommodation at Mt Buffalo Chalet and a cafe/shop.
- Stayed at Frys Hut for 3 nights over Aust Day weekend. Everything was good but there was no facility to leave rubbish at, either at main campsites or towns. This would have been handy on day 2 and final day.
- Upgrade the toilets maybe add showers this would stop people from bathing in river and more fire pits around would be nice but all in all very well managed. Regards Blair Robinson
- Was surprised to be visited, and to see that the cattlemen's huts have been checked as often as they are. Enjoyed the camping holiday with our horses to travel through parts of the High Country.

- Over a number of years I have spent many weekends walking and skiing in the Alps. I have always enjoyed the experience and have usually been impressed by the management of the area. One concern I have at the moment is the future of the chalet at Mt. Buffalo. When we stayed at Lake Catani over the long weekend we noted the deterioration of the building. It would be a huge pity if this magnificent hotel was allowed to deteriorate and spoil the Mt. Buffalo experience.

- When can we see some sort of decision made for the reopening of the Mt Buffalo Chalet - if I could I would get very involved in having it operational

- I preferred not to have the road sealed between Falls Creek and Omeo

- Overall very good, I would like to see much more done to provide shelter in remote areas and information about what is tucked away. I think this would assist bring more people to the mountains.

- I am very happy about the way the government maintains the parks in all over australia. Two years before we went to Mt.Buller. We had lots of fun and enjoyed a lot. we had little bit trouble in driving while returning from mt.Buller. As it is very dark and because of huge fog & there is no enough lights in mountain roads. Its very risk for inexperienced drivers to drive in this tough situation. we suggest that the management can increase few more road lights in the mountain regions. Thanks

d. Trails Related

- Track signs are not being replaced from places that have been burnt out etc...even though it has been over a year in some places.

- Parks are great and need to maintain good access for four wheel driving and camping.

- Track maintenance in peak period times. Perhaps some tracks could be widened for safety in vehicles passing oncoming traffic but definitely SET A 40 KMH SPEED LIMIT FROM THE TURN-OFF FROM THE MANSFIELD-MT BULLER ROAD (at Merrijig).

- Bungalow Spur Track needs to have regrowth cleared to give it more definition and make it easier for people to stay on the track ie reduce people impact in surrounding vegetation. North West Spur track needs to more signage.

- Some areas of the park need to be closed to traffic after heavy rain due to the damage it has on tracks which may cause other drives to drive around problems causing further damage.

- All tracks should be clear, even in Wilderness Areas, and, if necessary, well marked. It is all very well to say visitors do so at their own risk, however everyone has to start somewhere, as my family did with the Alpine Walking Track as it was then known. Mount Stradbroke now has a track marked to it, and the walk is well worth while, however, the rocky top is rather dangerous - I had a very active youngster who I would have been worried about there without some sort of restraint on the rock.

- Some great remote walking tracks in the Alps but need better maintenance, these are a real asset to tourism in Victoria and the wellbeing of our global community.

- I believe the parks should be available for everyone to enjoy. There should be well marked trails for walking and skiing. The around the Rocky Valley Dam walk is important as is development of facilities on the foreshore so this area can be utilised by tourists and sporting groups. If this is managed well there will be little impact as opposed to creating a more beautiful area to be enjoyed by more people.

- Beautiful part of the world and will visit again. I would like to see the walking trails with more markers. There was a track that had a marker at the beginning but I couldn't find anymore. The track was not well cut and I felt that I could easily have got lost so I turned around and went back the way I came.

- National Parks are suffering from lack of maintenance - weed suppression, track quality and access roads. There is too much emphasis on "iconic" tracks and areas at the expense of all other areas.

- Don't close all the tracks. Meaning 4WD tracks.

- Mt Buffalo is such a beautiful national park and yet the tracks are poorly managed.

- I think that the places I have visited have been very well managed only a few suggestions would be to make tracks in to the more popular areas wider.

- 4wd tracks should be closed permanently in the higher elevations. I.e. track beyond lovichs hut to howitt carpark. Further development of ski resorts should be stopped immediately.

- Some great remote walking tracks in the Alps but need better maintenance, these are a real asset to tourism in Victoria and the wellbeing of our global community.

- Sign-posting for a lot of the walks was pretty poor around the sheepyard flats campsite and the other sites further upstream

- It is a shame how many tracks are being closed to the 4x4 community. We do help keep the tracks clear of fallen trees etc which helps when emergency services need access to the areas. Please keep the tracks open so our daughter can camp and enjoy the high country. thank you.

- Better access to the parks need to be given and 4WD tracks need to be kept open.

- Stop track closures when not required. Make management decisions based on those who use/visit the parks not those who never venture past the outer suburbs.

- I would like to see more provision of sustainable tracks (including narrower trails) for mountain biking. There is plenty of research that shows that cycling is no more damaging than walking if the track has been constructed well, and it is a rapidly growing activity that needs to be catered for.

- Walhalla extremely pleasant stay, although become a lot more popular recently, still excellent to see that you can still take your dogs, i wish more places were like that. very good walking tracks around area

4. Visitor Management

a. General

- Working in the 'information to the public' area there is often difficulty accessing information out of hours. It is difficult to find a person to answer the phone and direct the call to get the correct source of up to date conditions and/or places to stay, cost of camping etc.

- I am very conscious to minimize our groups impacts. I would like to see a bit more flexibility in the management of visitors like myself (groups that can prove they practice low impact camping, travel,ect) visiting and camping in remote area. Thanks

- I think due to the amount of motor bikes during peak periods that perhaps a little more signage for them to slow down in the populated areas may be a good idea as young children on bikes or walking are always about.

- I enjoy staying in the area however would appreciate if those with horses stuck to housing their animals in the areas provided. Instead of creating their own paddock near the river where contamination and unhappy campers are.

- We have been visiting the Howqua Hills area every year for 33 years It has become so popular that it is losing its appeal. I feel that some sort of control on the number of visiters will have to be implemented. Further in to this area deer hunters make it unpleasant if not dangerous to visit at certain times of the year. My interest in the area is ,Camping (Pickerings Hut), waiking (everywhere), fishing (upper Jamison river) . My hope is that this beautiful part of Victoria is protected for other generations to enjoy as I have had the privilge to. Yours sincerly Ross Cleeland

- Expand! Remove motor bikes from state parks. Alpine parks are great! keep up the good work.

- It would be nice to have some areas where dogs are allowed (with conditions of course)

- Recycling is very important and I think that visitors should be reminded to dispose of their rubbish in the correct bins. The rangers were very friendly and helpful.

b. Conflict related

- 4WD access conflicts with other uses - many 4WD users do not seem to have the same objectives and sensitivities about the beauty and value of the places they are visiting.

- Over Easter, noise by groups who played loud music and drank alcohol spoilt our stay.
- Trail bikes in the area can reduce the quality of the experience, too noisy, and seem to be in conflict with the natural values of the national parks.
- Too much bad behaviour from too many people in Wonnangatta Valley on long weekends. Too many 4wd'ers driving off road and damaging wet tracks especially on Queens Birthday and Cup Day weekends.
- Conflict between 4wd users, hikers and cattle-graziers in some high volume areas (although the latter has been improved).
- Sheep yard Flat was very good at the weekend. Many people and the trail bikes annoyed us. Also the cars of the other campers sped through camp which we thought was dangerous as there were little kids, including ours that had to be watched

- There are too many 4Wd tracks. They impact on the quality of experience in the park.
- Irresponsible dirt bike riders were dangerous. Children riding with their parents on main tracks sharing them with four wheel drives is a recipe for disaster. It surprised me that people can be so irresponsible with fires during fire restrictions. The clean up crews were fantastic after the campers had left. I would like to see police or parks enforcing the law/regulations during peak periods. It might end up saving someone's life.
- The snowmobiles in Falls Creek area and Bogong High Plains are a real problem.

- The were quite a few hoons at sheepyard flat (tunnel bend) over the Australia Day weekend which unfortunately ruins it for others. They also left an incredible about of rubbish including couches they had 1/2 burnt on one of their drunken evenings. Unfortunately people like that it will ruin it for people like us who want to take our families away and give them a true camping experience.
- The park should have special areas for 4wd and trailbikes. That way they are not tempted to disturb the peace in the rest of the park.
- Not enough camping markers for this area, a lot of which is degraded by the commercial four wheel drive and horse people and the cattlemen who impose on walkers as if they (the cattlemen, horse, commercial) own the country and are very rude about different attitudes to the environment.
- Keep out the noisy dirt bikes, campers come for peace and rest not the noise of motors.I enjoy my camping when ever I can with my family and it can be ruined by this. Everyone should respect why each other is there.
- Have stayed in the waningatta area a few times and are amazed at how many spot lighters are driving through and shooting at night, also the amount of rubbish left behind is amazing.
- Conflicts between user categories are increasingly apparent. These are exacerbated by a lack of adequate management resources on the ground within the parks.
- The park should have special areas for 4wd and trailbikes. That way they are not tempted to disturb the peace in the rest of the park.

c. Interpretation

- The information boards eg native fauna information in huts (antichinus vs rats!) and flora information is really good.
- Their education programs are woeful and keep getting cut. It is short-sighted not to use these resources to educate future generations. More education may lead to a more knowlegeable and engageed public who didn't think booting cattle out of the high country caused the fires.
- All a question of priorities. Ignoring education opportunities will impact your ability to create an engaged and informed public which would be the best long term solution to protecting our environment.
- Need better interpretation of sites.
- Greater promotion of natural values and indiginous heritage would deepen our knowledge/appreciation of the Alps (seems a lot of focus on European history and pioneering).
- More signage and information would be handy.
- Would like to see more signage for short walks (half day or less), and more signage as to which roads are suitable for 2 wheel drive cars around Walhalla. I usually day visit the area once per year.
- Far better interpretation is needed of indigenous culture through signage trails which should help tourists and other visitors to appreciate Aboriginal Culture and Lanadsapes in the Alps.

5. Comments on the Survey

- In regards to the survey - quite fun but frustrating that your markers didn't refresh -- way too large a site for that many markers and I look for wildlife everywhere so how do you account for that. Plus, I found some issues though important aren't as easy to map in retrospect. For example scenery is but impacts aren't -- you could do a better job if you got contacted before your visit, rather than after. Good luck with it.

- All map markers placed on my map are related to horse riding activities in the High Country. I could have used about 10 more markers in some categories. I think there should also be markers for environmental degradation not related to track and camp use, such as blackberry infestation.
- Greg - my knowledge isn't that great. I've only been to about six locations, but of those six I know them quite well. The system was very easy to use. Well done.
- Your survey is flippant does not meet any sort of indepth study or commitment to managing the alpine national park
- 250 words isn't enough! I found this survey very frustrating as there weren't enough icons for some of the things I do. I did not realise that if I used all the icons on one section of the map then I wouldn't have any for the rest of it.
- Please note: no employment category of 'retired"
- I think this survey is a great idea and I think that we need to continue managing these beautiful areas so that we protect the environment for years to come and so that people can visit and enjoy these areas.
- hey there i found this too be annoying because I could not get kinglake or marysville national parks up on your map anywayz hope this satisfies cheers Shane
- Please see comments attached to map.
- Some of the names are rather misleading as they appear to be incorrectly placed. The area I have covered with this access code is easily accessed and covers some beautiful country.

- Looking at the marked rivers I think I have put all my ridgeline markers in valleys -
- I would appreciate a one on one interview of my experience and knowledge of the Alpine National Park as both volunteer and paid employee
- This scale of this survey doesnt' work well with your methods. The order of the pins creates a bias becaues you can't put things on top of each other, there isn't enough pins and by the time you put all the pins relevant to one place, you are miles out on where you really want to indicate. Cool application but I hope you are not planning on a huge amount of accuracy in terms of location.

- I found this survey very frustrating as there weren't enough icons for some of the things I do. I did not realise that if I used all the icons on one section of the map then I wouldn't have any for the rest of it.

Appendix 6. Summary of annotated comments.

Total number of annotated comments = 407

Walking trails (n=37 / 9%)
Pest plant and animals (n=47 / 12%)
Comments on types of park experiences (n=82 / 20%)
Comments on scenery (n=68 / 17%)
Maintenance (n=31 / 8%)
Facilities (n=41 / 10%)
Crowding (n=13 / 3%)
Interpretation (n=10 / 2%)
Conflict (n=21 / 5%)
General comments (n=57 / 14%)

Appendix 7. Mapped attributes by park zone classification.

General observations about experiences by park zone:

- Conservation zones have highest percentage of aesthetic experiences
- The crowding experience is highest in Historic and Recreation Development zones and lower in the conservation and remote zones.
- Historic zones are have highest percentage of learning values
- Overnight and trail-based experiences are ubiquitous in all zones except that Trail experience is highest in conservation zones.
- Physical experience is highest in the Conservation and Recreation zone and lowest in the Historic zone
- The social experience is highest in Historic and Recreation Development zones
- The solitude experience is highest in the Reference, Remote and Wilderness zones but lower in the Historic and Recreation Development zones
- Wildlife viewing experiences occur in small proportions across all zones but lower in Recreation Development zones

Experiences by Zoning Classification

			Zoning Classification								
			Avon Wilderness Park	Conservation	Conservation and Recreation	Historic	Recreation Development	Reference Area	Remote	Wilderness Zone	Total
Experience category	aesthetic	Count	5	262	227	56	37	5	85	49	726
		%	16.7%	25.0%	19.0%	14.3%	18.4%	21.7%	21.1%	21.9%	20.7%
	crowding	Count	0	26	77	42	24	0	8	15	192
		%	.0%	2.5%	6.5%	10.7%	11.9%	.0%	2.0%	6.7%	5.5%
	learning	Count	3	63	72	59	15	2	22	13	249
		%	10.0%	6.0%	6.0%	15.1%	7.5%	8.7%	5.5%	5.8%	7.1%
	overnight	Count	7	172	212	81	40	4	86	42	644
		%	23.3%	16.4%	17.8%	20.7%	19.9%	17.4%	21.3%	18.8%	18.3%
	physical	Count	2	131	157	24	22	3	35	16	390
		%	6.7%	12.5%	13.2%	6.1%	10.9%	13.0%	8.7%	7.1%	11.1%
	social	Count	1	60	80	45	22	1	17	9	235
		%	3.3%	5.7%	6.7%	11.5%	10.9%	4.3%	4.2%	4.0%	6.7%
	solitude	Count	5	130	158	22	10	6	71	49	451
		%	16.7%	12.4%	13.3%	5.6%	5.0%	26.1%	17.6%	21.9%	12.8%
	trail	Count	4	153	128	37	27	0	58	18	425
		%	13.3%	14.6%	10.7%	9.5%	13.4%	.0%	14.4%	8.0%	12.1%
	wildview	Count	3	50	81	25	4	2	21	13	199
		%	10.0%	4.8%	6.8%	6.4%	2.0%	8.7%	5.2%	5.8%	5.7%
	Total	Count	30	1047	1192	391	201	23	403	224	3511
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

General observations about park impacts by park zone:

- Recreation zones have highest percentage of campsite impacts
- Remote Zones have lower campsite impacts
- Noise impacts were most frequently observed in Historic zones
- Rubbish impacts were highest in "Conservation and Recreation" zones and lower in Remote zones
- Track impacts were highest in the Conservation and Remote, but lower in Avon Wilderness, Historic and Recreation Development zones
- Water had lower impact in Conservation Zones
- Wildlife impacts were highest in Avon Wilderness Park

Impact Observations by Zoning Classification

			Zoning Classification								
			Avon Wilderness Park	Conservation	Conservation and Recreation	Historic	Recreation Development	Reference Area	Remote	Wilderness Zone	Total
Impact category	campsite	Count	0	16	45	13	6	1	2	9	92
		%	.0%	14.0%	19.8%	17.1%	25.0%	50.0%	3.6%	20.0%	16.2%
	noise	Count	0	11	25	23	4	0	9	6	78
		%	.0%	9.6%	11.0%	30.3%	16.7%	.0%	16.1%	13.3%	13.8%
	rubbish	Count	5	12	46	10	4	0	2	5	84
		%	21.7%	10.5%	20.3%	13.2%	16.7%	.0%	3.6%	11.1%	14.8%
	track	Count	0	48	44	6	1	1	25	13	138
		%	.0%	42.1%	19.4%	7.9%	4.2%	50.0%	44.6%	28.9%	24.3%
	vegetation	Count	7	20	33	7	3	0	10	7	87
		%	30.4%	17.5%	14.5%	9.2%	12.5%	.0%	17.9%	15.6%	15.3%
	water	Count	5	3	27	12	4	0	3	3	57
		%	21.7%	2.6%	11.9%	15.8%	16.7%	.0%	5.4%	6.7%	10.1%
	wildlife	Count	6	4	7	5	2	0	5	2	31
		%	26.1%	3.5%	3.1%	6.6%	8.3%	.0%	8.9%	4.4%	5.5%
	Total	Count	23	114	227	76	24	2	56	45	567
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

General observations about facilites/service observations and special places by park zone:

- The "Conservation and Recreation" zone had a significantly higher number of observations about facilities than other zones
- Special place observations were highest in the Conservation and "Conservation and Recreation" zones

Facilities and Special Places by Zoning Classification

			Zoning Classification							
			Avon Wilderness Park	Conservation	Conservation and Recreation	Historic	Recreation Development	Remote	Wilderness Zone	Total
category	facilities	Count	0	13	28	10	5	8	3	67
		% within category	.0%	19.4%	41.8%	14.9%	7.5%	11.9%	4.5%	100.0%
	special	Count	4	108	106	22	14	41	30	325
		% within category	1.2%	33.2%	32.6%	6.8%	4.3%	12.6%	9.2%	100.0%
	Total	Count	4	121	134	32	19	49	33	392
		% within category	1.0%	30.9%	34.2%	8.2%	4.8%	12.5%	8.4%	100.0%