

Visitor satisfactions, impact perceptions, and attitudes toward management options on the Routeburn Track

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This report is the eleventh from the Great Walks visitor research programme. Reports from surveys of other tracks are published through the same series. While data in this report were collected predominantly during January-February 1994 and flooding disruption did reduce the sample size, the visitor responses still provide valid indications of visit experiences and evaluations. Any significant management or use-pattern changes since 1994 can be interpreted in light of these results. The changes on the Routeburn Track have been major, with application of a hut booking system and the rebuilding of Routeburn Falls Hut. The results of this report still apply in situations where huts are being used to their managed capacity, although growth in use-levels is no longer an issue.

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Abstract

Walkers on the Routeburn Track in Mt Aspiring and Fiordland National Parks were surveyed in January-February 1994 as part of a wider study of track users in New Zealand. Evaluations of overall satisfaction and individual facility and service satisfactions were highly positive, suggesting little dissatisfaction or any need for urgent management action. However, crowding results indicated a need for urgent management action. Perceptions of crowding and social and physical impacts indicated that visit-experience problems would increase with future increase in use-levels, particularly difficulties due to hut congestion, which was highly associated with crowding. Visitors favoured information-based management to address these increasing use-pressures, rather than more regulatory controls. However a more direct approach appeared necessary, given the crowding levels, and the subsequent application of a booking system had some support from these results.

Executive summary

This report summarises key results from a 1994 survey of 144 walkers on the Routeburn Track, in Mt Aspiring and Fiordland National Parks. The survey was undertaken as part of a broader study of people doing overnight trips on the Great Walks. It provides information about visitor satisfactions with their visit experiences, about which aspects of visits may be detracting from the quality of these experiences, and about management options to address these issues.

Evaluation

Evaluations of the visit were very positive. Overall satisfaction scores were very high, and most visitors rated the experience better than they expected. In addition, only a minority indicated they expected use-levels lower than those they experienced. The overall satisfaction measure was linked to satisfactions with hut and track conditions, but these were only weak correlations. The lack of strong links with other variables limits the practical value of the overall satisfaction score as a possible tool for any monitoring the quality of visit experiences. High crowding perceptions indicated visit experiences were being compromised, but there was no relationship between these perceptions and overall satisfaction scores. However these crowding perceptions were found to be associated with impact perceptions related to hut congestion. In general, crowding scores appear to represent a more sensitive measure of compromises to visit-experiences.

Satisfaction with facilities and services

Satisfactions with specific facilities and services were high, and there were no notable links between these specific satisfactions and the overall evaluations of the visit (e.g., the overall satisfaction and crowding scores). Overall, these satisfaction results suggested there was no immediate need for significant management interventions in facility and service provision. Attention to the drying space and facilities in huts appeared to be the only prominent area where any further enhancement of visit experiences may be currently achieved.

Impact perceptions

Visitors were aware of high levels of some social and physical impacts, but the proportions of visitors bothered by these impacts rarely exceeded 30%. The social congestion conditions in huts, were particularly prominent, along with perceptions of uncertain hygiene and aircraft noise. Negative social impacts related to seeing guided groups were not notable, despite most visitors indicating they saw such groups. Such high tolerance for widely noticed impacts was apparent in many cases (e.g., perceptions of over-development). However, some types of impacts appeared to be seen as particularly unacceptable (e.g., associated with litter, toilet paper/waste, woodcutting), but these were not reported at notable levels. These impacts did not generally differ between different visitor groupings, apart from some differences among physical impact perceptions according to nationality (New Zealand/overseas), gender (male/female) and crowding perception (uncrowded/crowded). In summary, overseas visitors were more both-

ered by littering and physical damage impacts to campsites and vegetation; female visitors who felt crowded were more aware of track damage impacts from trampling; and overseas visitors who felt crowded were less tolerant of impacts from littering and physical damage. While quite simplified, these summary points highlight physical littering and damage as the main areas where impact perceptions were particularly variable. However, these perceptions were reported relatively low levels, and do not suggest any immediate management actions are required.

Attitudes toward management options

Visitors attitudes were most positive toward the use of information to encourage better choices of trip timing and appropriate behaviour on them. Attitudes were mostly negative toward options involving encouraging alternative types of visits and accommodation (e.g., camping, guided trips, new tracks), manipulating-use to channel or reduce visitor numbers (e.g., booking systems, permits, peak pricing, one-way walk, reduce facilities), and development of options to increase accommodation capacity of huts (e.g., more huts, more bunks in huts). Attitudes toward options involving application of rationing systems (e.g., bookings, permits) were more evenly split between those for and against. Given the very high crowding scores and the links of these to hut congestion impacts, there is some support for the application of the Routeburn Track booking systems. Any information-based approaches would require time before the effects could counter the increasing use-levels.

Recommendations

The most productive directions for preventative actions to minimise future compromises to the quality of visit-experiences appear to be:

- Specific attention to the facility capacity (e.g., drying space) and bunk capacity of huts
- Optimising/reconfiguring the use of space for comfort and facility access in huts
- Provision of general information about the Routeburn Track, and visiting it
- Provision of accurate information about the water hygiene conditions
- Application of a hut booking system
- Provision of information approaches which forecast visitor numbers and hut loadings in advance, accompanied by suggestions on visit timing and operation
- Investigate options for further managing aircraft noise impacts.

With a booking system in place, most further gains could be made by concentrating upon short-term physical changes to hut facilities and their operation, complemented by more long-term promotion of beneficial behavioural changes through information use. Appropriate research and information back-up could include:

- Assessing options for optimising the use of space and facilities in huts
- Investigating how space and facilities are used in huts by visitors

- Assessing the effectiveness of information-based techniques in influencing visitor use
- Investigating differences in the expectations and evaluations of visits by different visitor groups, particularly related to expectations of an experience under booking-system conditions
- Investigating the distinction between noticing and tolerating impacts, and being bothered by them
- Investigating the general resistance by visitors toward the more direct management approaches and the role of perceived freedom in recreation
- With reference to any insights from the investigations above, evaluate the outcomes of different management options on visit experiences and visit patterns, comparing booking systems with other short and long term options

Any monitoring of visit experience quality should concentrate on hut congestion conditions at key huts. A booking system does not prevent full huts, and congestion conditions may continue to arise. Emphasis should be on a variety of approaches, as simple measures of overall satisfaction are unlikely to provide a useful means to monitor any changes in these conditions.

Acknowledgements

The overall Great Walks study covered a wide variety of different track and recreation situations, and raised a number of large operational and analytical challenges. Help and advice on statistical approaches to these analyses was provided at various times by Margaret O'Brien and Ian West of Science & Research Unit, Department of Conservation, and Roger Wilkinson of Landcare Research. Data entry for the project was carried out very effectively by the Tourism Green project team of Michael Chan, Victor Keo and Sulia Aumua. Ian Mackenzie of Science & Research Unit provided the overall editorial assistance for final production of the reports. Thanks are also due to other Departmental staff who viewed the draft reports and made useful suggestions on their overall approach and contents.

For this specific report, overall co-ordination was managed by Paul Wilson of Southland Conservancy, Department of Conservation, and Owen Graham of Otago Conservancy. Field operations were co-ordinated by Ross Kerr and Ken Bradley of Te Anau Field Centre, and Richard Kennett of Glenorchy Field Centre. The actual application of the survey in the field was carried out by hut wardens on the Routeburn Track.

1. Introduction

The Routeburn Track traverses alpine terrain within Mt Aspiring and Fiordland National Parks. This survey was undertaken in January–February 1994, as part of a broader study of people doing overnight trips on the Great Walks. Tracks classified and managed as Great Walks are the primary locations for multi-day walking trips in the New Zealand backcountry. They are of high scenic and recreational value, and are characterised by high and increasing use-levels. This use pressure, and the need to provide for quality outdoor recreation experiences, requires that these tracks be specifically managed to provide high levels of facility and service provision without compromising the quality of the visit experience. To achieve this outcome, managers require information about visitor satisfactions with their visit experiences, and what aspects of visits may be detracting from these experiences. On this basis, the objectives of the Great Walks study were to:

- Provide brief description of overnight visitors to the Great Walks
- Identify visitor satisfactions with the facilities and services provided
- Identify visitor perceptions of crowding and use-impacts
- Identify visitor attitudes towards management options

Departmental staff at key huts administered standardised questionnaires to visitors on each track¹ on their last trip night. Overall, 144 Routeburn Track visitors completed the survey questionnaire. After data coding and entry, preliminary results were initially presented to managers as percentage tables. These descriptive results are summarised here in the questionnaire format (refer Appendix 1).

Other analyses were carried out on the database, and this report summarises the main findings derived from these descriptive and analytical results. The report presents overall evaluations by visitors of their visit experiences, and then investigates the specific aspects of facility and services satisfactions, social and physical impact perceptions, and attitudes toward different management options. Analyses are undertaken which assess how these specific responses vary between different groups of visitors, and how they relate to the overall evaluations. This approach enables any significant current or potential compromises to the quality of visit experiences to be clearly identified.

¹ A standardised questionnaire (Appendix 1) was developed for overnight walkers on the Great Walks system, which comprises the Abel Tasman, Heaphy, Kepler, Milford, Rakiura, Routeburn, Tongariro, and Waikaremoana Tracks, and the Wanganui River journey. Surveys of the Travers-Sabine and Dart-Rees track circuits were also included, although flooding prevented any work being possible on the latter. A sample of sea-kayakers was also collected in Abel Tasman National Park. Some site-specific questions were used where required, particularly for questions related to boat use on the Wanganui River and the Waikaremoana and Abel Tasman Tracks; some non-applicable questions were omitted on the Milford Track; and it was possible to survey at Easter on the Tongariro, Heaphy and Kepler Tracks. German and Japanese translations were provided.

2. Visitor information

In summary, visitor characteristics were representative of a young and international group of people, largely unfamiliar with the Routeburn Track and generally inexperienced at the backcountry walking activity. Short hut-based trips predominated. Some summary findings included: (refer Appendix 1 for details)

- An approximately even balance of men (52%) and women (48%)
- Only 14% were from New Zealand, compared with 17% German, 17% USA, 14% Britain; 8% Australia and Netherlands, 7% Japan
- Most (59%) were aged between 20-29 years, most others (25%) were between 30-39, only 6% were aged 50 or more
- Most (91%) were on a first visit to the track, 17% were on their first overnight walking trip, and only 19% had done more than 20 such trips
- Group sizes averaged a little under 3
- Most (83%) stayed 2-3 nights, with 91% in huts only, compared with 8% only camping.

New Zealand visitors represented a broader age-range, came in smaller groups, had more previous experience of the Routeburn Track and of overnight walks in general. overseas visitors were more often in the 20-29 year age-range (64% *vs* 30% for New Zealand visitors), had larger group sizes (mean of 3.02 *vs* 2.60 for New Zealand visitors), were more often on first-visits to the track (94% *vs* 65% for New Zealand visitors) and done fewer overnight walks (57% had done five or fewer *vs* 25 % for New Zealand visitors). In general, experience levels appeared to be low for almost all visitors, but lower for overseas visitors.

Comparisons were also made of the characteristics of visitors who indicated they were either 'crowded' or 'uncrowded' (refer to Section 3.2 and Appendix 3 for descriptive discussion of this crowding distinction). However, the only notable differences were the larger group sizes of those who were crowded (means 3.12 *vs* 2.44). Overall, the crowded and uncrowded visitors could not be distinguished from each other on the basis of their descriptive characteristics. No other notable distinctions between different groups of visitors were identified.

3. Evaluation of the quality of visit experiences

Overall evaluation of the quality of visit experiences was assessed through four questions related to overall satisfaction and perceptions of use-levels (refer Appendix 1 for question details).

3.1 EVALUATION OF OVERALL SATISFACTION

Two questions allowed visitors to evaluate the quality of their overall visit experiences:

- An *overall satisfaction* score (how satisfied or dissatisfied with the trip—Question 5)
- An *expectation fulfilment* score (was the trip better or worse than expected—Question 4)

Positive responses from visitors to these questions represented their evaluation that they had achieved high quality recreation experiences on their visit. Figures 1 and 2 show that satisfaction on the Routeburn (and other tracks) was very high (94%), and most experiences were as good as had been expected, or better (94%). These responses were also moderately correlated with each other ($r = .49$), indicating that where dissatisfactions were higher, there also appeared to be greater evaluations of the visit being below expectations. The proportion of

Routeburn Track visitors who indicated the visit experience was better than they expected was similar to that from visitors to other tracks. Virtually nobody indicated they were dissatisfied with their trip. The main conclusion drawn from these overall evaluations is that visitors are achieving quality experiences on the Routeburn that are frequently better than they expected.

Figure 1. Overall satisfaction.

Figure 2. Fulfilment of trip experience expectations.

3.2 EVALUATION OF USE-LEVELS

Two further questions allowed visitors to evaluate the quality of their visit experiences in relation to use-levels:

- A score for perception of *crowding* (overall, did they feel crowded on the trip—Question 2)
- An evaluation of *expected visitor numbers* (seeing more/same/less than expected—Question 3)

Positive responses from visitors indicating low levels of crowding, and not seeing more people than expected, would have reinforced overall evaluations of achieving high quality visit experiences. However, Figures 3 and 4 show that crowding perceptions were substantial, and that many visitors saw more others than they expected. More visitors felt crowded on the Routeburn Track (76%) than other tracks (60%), although the pattern of visitor numbers expectations was more similar. These crowding and expected use-level evaluations were moderately correlated with each other ($r = .50$), indicating those who experienced higher use-levels than they expected generally gave higher crowding scores². In addition, crowding scores appeared to be weakly correlated with overall satisfaction ($r = .37$). While this suggests that visitors who were relatively more dissatisfied also had higher crowding scores, low response frequencies prevent any conclusive statements being made.

Other questions were asked which aimed to identify any focal points for crowding perceptions on the Routeburn Track (Question 3). Overall, 69% of visitors indicated that some places were more crowded than others, and of these visitors, 90% included hut sites in their examples while 20% included track sections. Appendix 1 summarises other crowding information from Question 3, which indicates that

Figure 3. Crowding perception summary.

Figure 4. Fulfilment of visitor number expectations.

² In addition, an ANOVA test ($F(2,122) = 12.30$, signif. $F = .0000$) showed mean crowding scores increased from those expecting more people (3.02), through those expecting the numbers seen (4.28), to those expecting fewer people (5.22). Similar analyses found no significant differences between use-level expectations and overall satisfaction mean scores.

visitors who indicated a focus for hut crowding (n = 82) specified McKenzie Hut (61%) and Routeburn Falls Hut (24%); and those who indicated a track focus (n = 18) specified Harris Saddle (72%). These results indicated issues related to hut use were the key to crowding perceptions, although track issues were also of secondary importance.

Although substantial crowding perceptions were reported, and these could be interpreted as representing use-levels which are close to exceeding 'social capacity' (refer Appendix 3), they could not be reliably linked with overall satisfaction. In other words, apart from extreme responses where the most crowded were the most dissatisfied, higher crowding perceptions were not associated with higher evaluations of dissatisfaction with the trip, or it being considered worse than expected. While some visitors indicated they did experience crowding, and many experienced higher use-levels than they expected, this did not appear to substantially affect how they felt about their overall trip.

Despite this finding, the high crowding levels themselves suggest strongly that some degree of compromise to the quality of visit experiences was occurring (refer Appendix 3). Subsequent sections in this report present analyses which indicate where some of these compromises may occur in relation to satisfactions with particular facilities and services (refer Section 4.2), or with perceptions of particular social and physical impacts (refer Section 5.2).

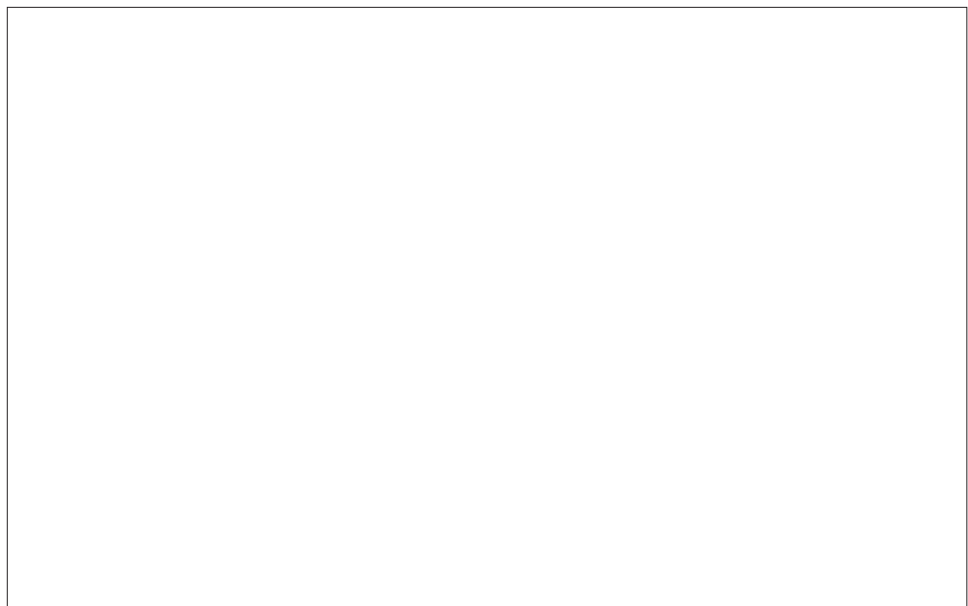


FIGURE 5. SATISFACTIONS WITH THE FACILITIES AND SERVICES PROVIDED (N = 1044).

4. Satisfactions with facilities and services

Satisfactions with 28 specific facility and service items were surveyed, covering aspects of the tracks, huts, campsites, and information services provided (refer Appendix 1, Question 7). The complete list of responses, summarised in Figure 5, shows there were few expressions of dissatisfaction. Some of the highest levels of dissatisfaction related to campsite facilities, although these can be disregarded here as campsite user numbers were very low ($n = 12$). Of more interest was that only drying facilities (32%), hut relaxation space (19%), and bunk numbers (15%) exceeded the 15% level of dissatisfaction. Apart from dissatisfaction with drying space, the results indicate a high acceptance of the existing standards of services and facilities, and by inference, may be indicative of little demand for any additional provision. Some attention to the facilities and space in huts for drying clothing and gear in wet conditions should be considered.

4.1 EFFECTS OF AGE, GENDER, NATIONALITY, AND CROWDING PERCEPTION

4.1.1 Background to analyses

Additional analyses were required to assess whether these satisfactions varied significantly according to age group, gender, nationality and crowding perception. Because it was apparent that patterns of visitor responses were often similar across particular groups or 'clumps' of these satisfaction items, summary scales of these 'clumps' had to be constructed to allow valid statistical analyses. The resulting satisfaction scales, each containing items which had related response patterns, are listed in Table 1 and shown in Figure 6 (next page). The satisfaction scale developed for campsite conditions was excluded from subsequent analyses due to the low numbers of visitors who used campsites ($n = 12$).

TABLE 1. SUMMARY SCALES FOR SATISFACTIONS WITH FACILITIES AND SERVICES (REFER APPENDIX 2).

SCALES	DESCRIPTIONS
Hut conditions	Hut and facility space, bunk numbers, water/toilet/other facilities
Track conditions	Slope, surface, difficulty, drainage, constructions, marking, signs
Information services	Map/brochures, visitor centre/warden advice, information signs
Campsite conditions	Includes campsite space, water/toilet/other facilities

FIGURE 6. SATISFACTION RESPONSES ORDERED IN SUMMARY SCALE STRUCTURE. (THIS IS SIMPLY A REORGANISATION OF MATERIAL PRESENTED IN FIGURE 5).

4.1.2 Significant findings

Using the SPSS MANOVA routine, a series of multivariate analyses of variance were carried out on these satisfaction scales (e.g., the dependent variables). Differences in these impact scales according to age-group (over and under 40 years), gender (male/female), nationality (New Zealand and overseas), and crowding perception (uncrowded/crowded) were analysed. The same approach was subsequently used for impact perception (Section 5.1) and management attitude (Section 6.1) scales. However, these analyses did not identify any notable differences, suggesting a general consistency of visitor satisfaction responses across different visitor groupings.

4.2 RELATING SATISFACTION SCALES TO OVERALL TRIP EVALUATIONS

None of the satisfaction scales were significantly associated with the overall satisfaction or use-level evaluations (e.g., crowding). No notable correlations or significant relationships (using SPSS Multiple Regressions) were found. Some weak correlations were identified between overall satisfaction with hut conditions ($r = .39$) and track conditions ($r = .29$), but these were not conclusive results. Overall, the state of facilities and services experienced on the Routeburn Track did not appear to contribute at all to how the overall trip was evaluated. And the lack of any notable relationships between overall satisfaction and any of the facility and service satisfaction scales indicates these questions represent distinctly different visitor perspectives on visit satisfaction. This is an important distinction to acknowledge as simply applying a single overall evaluation of satisfaction appears unlikely to highlight any specific-issue satisfaction problems until they are of an order where visit quality may be already highly compromised, and the problems are more difficult to manage.

FIGURE 7. IMPACT PERCEPTION RESPONSES (N = 1044).

5. Visitor perceptions of impacts

Perceptions of 26 specific impact items were surveyed, covering social impacts, physical impacts, and impacts associated with the facilities and services (refer Appendix 1, Question 5). Visitors were asked to respond to each item using the options of not experiencing the impact, experiencing it but not being bothered, being bothered a little, and being bothered a lot. The complete list of responses, (Figure 7), shows that most visitors did not experience many of these impacts. This may be because the impacts did not occur, or because they were not noticed by the visitor.

The most prominent impacts noticed on the Routeburn were indicated through combining the responses of those who were 'bothered' by impacts, and those who simply 'noticed' them. These 'impact aware' responses often represented a majority of the visitors. The main examples of these more prominent impacts, and the percentage of visitors who were 'aware' of them, included: 'seeing too many in huts' (74%), 'uncertain water hygiene' (72%), 'seeing guided groups' (67%), 'seeing too many on the track' (64%), 'noise from aircraft' (63%), 'noise in huts' (53%), and 'track trampling-widening' (51%). These were the most prominent impacts, although it should be remembered that there is a clear distinction between the impacts being 'noticed' and tolerated, and being seen as 'negative'.

The most negative impacts, those which most 'bothered' the visitors, appear to emphasise social hut conditions, physical track conditions and perceived water hygiene. For social hut conditions, visitors were most bothered by: 'seeing too many in huts' (42%), 'insufficient bunks in huts' (29%), 'noise in huts' (23%), and 'rushing for bunks' (16%). For physical track conditions, visitors were most bothered by 'track trampling—shortcuts' (25%), and 'track trampling—widening' (25%). A high proportion of visitors were also bothered by 'noise from aircraft' (31%). And many visitors were also bothered by 'uncertain water hygiene' (30%). This was a response to the statement 'Uncertainty about the water always being safe to drink'. From consultations with managers, it can be concluded that this response most often represents general caution about water quality, rather than being a direct reaction to hygiene problems experienced on the visit. It was not clear if this caution was related to perceptions of all water sources on the trip, or just those in trackside streams.

When visitors did notice impacts, many were not bothered by them. This response could be considered 'tolerance' of the impacts. For example, while 67% of visitors were aware of 'seeing guided groups' as an impact, most were not bothered by it (48% tolerated *vs* 19% bothered). From figure 7, other prominent example of this high impact tolerance included 'seeing too many on the track', 'overdeveloped signs' and 'overdeveloped tracks'.

When most of those noticing an impact were bothered by it, it could be considered to show high 'intolerance' and unacceptability of the impact. From Figure 7, impacts indicative of inappropriate behaviour by others appeared least acceptable. These included: littering of huts, campsites and tracks, seeing toilet paper and waste, and seeing wood cut for fires. Few of those noticing these impacts were not bothered by them. While these appear to represent the least acceptable types of impacts, they were not frequently reported here.

5.1 EFFECTS OF AGE, GENDER, NATIONALITY, AND CROWDING PERCEPTION

5.1.1 Background to analyses

Additional analyses were required to assess whether these impact perceptions varied significantly according to age group, gender, nationality and crowding perception. Table 2 and Figure 8 show the impact perception scales which were created for these analyses (refer Section 4.1.1).

TABLE 2. SUMMARY SCALES FOR SOCIAL AND PHYSICAL IMPACT PERCEPTIONS (REFER APPENDIX 2).

SCALES	DESCRIPTIONS
Litter damage	Litter/waste, vegetation damage, campsite wear
Hut congestion	Insufficient bunks, too many people, noise, rushing for bunks, water/toilet facilities
Social conflict	Big groups, guided groups
Over-development	Excessive level of huts, tracks, signs, and people on the track
Campsite congestion	Too many people, noise, rushing for sites, over-development
extra individual items—	plane noise, uncertain water hygiene

5.1.1. SIGNIFICANT FINDINGS

Differences in these impact scales according to age-group (over and under 40 years), gender (male/female), nationality (New Zealand and overseas), and crowded perception (uncrowded/crowded) were analysed (refer Section 4.1 for method). The significant effects and interactions associated with the analysis using these independent variables are summarised in Table 3.

TABLE 3. SIGNIFICANT EFFECTS ON IMPACT SCALES.

SOURCE OF SIGNIFICANT EFFECT*	SIGNIFICANT IMPACT SCALES†	MEAN VALUES (ADJUSTED‡)		
			New Zealand	Overseas
Nationality effect $F(6,99) = 4.21, p = .001$	Litter/damage $F(1,104) = 15.87, p = .000$		1.23	1.94
Gender/Crowded interaction $F(6,99) = 3.91, p = .004$	Track damage $F(1,104) = 8.95, p = .003$	Uncrowded	Male 2.01	Female 1.87
		Crowded	1.77	2.02
Nationality/Crowded interaction $F(6,99) = 3.91, p = .005$	Litter/damage $F(1,104) = 11.58, p = .001$	Uncrowded	New Zealand 2.01	Overseas 1.87
		Crowded	1.77	2.02

* The significance of overall satisfaction effects was tested using the Wilks' criterion in the SPSS MANOVA.

† A series of univariate ANOVAs in the MANOVA identified the contribution of each satisfaction scale to the overall significant effect, and identified these listed scales as being significant.

‡ Mean values for summary scales are divided by the number of constituent items to give a figure interpreted using the original question categories (e.g., 1 = Not noticed, 2 = Not bothered, 3 = Bothered a little 4 = Bothered a lot).

FIGURE 8. IMPACT PERCEPTION RESPONSES ORDERED IN SUMMARY SCALE STRUCTURE.

Nationality effect

New Zealand and overseas visitors had significantly different perceptions of physical impacts (Figure 12), particularly those impacts comprising the 'litter/damage' scale. Overseas visitors were more bothered by these impacts than were New Zealand visitors. Additional exploration of the items comprising this scale (refer Table 2 and Figure 8) highlighted litter on the tracks and around the huts as the most prominent items reflecting this distinction.

Gender/Crowded interaction

A significant interaction between gender and crowded perception was based largely on perceptions of impacts related to track damage. Uncrowded female visitors were less bothered than uncrowded males by track damage impacts, but among crowded visitors, females were relatively more bothered than males. This represents a distinctly different pattern of perceptions, where crowded males become relatively less bothered with these impacts, and crowded females become relatively more bothered. Additional exploration of the 'track damage' scale indicated this interaction effect was similar for the track trampling that developed shortcuts, and that which developed widening around wet or rough sections. These results suggest that female visitors are more aware of and bothered by particular physical impacts when they feel crowded, while male visitors are less so.

Nationality/Crowded interaction

A significant interaction between nationality and crowded perception was based largely on perceptions of physical impacts related to litter and damage. Uncrowded New Zealand visitors were much more bothered than uncrowded overseas by these impacts. However, among the crowded visitors, the perceptions of New Zealand visitors were relatively less negative, while those of overseas visitors were relatively more negative. Additional exploration of the 'litter/damage' scale indicated this interaction effect was similar for all individual items, although it was notably more pronounced for seeing litter at campsites, seeing human waste/toilet paper, seeing site wear from informal camping, and seeing litter around the huts. These results suggest that New Zealand visitors become relatively more tolerant of these physical impacts when crowded, while overseas visitors become relatively less tolerant when crowded.

5.2 RELATING IMPACT PERCEPTION SCALES TO OVERALL TRIP EVALUATIONS

Apart from some weak correlations, none of these impact scales were statistically associated with overall satisfaction, indicating that no specific social or physical impact perceptions were related to how the trip was evaluated. The overall satisfaction score was weakly correlated with perceptions of over-development ($r = .37$) and hut congestion ($r = .33$), but these were not conclusive results given the highly skewed satisfaction responses. However, more significant associations were found between impact perceptions and the overall crowding evaluation. An SPSS multiple regression ($F(2,121) = 27.57$, signif. $F = .0000$) identified an association (adjusted $r^2 = .301$) between the impact scales

(independent) and crowding (dependent). The hut congestion scale ($\beta = .505$, $t = 6.53$, $p = .0000$) was the most important predictor of crowding³. That is, being more bothered by the social impacts from hut congestion scale was strongly associated with feeling more crowded. This interpretation was supported by the strong correlation ($r = .54$) between hut congestion and crowding perceptions. Additional correlations calculated for crowding and the individual items comprising the hut/track congestion scale highlighted 'seeing too many in the hut' ($r = .58$) and 'insufficient bunk space' ($r = .50$) as being the most important individual impacts.

³ In addition, a temporary variable composed of the extreme high and low crowding scores was used in a separate multiple regression analysis to test this association further, and demonstrated a stronger association with the same impact scale (e.g., $r^2 = .605$; $\beta(\text{hut congestion}) = .632$; $\beta(\text{over-development}) = .380$).

FIGURE 9. MANAGEMENT PREFERENCE RESPONSES (N = 1044).

6. Visitor attitudes towards management options

Attitudes toward 18 options for managing future increases in track use were surveyed, with visitors indicating the degree to which they agreed or disagreed. Options included: increasing the capacity of accommodation, dispersing use pressures, imposing use-limits, and providing pre-walk information (refer Appendix 1, Question 8). The complete list of responses, is summarised in Figure 9.

The only management approach which attracted consistently high support was using pre-walk information to influence visitor choices about making track visits. Over 80% of visitors agreed with these approaches while less than 5% disagreed. More direct control methods such as reducing facilities and services in order to discourage use, allowing more camping freedom, making peak times cost more for visits, or making the track one-way only were highly out of favour. Development options such as building more huts, providing more bunks in huts, or allowing more guided trip opportunities were also unpopular. For many of the other options, the proportions of visitors either for or against were similar. For example, the options related to booking systems for huts and campsites were opposed by around 40% the visitors, and supported by around a 40%.

These results indicate a pattern of preferences by visitors for management options. Indirect information-based approaches are clearly most favoured. Approaches based on allocation systems appear to split visitors either for or against. Other developments, control, and use-manipulation options are generally more strongly opposed, apart from minor exceptions such as encouraging smaller group sizes, making alternative areas cheaper, and developing alternative tracks.

6.1 EFFECTS OF AGE, GENDER, NATIONALITY, AND CROWDING PERCEPTION

6.1.1 Background to analyses

Additional analyses were required to assess whether these management items varied significantly among the visitors according to age group, gender, nationality and crowded perception. Table 5 and Figure 10 (next page) show the attitudes to management scales created for these analyses (refer Section 4.1.1).

TABLE 5. ATTITUDES TO MANAGEMENT SUMMARY SCALES (REFER APPENDIX 2).

SCALE	DESCRIPTION
Rationing/use-limits	Booking systems for huts/campsites, limited track permits
Information management	Encourage use elsewhere, promote low-impact behaviour
Increase accommodation	More hut/camp capacity, guided options, alternative tracks
Manipulate use conditions	Pricing, facility reduction, promote small groups

(extra individual items— make a one-way track)

FIGURE 10. ATTITUDE TO MANAGEMENT RESPONSES IN SUMMARY SCALE STRUCTURE.

6.1.2 Significant findings

Differences in these management scales according to age-group (over and under 40 years), gender (male/female), nationality (New Zealand and overseas), and crowding perception (uncrowded/crowded) were analysed (refer Section 4.1 for method). However, these analyses did not identify any significant differences between the attitudes of different visitor groupings.

Because visitors attitudes were often substantially split either for or against the management options (refer Figure 10), additional exploration of these data were undertaken. The top and bottom 25% of scores for each of the management option scales were selected, representing the more 'extreme' attitudes of those who most strongly agreed or disagreed with the options. The only notable differences indicated from these explorations were between uncrowded and crowded visitors for the 'manipulate use' management options, and between male and female visitors for the 'information management' management options. The 'extreme-attitude' crowded visitors had higher levels of extreme agreement with manipulating use conditions (60% *vs* 46% for uncrowded visitors). And the 'extreme-attitude' female visitors had higher levels of extreme agreement with information management options (65% *vs* 43% for male visitors). Apart from these distinctions, no other notable differences were found between the different visitor groupings.

6.2 RELATING MANAGEMENT PREFERENCE SCALES TO OVERALL TRIP EVALUATIONS

There were no significant links between the overall visit evaluations (e.g., satisfaction and crowding), and any scales of the attitudes towards management options. These results suggest that preferences for different management options were unaffected by any experiences on the track visit.

7. Summary and discussion

7.1 OVERALL VISIT EVALUATIONS

Overall levels of dissatisfaction were negligible, and very few considered the experience was below their expectations. Overall these results indicate that Routeburn Track visitors had very positive visit experiences.

Some caution is required when interpreting these overall satisfaction findings, as there is a tendency for visitors to give approval to the status-quo of social and environmental conditions they experience on a visit, particularly if they have little previous experience of the site and do not have strong expectations as to what constitutes appropriate conditions. Over time in a situation of changing use conditions, overall satisfactions of such visitors can remain consistently high despite considerable changes in visit experiences. First-time visitors with inaccurate expectations of social and physical conditions on visits, or repeat-visitors with expectations based on previous conditions are those most likely to be indicating overall dissatisfaction. These types of visitors are usually also those most subject to being subsequently displaced to different sites, times or activities, and giving negative feedback to others about their experiences. Other visitors may recognise that elements of the visit-experience may not be what they would prefer, but are prepared to rationalise some of their experiences preferences in the interests of an enjoyable overall visit. All these considerations suggest that reliance on overall satisfaction measures as a monitor of visit-experience quality can be misplaced.

Unlike the situation indicated by overall satisfaction responses, crowding perceptions recorded from the survey were particularly high. The focus for these perceptions was predominantly in the huts at Lake McKenzie, and to a lesser extent Routeburn Falls. In addition, a notable proportion of visitors noted track crowding experiences at Harris Saddle. Based on the interpretations outlined in Appendix 3, overall crowding scores were at levels which suggested that the crowding conditions on the Routeburn Track were close to exceeding the social capacity of the visit experience. Without some action to limit or reduce crowding perception levels, the management interpretations also outlined in Appendix 3 were that the area may have to be accepted as a high-use sacrifice track. While these interpretations may be debatable, it is clear that the levels of crowding perception on the Routeburn Track were extremely high. While satisfaction responses did not directly indicate any major compromise to visit experiences, weak correlations with hut and track satisfactions suggested that some negative effects were beginning to occur. However, with such effects only becoming apparent at these high crowding levels, the overall satisfaction measure on its own does not seem adequately sensitive to changes in use conditions.

7.2 SATISFACTION WITH FACILITIES AND SERVICES

Apart from drying space in huts, no notable levels of dissatisfaction were apparent for any of the facilities and services on the Routeburn Track. None of the satisfaction scales were linked with any of the overall satisfaction and use-level evaluations. These very consistent and high levels of satisfaction across almost all the facility and service types indicated a lack of any specific visitor problems with track management infrastructure, and suggested there were no immediate needs for management interventions beyond normal maintenance. The only area that appeared to require particular attention related to the facilities for drying gear in huts. Notable dissatisfaction with convenience space in huts for relaxing and hut bunk numbers suggest that some consideration also be given to these, if improvements to facilities are a priority. The remaining sources of dissatisfaction were only minor (under 15%), and do not appear to warrant priority on the basis of satisfaction levels alone.

The survey revealed no significant differences in facility and service satisfactions between different visitor groupings, nor were there any notable relationships between the levels of these different satisfactions and the overall satisfaction measure. Generally these results indicate that there are few problems with facilities and services overall, and that this finding is generally consistent across different visitor groupings. These results also indicate that the specific 'facility and service satisfactions' and the 'overall measure of satisfaction' are largely unrelated, and may represent different perspectives with regard to evaluation of the visit experience. There were weak correlations of overall satisfaction with specific satisfaction with hut conditions, and with track conditions, but these only became apparent in very highly crowded conditions. In this respect, 'crowding' seems a more sensitive measure of visitor experiences than either 'overall satisfaction' or the other specific satisfactions. However, the latter offer some indications of specific facility and service problems as perceived by visitors, for example, the prominence of dissatisfaction with drying facilities.

7.3 PERCEPTIONS OF IMPACTS

These results indicated a variety of different types of impact levels and evaluations. Some impacts were hardly noticed by any visitors. Some impacts were noticed by many visitors, but only a minority were bothered by them. Some impacts were noticed by many visitors and notable proportions were bothered by them. Others impacts were not noticed by many visitors, but almost all were bothered by them. Overall, some of these impacts appeared more widely perceived than others, and these perceptions were complicated by varying degrees of visitor tolerance and negative evaluation.

The most widely noticed impacts were: seeing too many in huts and on the track, seeing guided groups, aircraft noise, noise in huts, and uncertain water hygiene. Apparent tolerance of all these impacts was substantial, but negative perceptions were particularly high (over 20%) for uncertain water hygiene, seeing too many in huts, aircraft noise, insufficient bunks in huts, track trampling of

shortcuts and widened sections, noise in huts, and seeing too many on the track. Apparent tolerance was greatest for seeing guided groups, which while noticed by 67% of visitors, only bothered 19%. This indicated that the remaining 48% of visitors aware of this impacts were tolerant of it. While guided groups were readily identified, negative perceptions of these were not high. A similar tolerance pattern was also apparent for seeing too many on the track. While many visitors indicated perceptions of over-developed huts, tracks and signs, very few of those surveyed indicated they were bothered by it. Overall, these results indicate the greatest likely compromises to the quality of visit experiences were related to perceptions of high hut use-levels, water hygiene, and aircraft noise. The relationship identified between crowding perceptions and the hut congestion scale further emphasised that social impacts related to hut conditions were particularly important, particularly if use level increases were anticipated.

Further variation in response patterns between different visitor groupings added to these results. In summary, overseas visitors were more bothered by littering and physical damage impacts to campsites and vegetation; female visitors who felt crowded were more aware of track damage impacts from trampling; and overseas visitors who felt crowded were less tolerant of impacts from littering and physical damage. These results indicate that most of the variation between the perceptions of impacts by different visitor groupings occurred for physical impacts. In particular, differences in impact perception of nationality groupings appeared strongest to seeing litter. There is some suggestion that New Zealand visitors were less concerned with littering impacts, particularly if they feel crowded. These findings may contradict some expectations that New Zealand visitors might be more sensitive to physical impacts. Perceptions differences between the male and female visitors suggest an increased sensitivity to track impacts among female visitors who feel crowded. Male visitors had similar perceptions of track damage impacts whether crowded or not. Overall, no explanation for these results was apparent from other data, and any further investigation to provide more conclusive statements may only be necessary if the distinctions between the visit experiences of different visitor groupings are an important management variable.

Given the prominence of social impacts related hut congestion, and the link identified with crowding perceptions, focus on hut conditions appears to be the most important immediate concern for maintaining quality visit experiences currently, and under any future conditions of higher use-levels. This focus should not be confined to the bunk capacities of huts, as issues of the general numbers present in huts, hut noise, and the availability of hut space were apparent. Attention to providing more accurate information on water hygiene is also important, given the widespread negative perception associated with it. The plane noise issue suggests some conflict with what visitors expect from the visit experience on this track. This may involve some information initiatives to better inform people, and some investigation of the aircraft activities. Although perceptions of guided groups were very high, no notable social impact issues related to guided walkers appeared prominent. Apart from the situation in huts, visitors appeared mostly tolerant of the widely noticed impacts related to high use-levels on the Routeburn track.

7.4 ATTITUDES TOWARD MANAGEMENT OPTIONS

When considering management options for addressing future increases in visitor use-levels, most visitors were highly positive toward information management. That is, the strategic use of information to better match visitor expectations with likely experiences, thus giving prospective visitors a better basis to choose a time and location that suits their preferred visit experiences. This may be a particularly important component of any general improvements undertaken in visitor information services. Results indicated clearly that information management approaches were the most highly preferred among all types of visitors. The main question this poses for managers is whether such approaches represent an effective tool of practical value. This is an area where additional investigation should be encouraged, as it offers the possibility of developing management approaches with much higher degrees of visitor (and public) support. For tracks such as the Routeburn, with high perceptions of crowding, such investigations should include consideration of the lead time required for information approaches to take effect. High and increasing use-pressures may reach a point where information approaches are too late, and more direct actions are required.

More direct management actions were not generally favoured by visitors. Most were highly negative toward approaches which directly increased accommodation options and capacity, or which involved manipulating use-conditions by creating visit disincentives. Promoting alternative tracks, making alternative options cheaper, and promoting smaller groups sizes were more favoured approaches.

Attitudes were more evenly split toward options involving application of allocation systems such as bookings or permits, which were generally opposed by around half the visitors. No explanation of reasons for this negative attitude can be drawn from these analyses, and no differences were apparent between the attitudes of different visitor groups. But this finding suggests specific investigation is required which addresses how booking systems are perceived by visitors, and what happens to visitor patterns when such systems are imposed.⁴

Overall, preference was apparent for less intrusive management interventions, which indicates perceived freedom may be an important component of the visit experience. Additional investigation of the role played by perceived freedom in recreation experiences seems appropriate. The role and effectiveness of information approaches requires more specific investigation, particularly with regard to their value situations where use-pressures are already extreme. Opposition to allocation systems of bookings or permits was substantial, but given the high degree of crowding and projected use increases on the Routeburn Track, the decision to apply a hut booking system appears reasonable. Investigations to determine the cost in terms of possible visitor displacement would appear appropriate, as would investigations to determine the effects on wider aspects of visitor experiences.

⁴ Subsequent to the data collection period for this survey, a hut booking system was applied in the 1995/96 season. Inferences have been drawn from simple comparisons between independent studies undertaken before and after its implementation. However, these have not been part of any specifically designed 'before-and-after' assessment. If required, specific additional analyses of the Routeburn database, and others in the Great Walks study may provide more information on attitudes toward booking systems.

7.5 CONCLUSIONS AND RECOMMENDATIONS

While satisfaction responses indicated there were no urgent needs for immediate management actions to address current problems, high crowding scores and some specific impact perception responses indicated that visit experiences were being compromised. These perceptions were mainly associated with hut congestion, although individual perceptions of uncertain water hygiene and aircraft noise were also prominent. While perceived by most visitors, guided groups were not generally interpreted negatively. These effects appeared to be largely tolerated, with many visitors indicating they were not bothered by them, results linking crowding with perceptions of hut congestion impacts indicated some of these evaluations were becoming more negative at the higher use-levels.

Overall, these results indicated that preventative actions to minimise additional compromises to the quality of visit experiences will need to be taken, and that due the high and growing use-levels on the track, these should be applied urgently. These findings provide some support for the application of a hut booking system on the Routeburn Track. If management control is required, visitors indicated a preference for such actions to be based most upon information use to guide visitor choices, rather than any more regulatory approaches to limit or channel visitor opportunities. While some development of long-term information approaches could be undertaken, current high crowding perceptions indicate more direct approaches would be required in the short term. However, New Zealanders were less supportive of management in general, and any proposed actions would need to allow for the effects on their perceived sense of recreational freedom. Responses suggested that of the direct management controls that may be required, booking systems were generally the least opposed. In summary, the main management actions which could be undertaken include:

- Specific attention to the facility capacity and bunk capacity of huts, and particularly the space for drying gear in huts
- Optimising the use of hut space for relaxation and for access to facilities within and around the huts (e.g., can the hut space be re-configured)
- Provision of general information about the features of the Routeburn, and for planning visits
- Provision of accurate information about the conditions of water hygiene along the Routeburn track, and more widely in other conservation lands
- Application of a hut booking system on the Routeburn Track, but undertake research based on crowding perceptions and impact perceptions to determine it's success in reducing compromises to visit experiences.
- Provision of information approaches which forecast visitor numbers and hut loadings in advance, indicate where and at what times on-track 'bottlenecks' during the day's walk are most likely, and general suggestions on visit timing and organisation to maximise the opportunities for avoiding 'crowded' visit experiences
- Investigate options for influencing aircraft behaviour, and for identifying particular circumstances of visitor disturbance from aircraft noise.

Most initial gains should be made by concentrating upon making whatever simple improvements are possible in the use of space in huts. The information management options require generating behavioural change among the visitors rather than the physical changes to hut facilities and their operation. Promoting beneficial behavioural changes through information use represents a more long-term approach, will be based largely on pre-visit information, and may require greater involvement with external agencies. Any consideration of these approaches will require additional investigations in a number of areas to assess the potential effectiveness of information use as a practical management tool. Investigations of the facility and service expectations of different visitor groups will be important, particularly emphasising hut conditions. Other more general investigations of how visitor perceptions of impact change from 'tolerance' to 'being bothered' appear worthwhile, with some consideration given to the difference in perceptions of litter between New Zealand and overseas visitors. These types of actions and investigations will further enhance visitor experiences, whether a booking system is in place or not.

While more regulatory management options were not highly favoured, they may still be necessary if urgent control is required, particularly in the short term. Additional investigations on the Routeburn Track and/or elsewhere should be encouraged to explore the reasons for the largely negative visitor attitudes toward these more direct options, and the extent to which perceived freedom from external controls is an element of preferred recreation experiences. General investigations should explore the possible consequences from more regulatory approaches for future visit-experiences and use-patterns. Similar investigations addressing the other management options would be particularly important if the option of applying a booking system to other tracks is being considered. Because there are similar proportions of visitors both for and against this type of option, it is unlikely that it could be implemented without compromising the experiences of some visitors.

Monitoring of the quality of visit experiences should not rely on overall visit satisfaction scores. Crowding scores offer a more sensitive overall measure. Any specific monitoring of visit-experience quality should concentrate first upon hut congestion conditions at key huts. For the Routeburn Track, this could initially concentrate upon visitor experiences at McKenzie Hut, which was commonly considered crowded before the booking system, and is often the last hut on the walk. Any monitoring should address wider elements of hut congestion conditions than simply bunk occupancy. This may involve more specific investigations of the use of space in huts. Monitoring of track congestion conditions does not appear necessary at this point. Such monitoring is necessary whether a hut booking system exists or not.

Appendix 1

Summary of Routeburn questionnaire responses (n = 144)

This presents the basic response percentages for the questions asked in the survey. These percentages are presented in the format of the original questionnaire, although some lists of responses are attached where their format is incompatible with this approach. Where appropriate, some distinction is also made between the responses of hut and campsite users (at least 1 night).

ATTACHED QUESTIONNAIRE RESPONSES

These responses are presented here as they do not fit the questionnaire format used for this appendix.

A. Question 1. Nationality breakdown

NATIONALITY	NO'S	%
New Zealand	20	14
Germany	25	17
Great Britain	20	14
United States	25	17
Australia	12	8
Switzerland	4	3
Netherlands	12	8
Canada	3	2
Denmark	1	1
Israel	3	2
Japan	10	7
Other Europe*	9	6
Other Asia	0	0
Other	0	0

* 7 Sweden, 2 France

B. Question 1. Nights on trip and at huts/camps

(i) Trip Duration

No. of nights on Routeburn

	1 nights	2 nights	3 nights	4 nights	5+ nights
% trips of this duration	11	65	18	4	1

(ii) Nights at Huts and/or Campsites

Overnight accommodation

	Huts only	Hut and 1 camp	Multiple huts/camps	Camps and 1 hut	Camps only
% trips	91	0	0	1	8

C. Question 3. Locations of Crowding Focus

Overall, (69%) of visitors (91) considered some places on the visit were more crowded than others. They were asked to indicate in general terms whether this occurred in huts, at campsites, on the track or elsewhere, and then relative to these, specifically where. These specific responses are summarised here. Note that multiple responses were allowed for.

Huts — 82 specified huts as a focus of crowding (90% of 91). Of these, the specific focus responses highlighted the following main sites:

61% — McKenzie Hut 24% — Routeburn Falls Hut 8% — Routeburn Flats

Campsites — 4 specified campsites as a focus of crowding (4% of 91). Of these, the specific focus responses highlighted the following main sites: (low frequency)

On the track — 18 specified areas along the track as a focus of crowding (20% of 91). Of these, the specific focus responses highlighted the following main sites:

72% — Harris Saddle/Shelter

Other — 6 specified 'other' areas as a focus of crowding (6% of 91). Of these, no particular areas were prominent.

Appendix 2

Details of Routeburn principal components analysis

Principal component analysis (PCA) was carried out upon selected subsets of response-list items from 144 respondents to the Routeburn sample from the Great Walks survey. These subsets related to response lists for visitor perceptions of impacts (Q. 5), visitor satisfactions (Q. 7), and visitor preferences for possible management responses (Q. 8) to increasing visitor numbers. The PCA defined a reduced number of summary scales which could then be used for more complex analytical procedures. The following material describes the summary scales, and demonstrates the degree to which they are representative of their component variables. Items were included in the scale if their removal reduced the value of the scale reliability co-efficient (Kronbachs alpha).

SATISFACTION SCALES (from Question 7)

SCALE NAME (and description)	RELIABILITY (Kronbachs Alpha)	COMPONENT LIST VARIABLES (from original questionnaire)	LOADINGS (from PCA) Q. 7 lists)
Hut conditions	0.8689	Hut cooking space/facilities Hut washing up space/facilities Space to relax in huts Number of bunks in huts Toilets at huts Water supply at huts Hut lighting facilities Hut drying space/facilities Hut heating facilities	0.860 0.792 0.766 0.712 0.674 0.635 0.571 0.499 0.431
Track conditions	0.7811	Boardwalks over wet/fragile areas Drainage of water Track marking Gentle slopes/not steep Steps Smooth/easy surfaces Bridges over rivers	0.687 0.670 0.659 0.601 0.598 0.570 0.544
Information services	0.8413	Material from visitor centres Advice from visitor centres Quality of maps/brochures Maps/brochures in the huts Information signs by the track Distance/time signs Advice from wardens	0.840 0.810 0.767 0.694 0.617 0.511 0.451
Campsite conditions	0.7903	Rain shelters at campsites Camp cooking space/facilities Camp washing up space/facilities Toilets at campsites Water supply at campsites	0.882 0.878 0.844 0.486 0.468

IMPACT PERCEPTION SCALES (from Question 5)

SCALE NAME (and description)	RELIABILITY (Kronbachs Alpha)	COMPONENT LIST VARIABLES (from original questionnaire lists)	LOADINGS (from PCA)
Litter/damage	0.8154	Litter around hut Seeing human waste/toilet paper Seeing where campsites have formed Seeing where wood cut for fires Litter around campsites Litter on track	0.760 0.741 0.729 0.686 0.671 0.618
Track damage	0.7604	Seeing trampling around wet areas Seeing shortcuts off tracks	0.827 0.806
Hut congestion	0.7633	Having to rush for bunk in huts Insufficient bunk space in huts Inadequate toilet facilities Too many people in hut Noisy people in huts at night Inadequate water supply	0.819 0.765 0.637 0.609 0.599 0.409
Conflict congestion	0.6397	Seeing people on guided trips of track Seeing too many big groups of people	0.786 0.699
Over-development	0.7956	Too much development of tracks Seeing too many on the track each day Too much development of signs Too much development of huts	0.842 0.723 0.659 0.595
Campsite congestion	0.7389	Too many others at campsites Noisy people at campsites Having to rush for campsite space Too much development of campsites	0.805 0.790 0.699 0.510

Extra items

Plane noise
Uncertainty in water hygiene

MANAGEMENT PREFERENCE SCALES (from Question 8)

SCALE NAME (and description)	RELIABILITY (Kronbachs Alpha)	COMPONENT LIST VARIABLES (from original questionnaire lists)	LOADINGS (from PCA)
Rationing/use limits	0.8137	Bookings for bunks in huts Bookings for spaces at campsites Require permits, and limit these Make track one way only	0.877 0.866 0.734 0.606
Information management	0.7919	Provide info on different track options Provide info on physical impacts Provide info on crowding conditions Provide info on social impacts	0.825 0.773 0.762 0.648
Increase accommodation	0.6938	Build more huts Allow more guided trips/facilities Provide more campsite/camping facilities Increase freedom for camping by tracks Provide more bunks in huts Provide more alternative tracks	0.780 0.687 0.662 0.573 0.545 0.447
Manipulate use conditions	0.5237	Remove some facilities to discourage use Make other track options cheaper Make peak use times more expensive Encourage small groups/discourage large	0.661 0.602 0.550 0.535

Appendix 3

Details of Routeburn crowding scores

Crowding was assessed using a widely used nine-point crowding scale (Question 2), and Table A3.1 presents the responses from Routeburn Track visitors.

TABLE A3.1. ROUTEBURN TRACK CROWDING SCORES.

DEGREE OF CROWDING	(scores)	TOTAL % (n=144)
NOT CROWDED	(1)	10
	(2)	14
CROWDED — slightly	(3)	22
	(4)	14
	(5)	11
CROWDED — moderately	(6)	13
	(7)	11
CROWDED — extremely	(8)	2
	(9)	2

Shelby *et al.* (1989)¹ summarised and evaluated the accumulated results from this method, and developed an interpretation method to highlight the management significance of these responses. These interpretations, which can be considered carrying capacity judgements related to the quality of visitor experiences, apply to the ‘crowded’ respondents (e.g., those scoring 3 or more). Table A3.1 indicates the proportion of ‘crowded’ visitors on the Routeburn Track was 76%.

Table A3.2 (next page) presents a range of results from the other Great Walks and from studies summarised by Shelby *et al.* (1989). Accompanying these results are the interpretations applied to different crowding scores. These interpretations represent informed but subjective guidelines based upon extensive accumulated knowledge. The interpretation of 76% crowding on the Routeburn Track in summer is that use is at ‘more than capacity’. The interpretation of this crowding is that management actions are necessary to preserve visit experiences, particularly if low density impacts are important components of desired visitor experiences. At this crowding level of 76%, use is almost at the level of being interpreted as ‘much more than capacity’. The management interpretation of this crowding level in Table A3.2 is that the track may have to be treated as a ‘sacrifice’ area, where the quantity of activity may be allowed to compromise the quality of the experience, due to high demand. The main management alternative to this approach would be to control the use to reduce the effects contributing to this crowding level.

Comparing the Great Walk crowding scores in Table A3.2 and Figure A3.1 indicates that crowding is higher on the Routeburn Track than elsewhere, and preventative management to control use or minimise the effects from increasing use will be required there before most other tracks.

¹ Shelby, B.; Vaske, J.J.; Heberlein, T.A. 1989. Comparative analysis of crowding in multiple locations: Results of 15 years of research. *Leisure Sciences* 11: 269–291.

TABLE A.3.2 DIFFERENT LEVELS OF 'CROWDED' RESPONSES. (AFTER SHELBY ET AL. 1989)

CROWD (%)	POPULATION	RESOURCE	STATE OR COUNTRY	RESOURCE CONDITIONS	CARRYING CAPACITY JUDGEMENT	
100	Boaters	Deschutes River	Oregon	Weekends section 1	Much more than capacity (80 - 100%) Manage for high density recreation experiences, or treat as a 'sacrifice area', allowing quantity of activity to compromise quality of experiences. Could be a localised compromise to reduce pressure on other areas.	
94	Anglers	Colorado River	Arizona	Thanksgiving weekend		
91	Boaters	Raystown Lake	Pennsylvania	On the lake		
89	Pheasant hunters	Bong Hunting Area	Wisconsin	Opening day		
88	Boaters	Deschutes River	Oregon	Weekdays section 1		
87	Riparian landowners	Lake Delavan	Wisconsin	Overall rating		
86	Goose hunters	Grand River Marsh	Wisconsin	Firing line		
85	Pheasant hunters	Public Hunting Area	Wisconsin	Opening day		
* 76 *	Walkers (GW)	Routeburn Track	New Zealand	Summer		More than capacity (65 - 80%) Studies and management are necessary to preserve recreation experiences, especially if low visitor impacts (social/physical) are important components. Immediate management to control use-levels at around 65% level of crowding conditions may be considered as an option. Research may be needed to establish more long-term solutions.
76	Trout anglers	Gun Powder River	Maryland	Opening day		
75	Salmon anglers	Waimakariri River	New Zealand	At river mouth		
75	Boaters	Raystown Lake	Pennsylvania	At attraction sites		
74	Salmon anglers	Rakaia River	New Zealand	At river mouth		
73	Canoers and boaters	Boundary Waters C.A.	Minnesota	Moose Lake		
72	Rafters	Grand Canyon	Arizona	1985 Summer		
70	Anglers	Klamath River	California			
70	Climbers	Mt. McKinley	Alaska			
* 69 *	Walkers (GW)	Abel Tasman Track	New Zealand	Summer		
69	Boaters	Door Country	Wisconsin			
* 68 *	Walkers (GW)	Tongariro Crossing	New Zealand	Summer (Easter 86%)		
68	Rafters	Rogue River	Oregon			
68	Rock climbers	Seneca Rocks	West Virginia			
66	Boaters	Raystown Lake	Pennsylvania	At put-in location		
* 63 *	Walkers (GW)	Kepler Track	New Zealand	Summer (Easter 86%)	High normal conditions (50 - 65%) Should be studied if increased use is expected, allowing management to anticipate problems. Represents the best time to establish more long-term management, as once higher crowding perceptions exist, there is difficulty in managing use 'down' to levels more	
63	Boaters	Raystown Lake	Pennsylvania	At take-out location		
* 62 *	Walkers (GW)	Milford Track	New Zealand	Summer		
62	Deer hunters	Sandhill	Wisconsin	1988 High-density hunt		
61	Goose hunters	Fishing Bay	Maryland	Firing line		
61	Floaters	Wolf River	Wisconsin			
59	Salmon anglers	Rakaia River	New Zealand	All anglers		
* 58 *	Sea Kayakers (GW)	Abel Tasman Coast	New Zealand	Summer		

	Heaphy Track Sandhill Lake Delavan Brule River Grand Canyon Snake River Mt. Jefferson Brule River	New Zealand Wisconsin Wisconsin Wisconsin Arizona Oregon Oregon Wisconsin	Summer (Easter 71%) One-day visit 1975 1985 Winter In Hell's Canyon High-use period	appropriate for the main recreation experiences desired.
<p>* 55 * Walkers (GW) Wildlife photographers Recreationists Anglers Rafters Rafters Backpackers Canoers</p> <p>50 Deer hunters 49 Backpackers 48 Pheasant hunters 46 Deer hunters 45 Salmon anglers 44 Turkey hunters 43 Tubers * 43 * Walkers (GW) * 42 * Canoeists (GW) * 42 * Walkers (GW) 42 Sail-boaters 41 Tourists and drivers 39 Backpackers 38 Floaters 37 Canoers</p>	<p>Heaphy Track Sandhill Eagle Cap Wilderness Bong Hunting Area State-wide Rakaia River State-wide Brule River Travers-Sabine Track Whanganui River Waikaremoana Track Apostle Islands Stockings Park White Mt. Nat. Forest Klamath River Brule River</p>	<p>New Zealand Wisconsin Oregon Wisconsin Wisconsin New Zealand Maryland Wisconsin New Zealand New Zealand New Zealand Wisconsin Michigan New Hampshire California Wisconsin</p>	<p>Low Normal Conditions (35 - 50%) A problem situation does not exist at this time. As with the above category, these may offer unique low-density recreation experiences. These are likely to change with any increase in social or physical impacts resulting from increasing numbers of users, or from changes in activity types.</p> <p>1982 High-density hunt Late season No specific resource Upstream No specific resource Summer Summer Summer Summer 1985 Presidential Range 1985 Low-use period</p>	<p>Low Normal Conditions (35 - 50%) A problem situation does not exist at this time. As with the above category, these may offer unique low-density recreation experiences. These are likely to change with any increase in social or physical impacts resulting from increasing numbers of users, or from changes in activity types.</p>
<p>* 35 * Walkers (GW) 32 Anglers 31 Hikers 27 Goose hunters 26 Rafters 25 Trout anglers 24 Backpackers 24 Deer hunters 23 Trout anglers 20 Canoeists 17 Goose hunters 12 Deer hunters</p>	<p>Rakiura Track Colorado River Dolly Sods Wilderness Tuckahoe State Park Illinois River Savage River Great Gulf Wilderness Sandhill Gunpowder River Wanganui River Grand River Sandhill</p>	<p>New Zealand Arizona West Virginia Maryland Oregon Maryland New Hampshire Wisconsin Maryland New Zealand Wisconsin Wisconsin</p>	<p>Summer Midweek Low-use period Low-density hunt Low use period Low use period 1982 Low-density hunt Late season Summer (Easter 68%) Managed hunt 1988 Low-density hunt</p>	<p>Suppressed Crowding (0 - 35%) Crowding here is limited by certain management or situational factors, which allow particular low-density recreational experiences. These are likely to be unique, and managers should be concerned with maintaining them. Changes likely to increase visitor numbers/impacts should be considered carefully.</p>

** and bold type identify the crowding responses for the tracks included in New Zealand's Great Walks.

FIGURE A3.1. DIFFERENT LEVELS OF 'CROWDED' RESPONSES ON GREAT WALKS.