



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

Crowded effect

Uncrowded and crowded visitors had significantly different attitudes towards management options to cope with increasing use-levels. Compared with uncrowded visitors, crowded visitors were less negative toward management options representing an increase in the accommodation capacity of the track. Additional exploration of the 'increase accommodation' scale indicated that crowded visitors were particularly less opposed to building more huts and providing more bunks in huts. To a lesser extent they were also less opposed to allowing guided walk opportunities. Differences for the other options related to camping and providing alternative tracks were less distinct. Overall, crowded visitors appeared relatively more supportive of hut-based options to increase or enhance accommodation capacity.

Nationality effect

New Zealand and overseas visitors had significantly different attitudes towards some of the management options to cope with increased use-levels. New Zealand visitors were relatively more opposed to limiting boat use, while overseas visitors were relatively more opposed to rationing/use-limits. Exploration of the 'limit boats' scale indicated that New Zealand visitors were more opposed to limiting boat access to some places, and to limiting the use of water taxis. Exploration of the 'rationing/use-limits' scale indicated that overseas visitors were particularly more opposed to booking systems for huts. This distinction was less apparent for the options of requiring permits to do the track, and having booking systems for campsites. Overall, New Zealand visitors appear more in favour of imposing use-limits, and less in favour of limiting boat use.

Gender/Crowded interaction

A significant interaction between gender and crowded perception was based largely on attitudes to the management options of boat limits and increasing accommodation. Uncrowded males were least supportive of limiting boat use, but appeared more supportive of such a management option when feeling crowded. Their attitudes of female visitors remained largely consistent whether crowded or uncrowded. Uncrowded males and females had similar attitudes toward increasing accommodation capacity, but these attitudes were notably more supportive among crowded visitors, and particularly among crowded males. In both cases, the interaction appears to emphasise less resistance to management among crowded visitors, and particularly among crowded males. Crowded males appear more supportive of limits to boat use and increasing accommodation capacity. Additional exploration of the 'increase accommodation' scale indicated that this effect was most apparent for the options of providing more huts, and more bunks in huts.

Extreme responses

Because visitors attitudes were sometimes substantially split either for or against the management options (refer Figure 11), 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. Differences in the proportions of these extreme positive and negative attitudes were apparent according to age-group, nationality, and crowding perceptions.

Older visitors with these extreme 'agree/disagree' responses appeared more positive than younger visitors toward most types of management options, indicating higher levels of extreme agreement with booking systems (66% *vs* 47%), increasing accommodation options (49% *vs* 37%) and managing information use (57% *vs* 44%). New Zealand visitors with these extreme attitudes indicated higher levels of extreme agreement than overseas visitors with booking systems (57% *vs* 37%) and increasing accommodation options (46% *vs* 31%), while overseas visitors with these extreme attitudes indicated higher levels of extreme agreement with limiting boat use (70% *vs* 37%), manipulating use conditions (82% *vs* 65%) and managing information use (59% *vs* 44%). Crowded visitors with these extreme attitudes indicated higher levels of extreme agreement than uncrowded visitors with increasing accommodation options (53% *vs* 32%), managing information use (58% *vs* 41%), limiting boat use (51% *vs* 39%) and manipulating use conditions (77% *vs* 66%).

Overall, these exploratory results indicate that crowded visitors and older visitors appeared to agree more often with most types of management options. New Zealand visitors appeared to agree more with facility development options and use-rationing, while overseas visitors appeared to agree more with manipulating use by using information approaches or specific management actions.

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. In addition, perceptions of crowding were at low levels and few visitors saw more others than they expected. These findings suggest that no major use-level issues are apparent on the Lake Waikaremoana Track at present, and visitors are having highly positive visit-experiences.

However, some caution is required when interpreting these satisfaction findings, particularly as most visitors to the Lake Waikaremoana Track are on a first visit. There is a tendency for such visitors to give approval to the status-quo of social and environmental conditions they experience on a visit. They usually lack previous experience of the site and any strong expectations as to what might constitute the appropriate and acceptable conditions which occur there. In a situation of changing use conditions over time, the overall satisfactions of such visitors can remain consistently high despite considerable changes in visit experiences. Those first-time visitors with strong but inaccurate expectations of social and physical conditions, or repeat-visitors with expectations based on previous conditions, are those most likely to indicate overall dissatisfaction. These types of visitors are usually also most likely to be displaced to different sites, times or activities, and are more likely to give negative feedback about their experiences to others. However, 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 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. However, should considerable levels of dissatisfaction feature in such measures, it is likely that major problems are already well-established. Clearly this was not the case on the Lake Waikaremoana Track.

7.2 SATISFACTION WITH FACILITIES AND SERVICES

No notable levels of dissatisfaction were apparent for any of the facilities and services on the Lake Waikaremoana Track. The high satisfactions across 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 concerns which may possibly require some consideration were related to dissatisfactions with track drainage, distance/time signs, hut lighting, and hut toilets. However, these were only minor sources of dissatisfaction (around 15%), and apart from hut toilets, these did not represent core facilities or services. They do not appear to warrant high priority on the basis of satisfaction levels alone. Many

visitors were neutral rather than positive in their satisfactions with the information and advice received from wardens and visitor centres. This may indicate a need to assess the role and effectiveness of staff-based information services, and a focus on enhancing these if improving visitor information is accorded additional priority.

While overall satisfaction scores did not highlight any important satisfaction issues, the significant differences identified between the satisfactions of different visitor groupings did highlight some issues relating to crowding perception, gender, age, and nationality. In summary, crowded visitors were more dissatisfied with hut conditions; older male visitors were particularly more satisfied with information services; and crowded overseas visitors were more dissatisfied with track conditions. While quite simplified, these summary points highlight hut conditions, information services and track conditions as areas where satisfactions were particularly variable.

Satisfactions with hut conditions were notably lower among crowded visitors, and particularly featured lower satisfactions with bunk numbers and relaxation space in huts. Lower satisfactions with facilities and space in huts for drying gear, washing-up and cooking were also noted. While some competition for bunks was apparent, these results suggest that the relatively greater dissatisfactions of crowded visitors were also substantially related to how the space and facilities in huts were being used. The basic management and research question to address this issue is how huts might be reconfigured to optimise the use of hut space. Given the likely increases in use levels in the future, these issues assume some priority.

Satisfactions with information services were also notably higher among older male visitors, and relatively lower among all other visitor groupings. These lower information satisfactions featured advice from visitor centres most prominently, and advice from wardens to a lesser extent. While overall dissatisfactions were very low, these findings may reflect an underlying information need related to direct staff contact. This need appears least notable among the older male visitors, but more important to younger visitors, and older female visitors. If improvements to information services are given priority in the future, these results indicate that some focus on information needs related to staff contact may be appropriate. While not a strong result, these analyses also suggest some age and gender-related distinction among visitors in their perceived need for staff-based information services.

Satisfactions with track conditions were notably lower among crowded overseas visitors, and featured lower satisfactions with track marking, steps and track drainage in particular. Crowded New Zealand visitors were much less dissatisfied with these. These data provide no explanation why crowded overseas visitors are less satisfied with track conditions. It may be that a crowding perception is linked with a generally more negative interpretation of facilities and services, although this is not directly indicated by these results. Further investigation of crowding perceptions and their relationships with other perceptions would be required to provide any explanation, although given high overall satisfactions this does not appear to be a priority issue.

Overall, these findings suggest that while overall levels of satisfaction with facilities and services were high, hut conditions related to relaxation space and

facility access will become a more prominent issue in situations where higher use-levels and perceptions of crowding are anticipated. It appears that these will represent the first areas where compromises to the quality of visit experiences may occur. Should improvements to information services be accorded management priority, the information services provided directly by staff should be addressed. However, the relatively lower scores for some these satisfaction scales occur within a context of high satisfaction levels, suggesting that these are currently not priority issues of serious dissatisfaction.

7.3 PERCEPTIONS OF IMPACTS

Negative social impacts were not prominent. While, many visitors were aware of impacts such as seeing too many in huts, boat users at huts and camps, and perceived over-development of huts, tracks and signs, most of these visitors were tolerant of these impacts rather than being bothered by them. Understanding the distinction between simply noticing these impacts and being specifically bothered by them appears an important research issue. Visitors also appeared to have very little tolerance of particular types of impacts which very visibly represent inappropriate behaviour (e.g., seeing litter, toilet paper/waste, and woodcutting). While these were not prominent impacts overall, they do suggest particular visitor sensitivity to such 'inappropriate' behaviour in natural settings.

Visitors were most bothered by perceptions of various physical impacts. These were based most upon perceptions of uncertain water hygiene, littering, and track damage. Perceptions of uncertain water hygiene were most negative, bothering 56% of visitors. While it was not apparent that this perception represented any actual conditions experienced on the track, other issues related to toilets, water and hygiene were apparent from perceptions of insufficient toilets and water supply. Around half the visitors perceived these as being insufficient, although only around 20% were bothered by it. Fewer visitors indicated they noticed toilet/paper and waste, although most of those who did were bothered by it. Litter also appeared to be an issue, with around half the visitors noticed litter around huts and on the track, and over 30% were bothered by it. There appeared to be very little tolerance for seeing litter. Many visitors (over 50%) also noticed impacts from trampling damage which widened tracks and created shortcuts, but only around 20% were bothered by it. Perceptions of water and toilet conditions, and observations of litter and waste, appear important issues for management concern, although they were not linked to visit satisfaction.

While overall impact perceptions highlighted physical impact issues, variation in the impact perceptions of different visitor groupings highlighted social impact issues relating to crowding perceptions. In summary, crowded visitors were significantly more bothered by all impact perceptions related to hut/track congestion. This related most to seeing too many people in huts and experiencing insufficient bunk numbers. While the negative perceptions of these hut congestion impacts were not high overall, they were linked with greater perceptions of crowding. If crowding perceptions increase in future, it

is likely that any compromises to the quality of visit-experiences will be first apparent from perceptions of impacts related to hut congestion. To a lesser extent, perceptions of water, toilet and hygiene impacts were also higher among crowded visitors. However, the lack of any link between higher perceptions of these impacts and higher crowding scores suggests that these perceptions may not necessarily increase should use pressures grow. In this respect they are unlike the hut congestion impacts, which although much less prominent overall under current conditions, are more clearly linked to higher crowding perceptions.

Overall, the physical impact perceptions related to water, toilets and hygiene, track conditions, and littering are most prominent. Management attention may be required to first address these issues. However, these perceptions do not appear likely to change substantially should use pressures increase. In that situation, social impacts related to hut congestion appear to represent the area where visitor experiences are most likely to be compromised. Lack of major dissatisfaction issues and relatively low crowding score suggest that management actions are not urgent. However, these findings indicate where any additional management may be best directed to improve current conditions, and to minimise any future compromises.

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, and to give prospective visitors a better basis to choose visit timing and location that better suits their preferred visit experiences. This may be a particularly important component of any general improvements undertaken in visitor information services. These results indicated clearly that such information management approaches were considered most preferable among all types of visitors. The main question this poses for managers is whether such information management 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.

By contrast, most visitors were highly opposed to other management options related to development of increased accommodation capacity on the track (e.g., more huts, more bunks in huts, more camp options, new tracks, guided trips), and to rationing or manipulating-use to channel or reduce visitor numbers (e.g., booking systems, permits, peak pricing, one-way walk, reduce facilities). The strength of apparent opposition to these approaches indicates that considerable background research would be required, as would ongoing consultation with visitor-groups, before any of them could be implemented ahead of the more acceptable information-based options. Booking systems for huts (and campsites), which have been considered as management options for controlling visitor numbers on many of the Great Walks, were opposed by around 50% and

supported by around 25% of visitors overall. These analyses do not provide any explanation of the generally negative attitudes of visitors toward added management controls, but it appears that specific investigation of visitor attitudes towards such control of their visit freedom would be appropriate.

While most visitors appeared opposed to additional management, significant differences in these attitudes between different visitor groupings highlighted issues relating to crowding perception, nationality, and gender. In summary, crowded visitors were less opposed than uncrowded to increasing accommodation capacity; New Zealand visitors were more opposed than overseas visitors to limiting boat use, but less opposed to rationing/use-limits; and crowded males were less opposed to limiting boat use or increasing accommodation options. While a quite simplified summary of complex interactions, these points highlight areas where attitudes to management options were most variable.

Differences between crowded and uncrowded visitors highlighted different visitor attitudes toward increasing accommodation options. Crowded visitors in general, and crowded male visitors in particular, were less resistant to development of increased accommodation capacity, particularly more huts and more bunks in huts. Crowded male visitors were also less resistant to controls on boat-use. Comparisons of extreme attitudes results further suggested less resistance to many other management options among visitors who felt crowded. Overall these results suggest that when visitors feel crowded, they are more accepting of controls on their activity.

Differences between New Zealand and overseas visitors highlighted different visitor attitudes toward limiting boat-use and rationing/limiting use. New Zealand visitors were relatively more opposed to limiting boat use, suggesting the options of using boats as part of a trip on the Lake Waikaremoana Track were more acceptable to them. By contrast, New Zealand visitors were more supportive of options to ration and limit use-levels. Overseas visitors were relatively more opposed such use-limits, and to booking systems for huts in particular. While opposition to management by using rationing/use-limits was generally high overall, these results indicate the main visitor grouping where this opposition was particularly acute (e.g., overseas visitors). Given high overall opposition to such management, this distinction is not of great importance, although it does suggest that perceptions of visit freedom may be an important component of overseas visitor expectations of this track. Comparisons of extreme attitude results suggested New Zealand visitors tended to agree more with development and rationing options, while overseas visitors tended to agree more with using information approaches and manipulating use conditions.

Overall, attitudes toward management options tended to be strongly positive or negative, and any inter-group differences were relatively minor. However, these distinctions highlight the more 'management-resistant' sectors among the visitor-groupings, and identify some visitor-groupings where the negative attitudes towards some management options are more variable. These results suggest where further investigations may be required to help minimise conflicts arising from any proposed management changes.

7.5 CONCLUSIONS AND RECOMMENDATIONS

Perceptions of physical impacts related to litter, track damage, toilets and perceived water hygiene indicate there are some physical conditions which will require management action. However, analyses indicated that these conditions did not substantially compromise visitor experiences. On the basis of maintaining visitor experiences, these conditions do not represent urgent problems which require immediate management attention beyond normal maintenance processes. While there were no urgent needs for immediate management actions to address these physical setting issues, other visitor responses did indicate that there were social impact issues related to hut congestion and general perceptions of crowding. While these effects appeared to be largely tolerated, with many visitors indicating they were not bothered by them, the results linking crowding with perceptions of hut congestion impacts indicated some of these evaluations would be becoming more negative at higher use-levels. Overall these results indicated that preventative actions to minimise future compromises to the quality of visit-experiences will need to be considered, particularly with regard to hut conditions, but that these are not critical at present. 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 direct regulation/manipulation approaches to limit or channel visitor opportunities. Initially some development of long-term information approaches could be undertaken, as stringent controls do not yet appear essential. However, different visitor groupings indicated varying patterns of support for the different types of management options. Any proposed actions would need to allow for the different effects of management options on the perceived sense of recreational freedom of different visitor groupings. In summary, the main management actions which could be undertaken include:

- Identifying any physical impact ‘hot-spots’ related to littering and/or track damage, and initiating any additional problem-solving management beyond normal maintenance processes to reduce the scale of any notable problems.
- Optimising/increasing the facility capacity and bunk capacity of huts to standards more acceptable to visitors, but subject to management requirements.
- Optimising the use of hut space for relaxation and for access to facilities within and around the huts.
- Provision of general information about the features of the Lake Waikaremoana Track, and for planning visits to it.
- Provision of information approaches which forecast visitor numbers and hut loadings in advance; indicate where and at what times on-track ‘bottlenecks’ are most likely; outline what alternative trip patterns may be followed; indicate motorboat use-patterns and ‘hot-spots’, and provide other general suggestions on visit timing and organisation to minimise any ‘crowded’ visit experiences.

Most initial gains should be made by concentrating on reducing any physical impact ‘hot-spots’, and making whatever simple improvements are possible in

the use of space in huts. This may involve initiating investigations of visitor preferences for the standards of facilities, bunks and space in huts. The latter information options require generating behavioural change among the visitors rather than the physical changes to hut facilities and their operation. This may relate to both track users, and boat users on the lake. 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. The role of visitor centre and hut-based staff in directly communicating information may also require specific attention, as many visitors gave neutral satisfaction responses for these. Although specific facility and service dissatisfactions were not prominent, future investigation of the facility and service expectations of different visitor groupings should be considered, particularly emphasising hut conditions, toilet and water quality, perceptions of littering and track damage, time/distance information signs, and the content and accessibility of staff-based information services.

More regulatory management options were not highly favoured, and do not appear to be necessary in the short term. However, given the possibility of such options being considered in the future, additional investigations should be encouraged to explore the reasons for the largely negative visitor attitudes toward management options, and the extent to which perceived freedom from external controls is an element of preferred recreation experiences. Due to the low levels of crowding and impact perception, such investigations need not be carried out specifically in relation to the Lake Waikaremoana Track, although the issues related to boat-use are clearly more unique to this track.

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 Lake Waikaremoana Track, this could initially concentrate upon visitor experiences at the main hut or huts where visitors spend the last night on their trip. Some additional investigation of the different trip patterns on and around the Lake Waikaremoana Track may be appropriate (including boat-based trips). Any monitoring should address wider elements of hut congestion conditions than simply bunk occupancy, but also include the use of space in huts, and the use of huts by different types of groups (including boat-based groups).

Appendix 1

Summary of Waikaremoana questionnaire responses (n=349)

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 because they do not fit the questionnaire format used for the first part of this appendix.

A. Question 1. Nationality breakdown

NATIONALITY	NO'S	%	
New Zealand	261	75	
Germany	39	11	
Great Britain	18	5	
United States	5	1	
Australia	8	2	
Switzerland	5	1	
Netherlands	5	1	
Canada	4	1	
Denmark	0	0	
Israel	2	1	
Japan	0	0	
Other Europe	1	0	(Austria)
Other Asia	0	0	
Other	1	0	(Zimbabwe)

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

(I) Trip duration

No. of nights on Waikaremoana

1 nights 2 nights 3 nights 4 nights 5+ nights

% trips this duration

3 9 44 39 5

(ii) Nights at Huts and/or Campsites

Overnight accommodation

Huts Hut and Multiple Camps Camps
only 1 camp huts/camps and 1 hut only

% trips 59 14 5 10 6

C. Question 3. Locations of Crowding Focus

Overall, (54%) of visitors (n=187) 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 — 180 specified huts as a focus of crowding (96% of 187). Of these, the specific focus responses highlighted the following main sites:

54% — Mararuiti Hut 31% — Panekiri Hut 9% — Waiopaoa Hut
8% — Te Puna Hut

Campsites — 6 specified campsites as a focus of crowding (3% of 187).

On the track — 4 specified areas along the track as a focus of crowding (2% of 187).

Other — 0 specified 'other' areas as a focus of crowding.

Appendix 2

Details of Waikaremoana Principal Components Analysis

Principal Component Analysis (PCA) was carried out upon selected subsets of response-list items from 349 respondents to the Lake Waikaremoana Track 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 Q. 7 lists)	LOADINGS (from PCA)
Hut conditions	0.8520	Hut cooking space/facilities Space to relax in huts Hut washing up space/facilities Number of bunks in huts Hut drying space/facilities	0.759 0.745 0.724 0.709 0.688
Water/ conveniences	0.8631	Toilets at campsites Water supply at campsites Toilets at huts Rain shelters at campsites Camp washing up space/facilities Hut lighting facilities Water supply at huts Hut heating facilities	0.859 0.788 0.737 0.588 0.583 0.470 0.465 0.400
Track conditions	0.8248	Smooth/easy surfaces Steps Gentle slopes/not steep Boardwalk over wet/fragile areas Drainage of water Distance/time signs Track marking Bridges over rivers	0.706 0.702 0.699 0.633 0.609 0.556 0.531 0.415
Information services	0.8407	Material from visitor centres Advice from visitor centres Quality of maps/brochures Advice from wardens Information signs by the track Maps/brochures in the huts	0.730 0.704 0.678 0.678 0.522 0.361
Extra items		Camp cooking space/facilities	

IMPACT PERCEPTION SCALES (from Question 5)

SCALE NAME (and description)	RELIABILITY (Kronbachs Alpha)	COMPONENT LIST VARIABLES (from original questionnaire lists)	LOADINGS (from PCA)
Physical damage	0.7807	Litter on track	0.714
		Seeing shortcuts off tracks	0.660
		Litter around hut	0.627
		Seeing trampling around wet areas	0.604
		Seeing human waste/toilet paper	0.600
		Litter around campsites	0.577
		Seeing where wood cut for fires	0.499
		Litter on beaches	0.443
Hut congestion	0.7512	Insufficient bunk space in huts	0.805
		Having to rush for bunk in huts	0.730
		Too many people in hut	0.672
		Noisy people in huts at night	0.543
		Seeing too many big groups of people	0.524
Boat disturbance	0.7383	Disturbance by boats at huts/camps	0.795
		Disturbance by boats at beaches	0.776
Over-develop- ment	0.8938	Too much development of huts	0.874
		Too much development of campsites	0.840
		Too much development of tracks	0.835
		Too much development of signs	0.744
Camp congestion	0.7205	Too many others at campsites	0.754
		Seeing too many on the track each day	0.665
		Noisy people at campsites	0.617
		Having to rush for campsite space	0.576
		Seeing people on guided trips of track	0.510
Toilet/water/ hygiene	0.5352	Inadequate water supply	0.710
		Inadequate toilet facilities	0.666
		Uncertainty in water hygiene	0.505
Extra items		Seeing where campsites have formed	
		Plane noise	

All samples were asked about perceptions of impacts from planes, but this did not fit into any scale.

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	0.8707	Bookings for spaces at campsites Bookings for bunks in huts Require permits, and limit these	0.874 0.863 0.806
Information management	0.7627	Provide inf. on different track options Provide inf. on crowding conditions Provide inf. on physical impacts Provide inf. on social impacts	0.765 0.758 0.738 0.718
Increase accommodation	0.7007	Provide more campsite/camping facilities Build more huts Allow more guided trips/facilities Increase freedom for camping by tracks Provide more bunks in huts Provide more alternative tracks	0.741 0.676 0.632 0.632 0.615 0.450
Boat limits	0.8290	Limit access by boats to some places Limit use of water taxis	0.878 0.878
Manipulate/ regulate	0.6633	Make peak use times more expensive Make track one-way only Make other track options cheaper Remove some facilities to discourage use Encourage small groups/discourage large	0.715 0.672 0.668 0.538 0.482

Appendix 3

Details of Waikaremoana Crowding Scores

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

TABLE A3.1. LAKE WAIKAREMOANA TRACK CROWDING SCORES.

DEGREE OF CROWDING	(scores)	TOTAL % (n=349)
NOT CROWDED	(1)	37
	(2)	21
CROWDED — slightly	(3)	22
	(4)	8
	(5)	3
CROWDED — moderately	(6)	6
	(7)	3
CROWDED — extremely	(8)	1
	(9)	0

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 shows that the proportion of “crowded” visitors on the Lake Waikaremoana Track was 42%.

Figure A3.1 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. The interpretation of 42% crowding on the Lake Waikaremoana Track is that use is at ‘low normal conditions’, where no problem situations associated with use-levels currently exist. These crowding levels suggest unique low-density recreation experiences are being maintained, but that the quality of these is likely to diminish if use levels increase. These interpretations represent informed, but subjective guidelines, based upon extensive accumulated knowledge.

Comparing the crowding scores of the Great Walks in Table A3.2 and Figure A3.3 indicates that crowding is relatively very low on the Lake Waikaremoana Track, and preventative management to reduce serious effects will be required first on other tracks.

¹ Shelby, B.: Vaske, J.J. and Heberlein, T.A. 1989. ‘Comparative Analysis of Crowding in Multiple Locations: Results of 15 Years of Research’. *Leisure Sciences* 11: 269-291.

TABLE A3.2 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	Floater	Wolf River	Wisconsin			
59	Salmon anglers	Rakaia River	New Zealand	All anglers		
* 58 *	Sea Kayakers (GW)	Abel Tasman Coast	New Zealand	Summer		

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

** 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 THE GREAT WALKS.