

## 8. CROWDED *versus* UNCROWDED CANOEISTS

This section addresses analyses of relationships between crowding perceptions and other visitor responses. It discusses how a perception of crowding related to satisfactions, impact perceptions, and encounter preferences. Separate analyses were undertaken on the group of canoeists who gave a crowded score. This group comprised 96 canoeists, with 54 from summer and 42 from Easter (refer to Figure 7, Section 7.1). Differences from the responses of the uncrowded canoeists are discussed briefly in turn.

### 8.1 Crowded canoeists and satisfactions

Some differences were apparent in the satisfaction scores of crowded and uncrowded canoeists (Table 9). In particular, crowded canoeists were less satisfied with conditions important to achieving wilderness-type experiences. Crowded canoeists included a significantly lower proportion who were 'Very satisfied' with experiencing peace and quiet, solitude, wilderness feelings, and escape from civilisation. These differences suggest stronger social impact effects were occurring among crowded canoeists, and that these were affecting the 'wilderness' qualities of the experience in particular.

Some physical conditions also affected the satisfactions of the crowded canoeists. In particular, they were less satisfied with the provision of toilet facilities. They also appeared less strongly satisfied with opportunities for experiencing whitewater/running rapids, although the balance of the difference was contained in the 'neutral' response.

Table 9 Satisfaction differences according to crowding perception.

Satisfactions by crowding		Very Dis-satisfied	Dis-satisfied	Neutral	Satisfied	Very Satisfied
Peace/quiet **	Crowded canoeists	0	12	16	36	36
	Uncrowded canoeists	1	0	11	26	62
Solitude **	Crowded canoeists	0	14	41	25	17
	Uncrowded canoeists	3	2	26	23	46
Wilderness feelings *	Crowded canoeists	0	1	15	50	33
	Uncrowded canoeists	1	3	12	31	53
Escape civilisation *	Crowded canoeists	0	4	13	37	46
	Uncrowded canoeists	1	1	19	19	60
Whitewater/rapids **	Crowded canoeists	0	13	34	34	19
	Uncrowded canoeists	5	15	12	34	33
Toilets *	Crowded canoeists	0	6	21	34	40
	Uncrowded canoeists	3	12	12	20	53

Chi square significance  $p < .05$  (\*),  $.01$  (\*\*)

## **8.2 Crowded canoeists and impact perceptions**

The impacts perceived differently by crowded and uncrowded canoeists are presented in Figure 13. Those impacts more negatively perceived by crowded canoeists included seeing jetboats, the number of other groups encountered, too many big groups being encountered, sharing campsites and seeing motor boats.

For all impacts, there was greater perception of the impact by the crowded canoeists. For example, more crowded canoeists noticed that the huts were full, although most indicated they were not bothered by this.

Perceptions were most negative for impacts related to on-river encounters, rather than for impacts at accommodation sites, where more congestion would be expected. This suggests that social impacts associated with trip experiences are more prominent than are any facility capacity impacts associated with congested sites. This may reflect a greater expectation of encounters at overnight sites, rather than on the river. It is possible that on-river interactions are perceived differently than those at overnight sites, with the latter being more acceptable than the former.

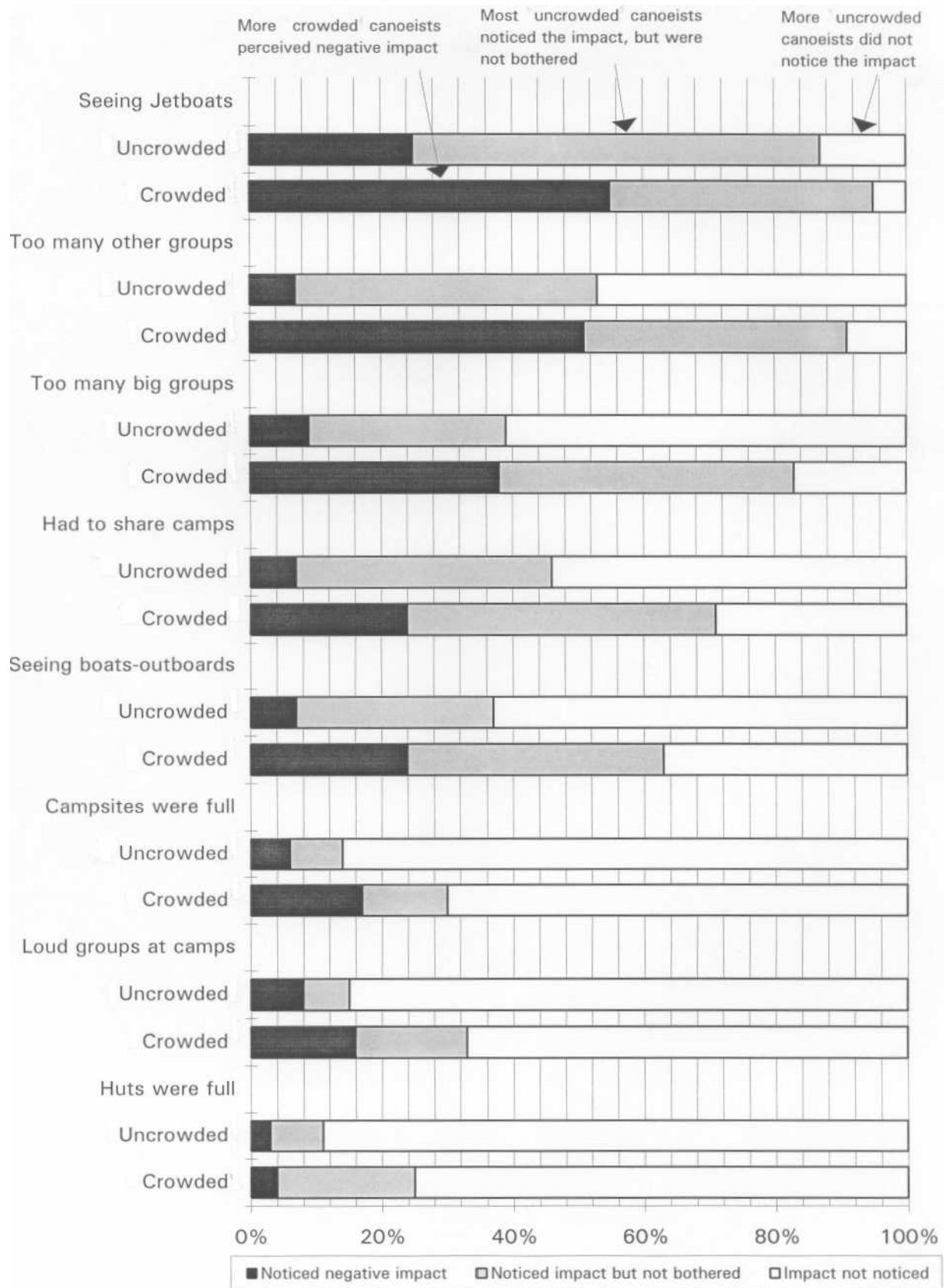
It was also interesting that the social impacts were those most often noticed. The physical impact perceptions differed little between summer and Easter. These results indicated that the crowding scores given related more to social aspects of crowding perceptions, rather than the actual numbers present or the inconvenience at overnight sites.

## **8.3 Crowded canoeists and encounter preferences**

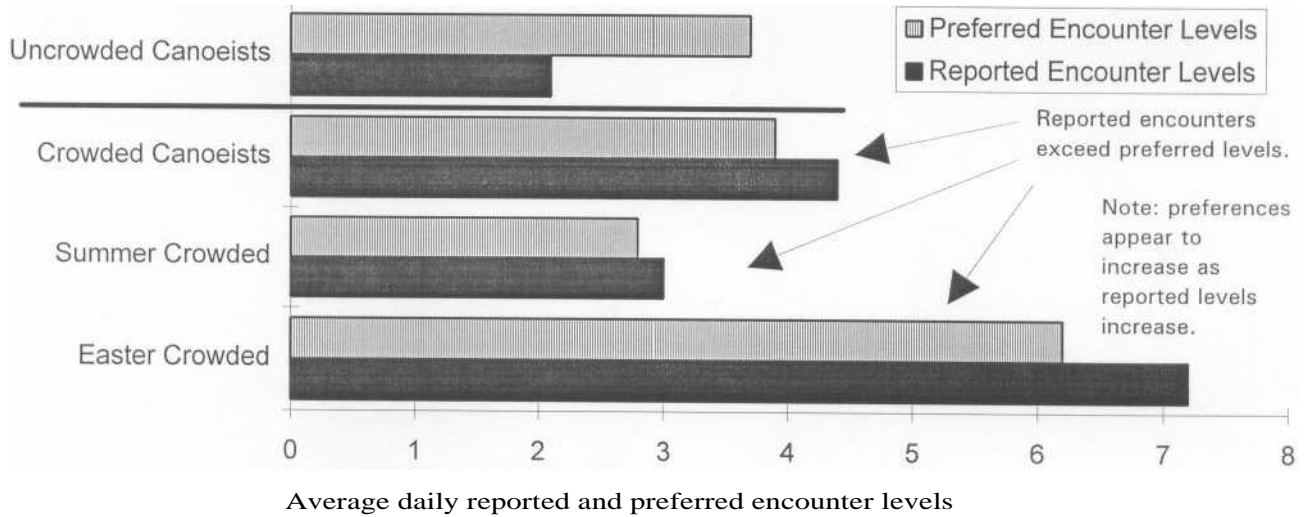
### **8.3.1 On-river encounters**

Crowded canoeists reported over twice the encounter levels of uncrowded canoeists, and this was highest of all in Easter (Figure 14). This indicated further support for a link here between higher use-levels and crowding perceptions. However, as suggested in Section 7.3.1, preferred encounter levels appeared to be higher when actual encounters were higher. This pattern was apparent here, and again suggests that as use increased, a change in the tolerance of increasing numbers was also occurring. Even among the crowded canoeists, actual levels of encounters were generally little more than those they indicated they could tolerate.

However, again the notable exception was Easter, where actual encounters were higher than those levels considered acceptable (7.2 v. 6.2). This reinforced the position of Easter as representing a clear crowding situation. Here, the apparent tolerance for increasing encounter levels appeared to have been exceeded, suggesting some perceptual 'threshold' may have been passed. Crowding relationships and possible thresholds have been investigated extensively in other research, and while no conclusive patterns have been established, it does appear that some elements of social carrying capacity are being exceeded under Easter conditions. This finding would correspond with the interpretation of Easter crowding scores as 'more than capacity' made in Section 7.



**Figure 13 Impact perception differences, crowded v. uncrowded canoeists.**

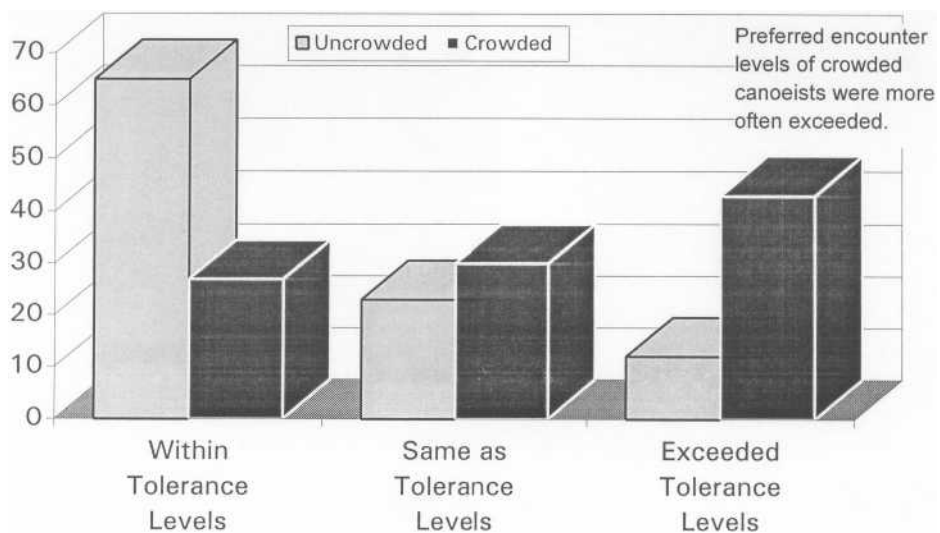


**Figure 14 Preferred and reported on-river encounter levels.**

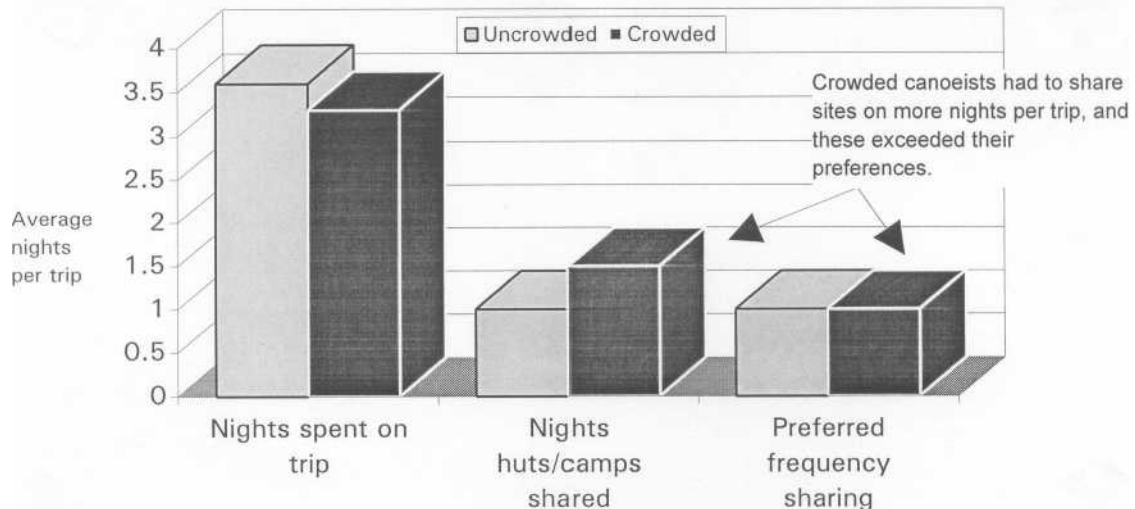
The encounter preference differences of crowded and uncrowded canoeists were further emphasised when the actual and reported encounter levels were cross-tabulated. Figure 15 is derived from this analysis, and clearly shows that the crowded canoeists saw more groups on the river than they would have preferred (43% v. 12% in summer).

### 8.3.2 Overnight site-sharing

There were also some differences in trip durations, and the reported and preferred levels of encounters at overnight sites. Overall, crowded canoeists were on shorter trips than those uncrowded (3.3 v. 3.6 nights on average). And there were major differences in the number of nights that overnight sites were shared, as shown in Figure 16.



**Figure 15 Achievement of on-river encounter preferences.**



**Figure 16 Preferred and reported site sharing encounter levels.**

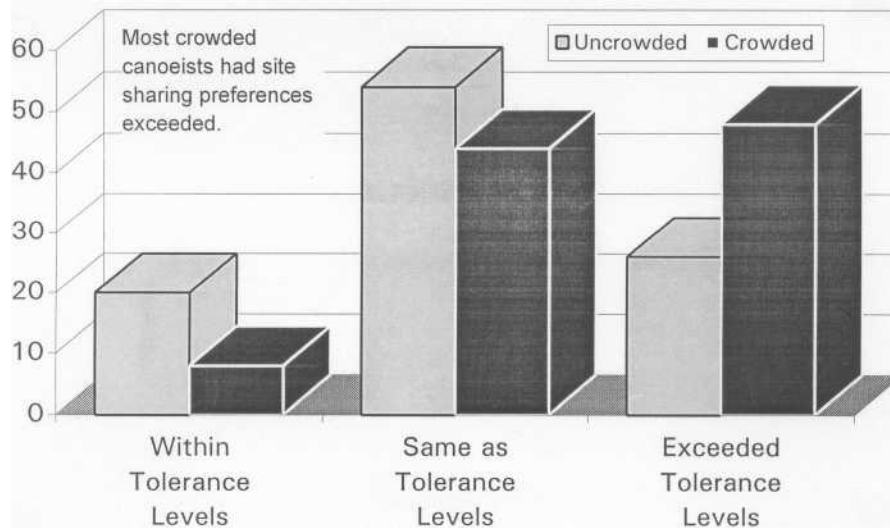
Based upon response frequencies from these results, it was calculated that among crowded canoeists, 80% shared sites, and they did so on an average of almost half the trip nights (45%). This was more acute for the crowded canoeists at Easter, all of whom had to share sites (100%), on an average of 76% of trip nights (eg. everyone shared on almost all nights). Summer crowding appeared less acute, with only 64% of crowded canoeists having to share, and having to do so on only 40% of trip nights. This suggested that overnight site congestion was of less importance relative to other factors in prompting crowding perceptions in summer.

Among uncrowded canoeists, 59 % shared sites, and did so on an average of about a quarter of trip nights (28%). These results indicated that uncrowded canoeists were on trips with the least occurrence of overnight sharing. Those most often crowded at Easter had the highest level of sharing overnight sites with others. However, site-sharing was not the sole source of crowding perceptions, as evident from the 36% of summer canoeists who felt crowded but who had not shared any overnight sites at all. This indicated other impact factors were contributing to crowding perceptions, as discussed previously (Section 6).

However, the central importance of site sharing in generating most crowding perceptions was reinforced by further analysis. Cross-tabulations were made of the number of nights that sites were shared, with the maximum number of nights such sharing would be preferred. Figure 17 represents a summary derived from these results. The main point apparent was that the crowded canoeists had their site sharing preferences exceeded almost twice as often as did uncrowded canoeists (48 v. 26%).

#### **8.4 Discussion points**

The satisfaction levels, impact perceptions and encounter-level preferences for meeting other river users were all distinct in a number of ways for crowded canoeists. In



**Figure 17 Achievement of site-sharing preferences, crowded canoeists.**

general, their perceptions of 'wilderness experiences' appeared to be more compromised by the presence and behaviour of other users than were those of the uncrowded canoeists. They indicated lower levels of satisfaction for such characteristic 'wilderness' features as peace and quiet, solitude, escape from civilisation, and wilderness feelings. They also indicated higher levels of negative social impacts such as the number of other groups encountered, the sizes of groups encountered, having to share campsites, and encountering jetboats and other motorboats. In addition, they were also more likely to notice that huts were full.

The focus for these social impact perceptions appeared as much due to on-river encounters as meeting others at overnight huts and campsites. This suggests the expectations of 'wilderness-type' experiences are at least as stringent on the river as they would be for overnight stops, where more expectation of actual crowding may be anticipated.

Crowded canoeists did encounter higher numbers of other users. They reported over twice the number of daily on-river encounters (Figure 14), and around 50% greater frequencies of sharing overnight huts and campsites (Figure 16). Some tolerance for these encounters was apparent, with the levels of encounters canoeists would have preferred appearing to be correspondingly higher where higher actual encounter levels were reported (Figures 15 and 17). For uncrowded canoeists, these tolerable levels were not exceeded. However for the crowded canoeists, particularly in the peak-use period represented by Easter, these tolerable levels were very often exceeded. Clearly, while encounter level preferences do appear flexible, suggesting visitors do adjust their

preferences in response to the use-level conditions **encountered**,<sup>7</sup> it does seem apparent from the Easter results in particular that this 'shifting tolerance' does have limits.

This is where consideration of 'carrying capacity' issues becomes more relevant. Better definition of the actual use-level conditions in these different situations, and the patterns of visitor responses to these, may allow a more specific identification of a carrying capacity range for river use. Section 9 discusses the implications of these results for eventual definition of carrying capacity options, and outlines the information and data needs which should be addressed to achieve this outcome.

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7 The main strategy used by 46% of 'crowded' canoeists in Shelby *et al.* (1990) to cope with crowding on the Deschutes River emphasised avoidance of others (by visiting at a different time, or by speeding up/slowing down). An additional 30% stated they would simply change their perception of the river (e.g., shifting tolerance).

## 9. DISCUSSION AND RECOMMENDATIONS

The fourth objective of this study was to provide information assisting definition of recreation carrying capacities for canoeing the Whanganui River, and make associated recommendations regarding future management and research needs.

### 9.1 Carrying capacity

While carrying capacities are generally associated with ecological, physical, facility and social impacts from use, only the facility and social aspects are relevant for management consideration here.

Ecological carrying capacity can be considered to represent the ability of the environment to absorb more users without undergoing major or irreversible change. Some change is inevitable from use, and the main management question here is how much change is acceptable from human impacts? In the context of this flood-prone river trench, impacts from human recreational activity are relatively insignificant when compared with disturbance by the periodic flood events. These often wipe out any perceptible physical or ecological impacts from human recreational use. And to date, no specific elements of the riverside ecology have been identified as possibly requiring use-level management. Identification of an endangered species on riverside terraces used for camping would be an example of where an 'ecologically' defined carrying capacity may be appropriate to some sites. However, this type of situation has not yet arisen, and to date, ecological capacity issues have not been prominent.

Physical carrying capacity, which can be considered to be the physical capability of the river to hold more users, is only realistically limited on the Whanganui River by the need for canoeists to make overnight **stops**.<sup>8</sup> For managers, this relates to the capacity of the accommodation sites and facilities to hold more users, and to cater for their basic needs (water, shelter, fuel, waste disposal). The physical and practical limits to this represent the facility carrying capacity.

The main focus of considering carrying capacity here is with the limits imposed by the availability of facilities, the user perceptions of these, and their general perceptions of recreation experiences and social impacts. Discussion of both the facility and social capacity aspects of carrying capacity follows, each in relation to the results of this study.

#### 9.1.1 Facility capacity

It was estimated by managers that there was gross daily accommodation capacity in formal campsites and huts managed by the Department for approximately 1100 visitor nights over the whole river. It was further estimated that with development of such sites, this gross capacity could be approximately doubled to 2000 visitor nights (Appendix 7). The average daily number of canoeists recorded on the river at any one

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<sup>8</sup> On rivers offering different types of experiences (e.g., running rapids), physical limits may also be represented by other criteria (e.g., the number of craft which can run a rapid at any one time).



time during the study period was around 95. And even during the peak period of Easter, was less than 150 canoeists (Table 1). This would appear to suggest that in general terms, the capacity of the river to cater for more users was high. However, there are two mitigating factors which qualify this suggestion. The first relates to the distribution of the accommodation capacity, and the second to the effect of social impacts.

The accommodation capacity of the Whanganui River trench is not distributed evenly along the course of the river journey. Some sites could accommodate numbers in excess of 100, assuming appropriate facilities were in place, while others could not cope with more than 50 at maximum capacity. The larger sites also tend to be concentrated along certain sections of the river, while in other places there are major 'bottlenecks'. The area around John Coull but was a potentially major bottleneck, with the but capacity being only 30, and the main campsite (Puketapu) being closed (wahi tapu site). New campsites are being developed to overcome the possibility of such a 'bottleneck'. However, this does illustrate that even if all available options were developed, the existence of these types of 'bottlenecks' would still prevent the complete capacity being achieved. It is also important to consider whether it would even be desirable to achieve the highest level of capacity possible. This brings us to the second main type of limiting factor-the social capacity.

### **9.1.2 Social capacity**

**Background** ' Social capacity' here does not refer to any objectively definable absolute level of 'social carrying capacity'. Rather, it relates to a situation where the social characteristics of increasing use levels and variety compromise the key recreation experiences for which an area is being managed. The important elements here are the definition of key recreation experiences and social impacts, the acceptable degree of change to these before they are considered to be compromised, and the strategies available to managers to minimise, regulate or prohibit such changes. In all cases, the important elements must be defined by managers rather than being considered inherent qualities. The research contribution here is to aid this task.

Assuming that after environmental protection, the second main objective of use-management is to maintain the quality of recreation experiences, such 'social capacity' is the key factor limiting the facility capacity ever being reached. Results of this research showed that the trip features most highly scored for importance and satisfaction related to natural settings and ' wilderness-type' experiences. With these types of experiences being those most preferred by current users, crowding and conflict impacts would compromise satisfaction long before complete facility capacity was reached.

Ideally, the specification of some 'social carrying capacity' (with this being a management-defined arrangement of user numbers, types, distributions and behaviours in a recreation area), should be aimed at controlling the factors which lead to major dissatisfaction with visit experiences through crowding, conflict and impact perceptions. This represents a defined management state rather than an inherent environmental limit. In this context, this study assists in better definition of such defined management states.

**Social capacity in this study** The results of this study indicate that visitor experiences are already being compromised in some situations. The contrast between the summer and Easter responses suggests that while the problems are not acute during the overall summer season, Easter conditions appear to be 'more than capacity' for maintenance of current recreation experiences. Easter use-levels were approximately twice those of summer averages. Reference to the interpretive table (Section 7.1) indicated that the amount and nature of this Easter use was over-capacity. The suggested response from this table was that management actions would be needed to maintain the quality of the currently achieved recreation experiences. Perceptions of negative social impacts on recreation experiences were also more pronounced at Easter, and satisfactions with these tended to be lower.

These results all indicated that under Easter conditions, recreation experiences were being compromised by social impacts (particularly those representing 'wilderness-types' of experiences). While satisfaction scores remained high,<sup>9</sup> it was clear from these other results that the higher Easter use-levels were resulting in more negative evaluations of experiences. And while canoeists did demonstrate some tolerance for some impacts (e.g., 'shifting tolerance' in encounter preferences), under Easter conditions it appeared that this tolerance was exceeded. Somewhere between the different conditions represented by summer and Easter use, thresholds in canoeist tolerance for some impacts appear to have been passed. This was represented by the much higher Easter crowding scores, perceptions of some impacts, perceptions of some dissatisfactions, and indications of encounter level preferences being exceeded.

The Easter period was clearly a peak-use unique case, and was not representative of the usual conditions of use over the main summer period. But these results from Easter do give some indication of the potential visitor problems which could be expected to emerge should overall use levels approach those of Easter, as may be expected given current projections for increases in tourism. Definition of a management state as a 'social carrying capacity', for maintaining the types of 'wilderness' canoeing opportunities currently provided, would appear to require management specification of use-conditions at levels somewhere below those occurring at Easter peak use.

While no simple relationships between use-levels, social impact and crowding perceptions, and satisfactions are available as a model for defining a social capacity, all these factors can be used as indicators of the social capacity options for the desired recreation opportunities. Clearly, management judgement must be exercised as the basis of this process.

## 9.2 Management recommendations

Crowding and conflict problems were apparent among canoeists on the river. This was most apparent during the intensely peaked Easter holiday period. During summer, the problems were not at levels requiring urgent management attention. This suggests that

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9 This is not an uncommon finding, as noted in Shelby *et al.* (1990), who also found high satisfaction with river running experiences, despite high crowding scores.

an increase in numbers doing canoe trips could continue in the short term without the need for management to apply strategies to slow down or limit this growth. However, the unique situation of more intense use at Easter shows that this growth can not continue to increase indefinitely without negative social and physical impacts, at levels which would begin to detract from visitor experiences. This assumes that the desired management objectives remain oriented toward maintaining and enhancing current 'wilderness' types of recreation experiences as the main priority. If this is the case, it is important to note that crowding scores indicated that in the case of Easter use-levels, capacity could be considered to be exceeded, and that management action was required to maintain the quality of the recreation experience. Taking all this into account, and recognising that no objective means for determining a 'carrying capacity' is available,

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**It is recommended that the initial management direction taken should be to treat Easter conditions of use-levels and visitor experiences as being a model for definition of carrying capacity during the main summer season.**

This recognises that other management actions can be undertaken which may diminish some effects of higher use, thereby allowing total numbers to increase. To enable this to occur, a number of possible management initiatives are necessary. These initiatives (listed below in no particular order of priority), are required to provide better information on relating use-levels and conditions with visitor experiences, and to allow management actions which reduce impact effects.

### **9.3 Recommendations to improve management information**

#### ***Recommendation 1. Develop visitor monitoring techniques based on the 'Great Walk' pass system.***

Better information on possible relationships between use-levels and visitor crowding and impact perceptions are important. The first step will be to improve information on visitor numbers and use-patterns. The receipt butts from sales of 'Great Walk' passes record data such as trip commencement date, nationality, and party size. Collected and recorded properly, this would give a detailed record of the number of canoeists, some of their characteristics, and some details of their trips. (This may involve some alteration of the types of simple data recorded on pass butts.) Differences between summer and Easter use conditions could be identified in this way.

A useful application of this information would be to get a record of the number of visitors starting on the river each day. This would establish the real use-levels, and could be calibrated with:

- Corresponding site-use records from huts, camps, river patrol counts and track-counters. With this, the numbers starting could be related to the numbers using different sites, thus allowing managers to forecast and plan better for any pressure points in advance.
- Other monitoring of visitor crowding and impact perceptions, satisfactions and encounter reports and preferences.

***Recommendation 2. Consider undertaking additional crowding research once this monitoring is established.***

Research on visitor impact and crowding/conflict perceptions could be initiated once the findings of any comprehensive visitor monitoring programmes are available. These may identify specific periods when impacts are most likely to occur, allowing for more specific research into how the impacts occur, and how they can be managed. It would also improve the understanding of relationships between varying use levels, and the crowding, impact and encounter perceptions of visitors. If better relationships can be identified, they may allow indicators to be developed for monitoring visitor experiences.

These would provide useful tools for monitoring any social capacity defined by managers. Indicators which are suggested from this study include:

- Crowding scores based upon the crowding scale used in this study
- Encounter levels with other canoeists and users (reported and preferred)
- Perceptions of key impact indicators (to be defined with further analysis)
- Satisfaction levels with key satisfaction indicators (to be defined with further analysis)

For application of such indicators, more analysis is needed, and consultation with managers over their limitations will also be required.

***Recommendation 3. Combine improved monitoring and crowding information to identify 'threshold' effects between summer and Easter use conditions.***

An accurate visitor monitoring system based upon 'Great Walks' passes would improve understanding of the differences between summer and Easter conditions, and better relate them to actual user numbers. If the Easter conditions are considered to be a preliminary threshold (in the absence of further management changes or better information), such a monitoring record could identify the visitor daily departure levels for Easter. These could be applied as preliminary limits for summer visitor numbers. Managers could then monitor for trends or changes in summer use conditions, which if approaching or exceeding Easter levels, would require further management actions. These actions may include application of use-level management, and impact reduction or prevention strategies.

#### **9.4 Recommendations to reduce impacts**

***Recommendation 4. Provide more information on variation in recreation experience conditions at different times and sites.***

Using monitoring results and increased management knowledge of trip timing and patterns, information could be made more widely available which would allow visitor choice in the type of recreation experiences they wish to achieve. Those concerned by a high degree of encounters with others or possibly having diminished 'wilderness' experiences, could choose whatever times are most likely to match their requirements. On such a basis, such visitors may choose to avoid the Easter and peak summer periods

for example. Or they may choose trip patterns and overnight site selections which minimise contact with others. This could be done by amendments to any new editions of existing information material; through production of new material or bulletin-style updates; through the use of changeable content in trip entry-point signage, advising of conditions and loadings (e.g., covered whiteboard notes, bulletin boards); through similar signage and information at visitor and information centres, and through structured management of word-of-mouth messages (e.g., contact and brief key people at key exchange locations such as shops, hostels, hire companies, etc.).

***Recommendation 5. Increase co-operation with commercial hire and guiding operators.***

Commercial recreation opportunities are a growth area for visitor numbers, and in particular for overseas visitors. These are expected to be the main source of any major increase in future use-levels. Because of the formal relationship between the Department and operators, and the direct communication links to visitors through them, it will be possible to apply guidelines for impact management. This will be the most productive means to guide visitor behaviour toward impact minimisation and avoidance. By doing this, the social and physical capacity of the river experience can be enhanced, thus allowing for increased numbers without associated impacts. Based upon results of this study, such guidelines should emphasise smaller party sizes, more strategic selection of trip patterns and overnight sites used, the appropriate behaviour around jetboats and what to expect of them, and the environmental care code (e.g., carry in and out, hygiene, water quality conservation).

***Recommendation 6 More management of large groups on the river.***

Larger organised groups of canoeists should be required to provide formal notification of their intention to use the river. The Department should retain some capacity to direct their trip patterns and timing to minimise potential conflicts with other users (e.g., monopolising but and campsite space, travelling 'en masse' down the river). The requirements now in place for canoeists to obtain Facility Use Passes does provide one mechanism for getting prior warning of the intentions of large groups.

***Recommendation 7. Provide more descriptive signage at riverside campsites.***

As part of the process of spreading users over a wider range of sites, signage could be increased and enhanced to provide more options for visitors to choose the sites that best suit their trip-type and party needs. Site capacities (the appropriate number of tents for the site), types (whether formal with facilities, or informal with few or none), and travel times to alternatives (next few sites, including some description) could be included on brochures and signage. The notification of nearby down-river alternative sites, and the travel-times to them would be particularly useful on major signs, located where 'bottlenecks' exist or are anticipated.

## **10. ACKNOWLEDGEMENTS**

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## 11. REFERENCES

- Baxter, J. and Sandrey, R. 1986. Recreational Canoeing on the Whanganui River. A report for the Department of Lands and Survey, New Zealand. Department of Agricultural Economics and Marketing, Lincoln College (now Lincoln University), Canterbury.
- Cessford, G.R. 1987. Recreation in the Greenstone and Caples Valleys: for whom and how. Unpublished M. App. Sci thesis, Department of Parks, Recreation and Tourism, Lincoln University, Canterbury.
- Cessford, G.R. (in press) Reports on the results of the 'Great Walks' Study, undertaken on all Great Walks during the 1993/94 summer season. *Science and Research Series*, Department of Conservation.
- Department of Conservation 1989. Whanganui National Park Management Plan. Department of Conservation, Whanganui.
- Department of Statistics 1992. National Summary - 1991 Census of population and dwellings. New Zealand Department of Statistics, Wellington.
- Devlin, P.J.; Hoskyn, M.L. and Simmons, D.G. 1980. The Whanganui River - a Recreation Survey. *Bulletin Number 31*. Department of Horticulture, Landscape and Parks, Lincoln College (now Department of Parks, Recreation and Tourism, Lincoln University).
- Manning, R.E. 1986. Studies in Outdoor Recreation: a review and synthesis of the social science literature in outdoor recreation. Oregon State University Press, Corvallis, Oregon.
- Shelby, B. and Heberlein, T.A. 1986. Carrying Capacity in Recreation Settings. Oregon State University Press, Corvallis, Oregon.
- Shelby, B. and Colvin, R. 1982. Encounter measures in carrying capacity research: actual, reported and diary contacts. *Journal of Leisure Research* 14(4): 350-360
- Shelby, B.; Johnson, R.L. and Brunson, M. 1990. Comparative analysis of whitewater boating resources in Oregon: toward a regional model of river recreation. *Report WRR1-180*. Water Resources Research Institute, Oregon State University, Corvallis, Oregon.
- Shelby, B.; Vaske, J.J. and Heberlein, T.A. 1989. Comparative Analysis of Crowding in Multiple Locations: Results from 15 Years of Research. *Leisure Sciences* 11: 269-291.
- Shultis, J.D. 1991. Natural Environments, Wilderness and Protected Areas: an analysis of historical Western attitudes and utilisation, and their expression in contemporary New Zealand. Unpublished PhD thesis, Department of Geography, University of Otago, Dunedin.

## APPENDIX 1

### Visitor count results and tables

An absolute count of all canoeists on the Whanganui River was beyond the scope and resources of this study. However, the partial counts that took place have provided further data for estimating total use-levels to date. These data resulted from the visitor counting programme at John Coull hut and on river-patrols, and from the trip intention records at Taumaraunui. The results and estimates from these respective sources are presented in summary below. Details of the counts are presented at the end of this appendix.

#### A1.1 Visitor counting programme

The raw physical counts made during the 91 day study period are presented in Table A1.1. However, to develop estimates of total use levels required adjustment and extrapolation of these counts.

Daily shore counts from the John Coull but site recorded approximately 1800 canoeists on the 70 days that counts were made. This represented an average of approximately 27 canoeists seen per day. When extrapolated to cover the full 91 day study period, the total count estimate was up to 2400 canoeists. This can be regarded as only a minimum baseline annual estimate because some canoeists would have been missed from the count each day, and there remained a further 274 days of non-peak use outside the study period, for which no count or estimate was made. An average of 10 canoeists per day during these off-peak days would result in an overall annual use-level estimate of over 5000.

River Patrol counts were a different means of use-level estimation. As shown in Table 1, they directly recorded a total of 2386 canoeists on the patrol days. When the 23-day top-section count was extrapolated by its daily average to match the 27 day bottom-section count, the resulting overall use-level estimate was 2542 canoeists. Interpretation of these data shows that on any given day during the study period, around 94 canoeists would be engaged in their trip somewhere on the river. Clearly, this represents only an average, with the actual use-pattern ranging from a low of 24 canoeists counted on the river (6 Dec), to a high of 231 (7 January). Detail of these counts, and those for the Tieke hut bypass records are presented at the end of this Appendix.

The difference between summer and Easter counts is evident in Table A1.1. Although absolute numbers are lower in Easter, the daily averages are much higher than even the peak-use summer period. Easter river patrols recorded almost all their canoeists on one of the two days done. This suggested an intense 'wave' of users occurs during the limited Easter holiday period, when trip patterns tend to overlap much more.

**Table A1.1 Summary of visitor counts.**

	Hut based counts		River patrol counts	
	John Coull hut	Tieke hut bypass	Top River section	Bottom River section
<b>Total</b>	1837	365	899	1487
(daily av.)	(70 days=26.5)	(24 days=15)	(23 days=39)	(27 days=54.5)
<b>Summer</b>	1712	265	899	1344
(total daily av.)	(67 days=25.5)	(21 days=12.5)	(23 days=39)	(25 days=53.5)
(peak-use av.)	(37 days=34.5)	(17 days=13)	(9 days=66)	(11 days=99)
<b>Easter</b>	125	100	no count made	143
(daily av.)	(3 days=41.5)	(3 days=33.5)		(2 days=72) (1 day=137)