

Final

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**Upper Lee River Waimea Water
Augmentation**

Assessment of Effects on Recreation



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Upper Lee River Waimea Water Augmentation Assessment of Effects on Recreation

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1 Summary

This report has been prepared for Tonkin & Taylor Ltd on behalf of the Waimea Water Augmentation Committee (WWAC). It reviews the recreation values associated with the Lee, Wairoa and Waimea Rivers in the Tasman District, and assesses the potential effects of a reservoir and dam on the upper Lee River (Figure 1) with an augmented seasonal flow regime below the dam to support in-stream ecological values and water supply activities in the lower catchment. This assessment has used the results of flow modelling undertaken by Tonkin & Taylor to predict effects on recreation values and activities.

The main recreational use of the study area is swimming in the lower Lee River and the Wairoa and Waimea Rivers, with, at least historically, tens of thousands of user days per year (Orr 1982, Fitzgerald & Shaw 1986). The scale of use of the rivers for swimming – and the picnicking and general terrestrial recreation associated with it – is likely to far outweigh trout fishing throughout the catchment (940 angler days in 2007/08 (Unwin 2009)), whitebaiting towards the Waimea Inlet, and the whitewater kayaking which occurs predominantly in the Wairoa River. Limited tramping and hunting occurs in the upper Lee Valley.

The swimming values are regionally significant throughout the catchment. Kayaking (in the Wairoa River), trout angling (in the Waimea and Wairoa Rivers) and whitebaiting (in the lower Waimea River) are also regionally important.

Swimming in the Lee and Waimea Rivers occurs at many flow levels. Periods of very low flow have not been identified as either particularly restrictive or beneficial, and the flow regime modelled to result from the proposal is within normal ranges. The net effect of the proposal on swimming in the Lee River will be minor or less: in more than 50% of years flows will be infrequently augmented; in 20% of years flows will be occasionally augmented, and in only approximately 6% of years will flows be consistently augmented over the summer and spring period. Conversely, some peak flows will be removed while the reservoir refills, but these will probably occur during rain events when swimming is less likely to occur. Hay et al (2009) report the potential for some increased periphyton growth in the Lee River downstream of the dam in the first few years after reservoir filling; the result of short-term nutrient enrichment. A mechanism for incorporating artificial flushing flows has been recommended for the dam design as mitigation of this potential issue by Hay et al (2009), and considering the future potential for didymo invasion. Short-term nutrient enrichment may also have minor effects on downstream water clarity for the first three to four years of operation (ibid).

The scale of change in base flows in the Wairoa and Waimea Rivers during dry and moderate years will be insufficient to be registered by river users in comparison with wet years, although the current extreme low flows will no longer be experienced in any year. Maintaining a minimum baseflow of 1.1 m³/s in the Waimea River, up from the current minimum of 0.225 m³/s, is estimated to improve adult trout numbers by approximately 25% – from 15 per km to 19 (Hay et al 2009). The Lee River features low existing use for trout angling (50 ± 50 angler days in 2007/08 (Unwin 2009)) and the potential improvement in trout habitat in the Lee reported by Hay et al (2009) will only have marginal effects on the catchment's level of angling amenity.

Current access for tramping and hunting into the upper Lee Valley from the west is dependent on agreement with land owners and managers, and does not currently represent a long-term solution to recreational access to the western side of the Mount Richmond Forest Park. The Lee dam proposal does not represent an important impediment to organisations seeking a long-term solution to access. Formal access through Lucy Creek is preferred, but is not currently available.

Jet boating in the Waimea River may be enhanced by increased base flows. This may be important for jet sprint events when very low flows make sprint course creation difficult.

The Wairoa River is kayaked mostly above the Lee confluence, and is the key kayaking resource in the study area. The proposed scheme will occasionally remove or reduce the scale of the peak flows experienced below the confluence while storage is recovered in the reservoir. Effects of the proposal may not, in fact, be noticed. Limited kayaking occurs in the Lee River and augmented base flows would be likely to support some additional enjoyment of this resource, potentially for slalom training.

The new reservoir presents a new recreation opportunity, although it will be predominantly located on private land with no public vehicular access. Some difficult and limited public access via the legal road bounding the river bed currently exists. However, this will effectively be terminated by the dam (see Figure 3).

It is unlikely that the proposed setting will allow or warrant the development of special facilities or access for recreation on a large-scale basis. Some recreational users will be more likely to want to satisfy their curiosity rather than develop habitual visiting patterns due to the limitations of the setting, particularly the area and configuration of the reservoir surface.

Opening the reservoir for casual canoe and kayak use over a confined period of weeks in the early summer could be considered and may be sufficient to satisfy recreation demand. Limited jet and power boating opportunities could arise on the reservoir and this may have value for waterskiing, although the size and shape of the reservoir (narrow and elongated) will be a handicap. Access by powered craft would require a launching facility, whereas kayaks and canoes can be carried to the shore. Should a quality recreational fishery result, angling access could be of value. A smorgasbord of recreation pursuits can be supported in the one area, with little conflict, if managed well.

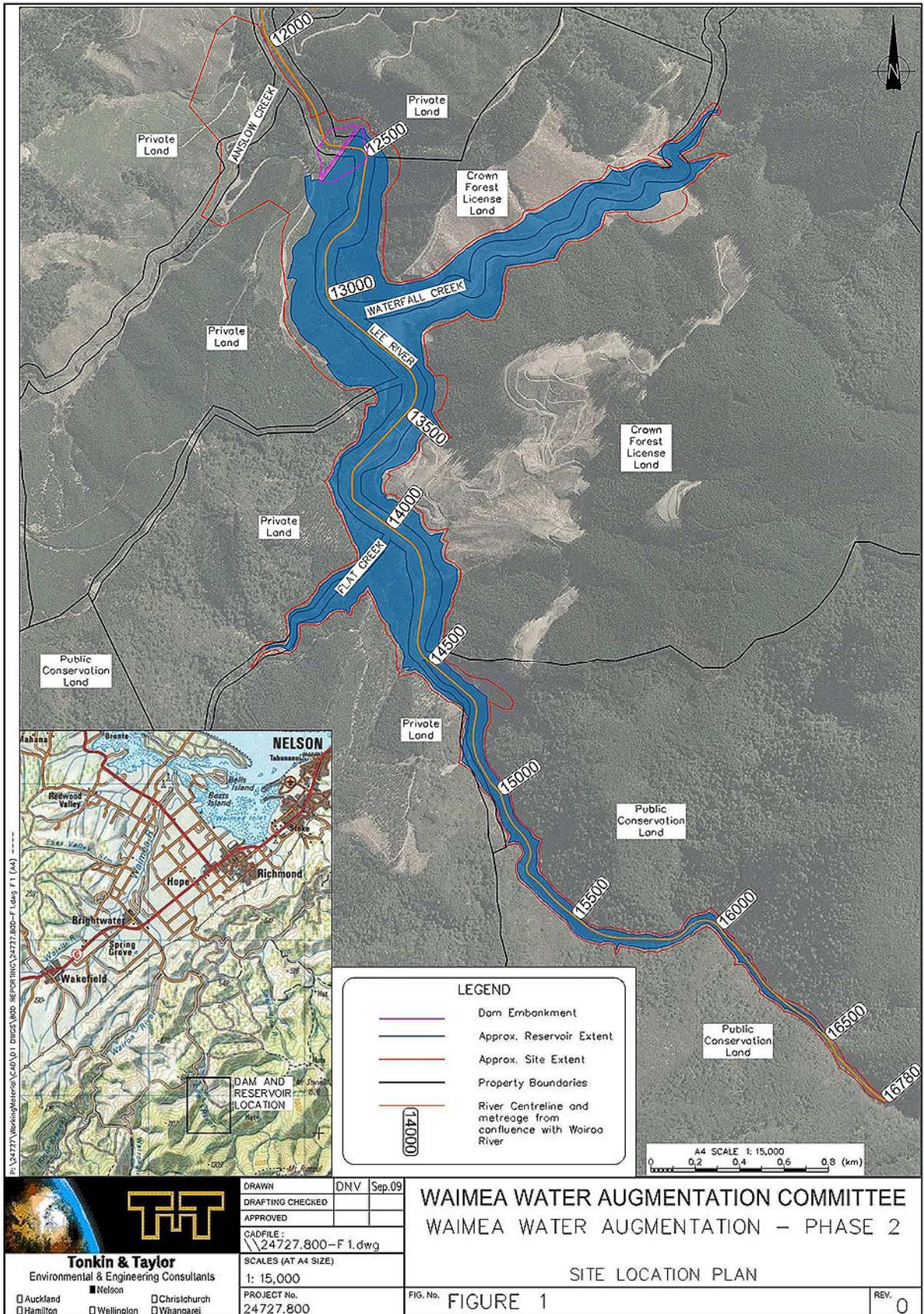
Construction traffic may have adverse but temporary effects on general recreational use of the Lee River setting.

1.1 Conclusion

The net adverse recreation effect of the proposal on the existing recreation setting, without mitigation, will be to limit public access along the bed of the upper Lee River – noting that the current access option is difficult, limited to foot travel and is infrequently used. The key mitigating effect is the improvement in trout habitat in the lower Waimea River and the increase in adult trout numbers there, along with minor positive effects on jet boating and kayaking. This may be considered to be a fair balance, and other developments for recreation will represent an enhancement to the net level of recreation amenity in the area.

Short term effects relate to a minor reduction in water clarity and a minor potential increase in periphyton growth downstream of the dam for the first three to four years of operation. These effects will have minor temporary adverse effects on swimming.

The net effect of the proposal on recreation is likely to be slight, but potentially positive. Enhancements to recreation amenity may be gained by the management of the reservoir for recreation and via increased recreation access provision to the upper Lee Valley, which would need to recognise the private land status of several important properties.



2 Aim and objectives

2.1 Aim

Complete a review and assessment of the terrestrial and aquatic recreation resources potentially affected by the upper Lee River Waimea Water Augmentation option.

2.2 Objectives

- Describe the current recreational activities undertaken within the study area, including a review of their significance on a national, regional and local scale,
- Assess the impacts of the upper Lee River water storage and flow augmentation option on these activities;
- Recommendations to avoid, remedy or mitigate potential adverse effects;
- Investigate the potential of the proposal to benefit recreation within the study area;
- Describe a recreation vision for the setting, with the proposal in place, including a description of the net recreation effect of the proposal.

2.3 Study area

The study area includes (shown in Figure 2):

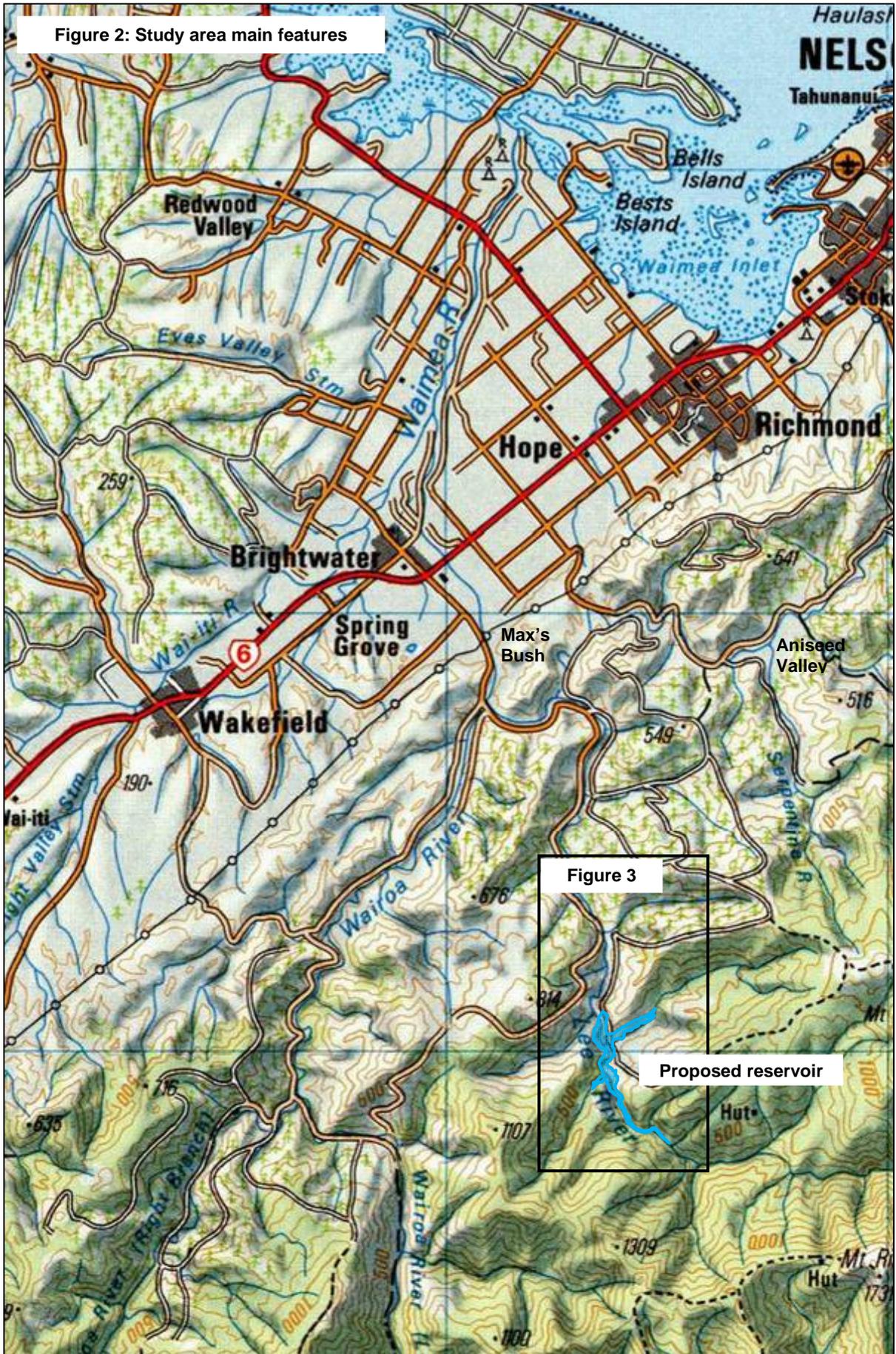
- the Lee catchment and River,
- the Wairoa River downstream of the Lee confluence,
- the Waimea River downstream of the Wairoa confluence,
- the riparian margins from the proposed dam to the sea,
- and other regional river-based recreation settings which provide context for the recreation settings in the Waimea catchment.

2.4 Considerations

Two considerations have been presented by the core project team in relation to this assessment. These are to recognise that:

- the future recreation options must have minimal impact on private land use in the upper Lee Valley.
- the upper Lee River catchment in Mount Richmond Forest Park has a remote undeveloped character, which should be retained.

Figure 2: Study area main features



3 Activity summaries

Data describing each activity in this section are drawn from stakeholder interviews, literature review (published research, policies and popular guides) and internet sources.

3.1 Legal access to inundation area

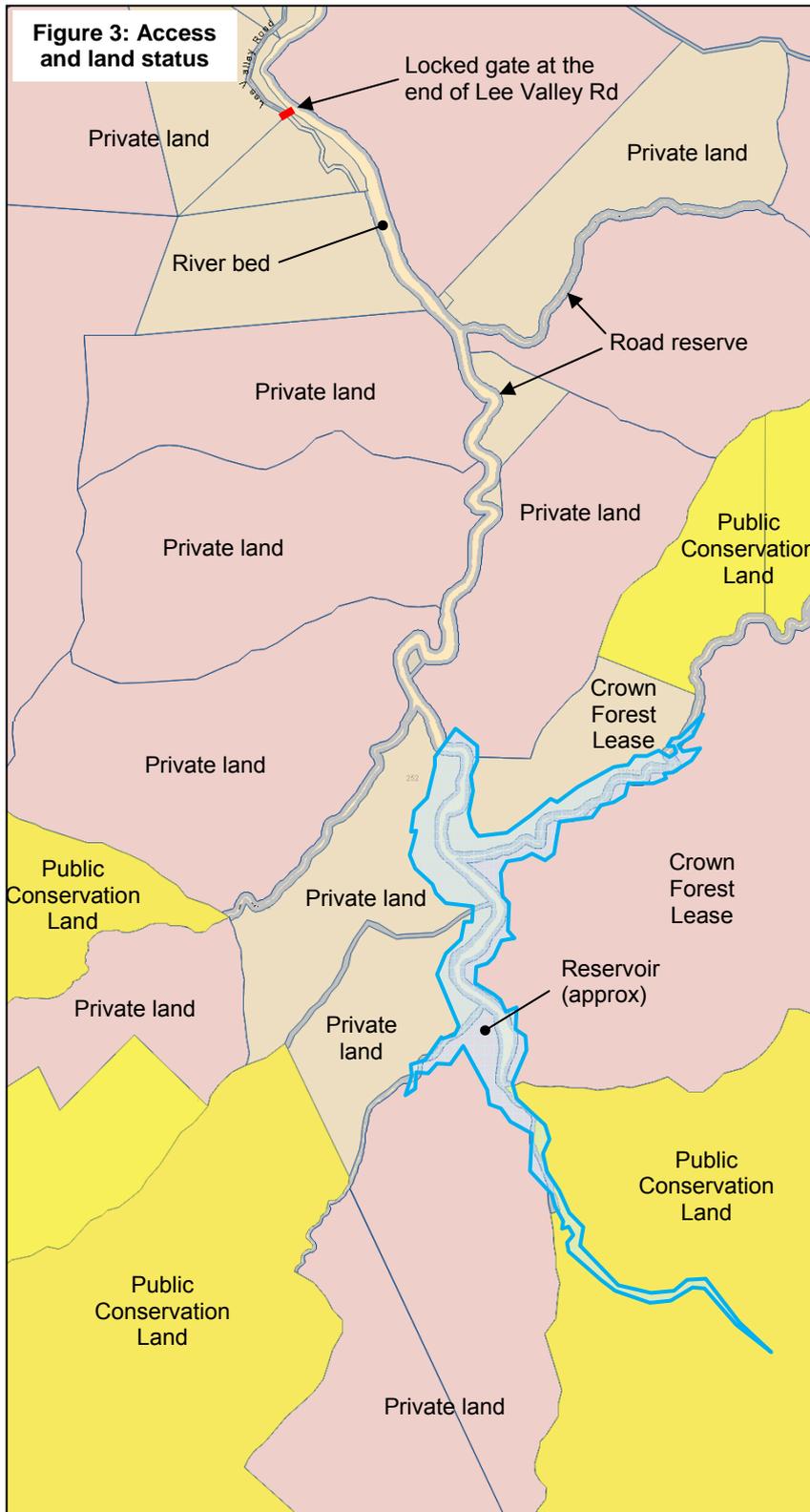


Figure 3 details the legal status of the land in the upper Lee Valley. Public road access is provided by the formed legal road which ends at the locked gate immediately north of the Lee Processors Ltd quarry.

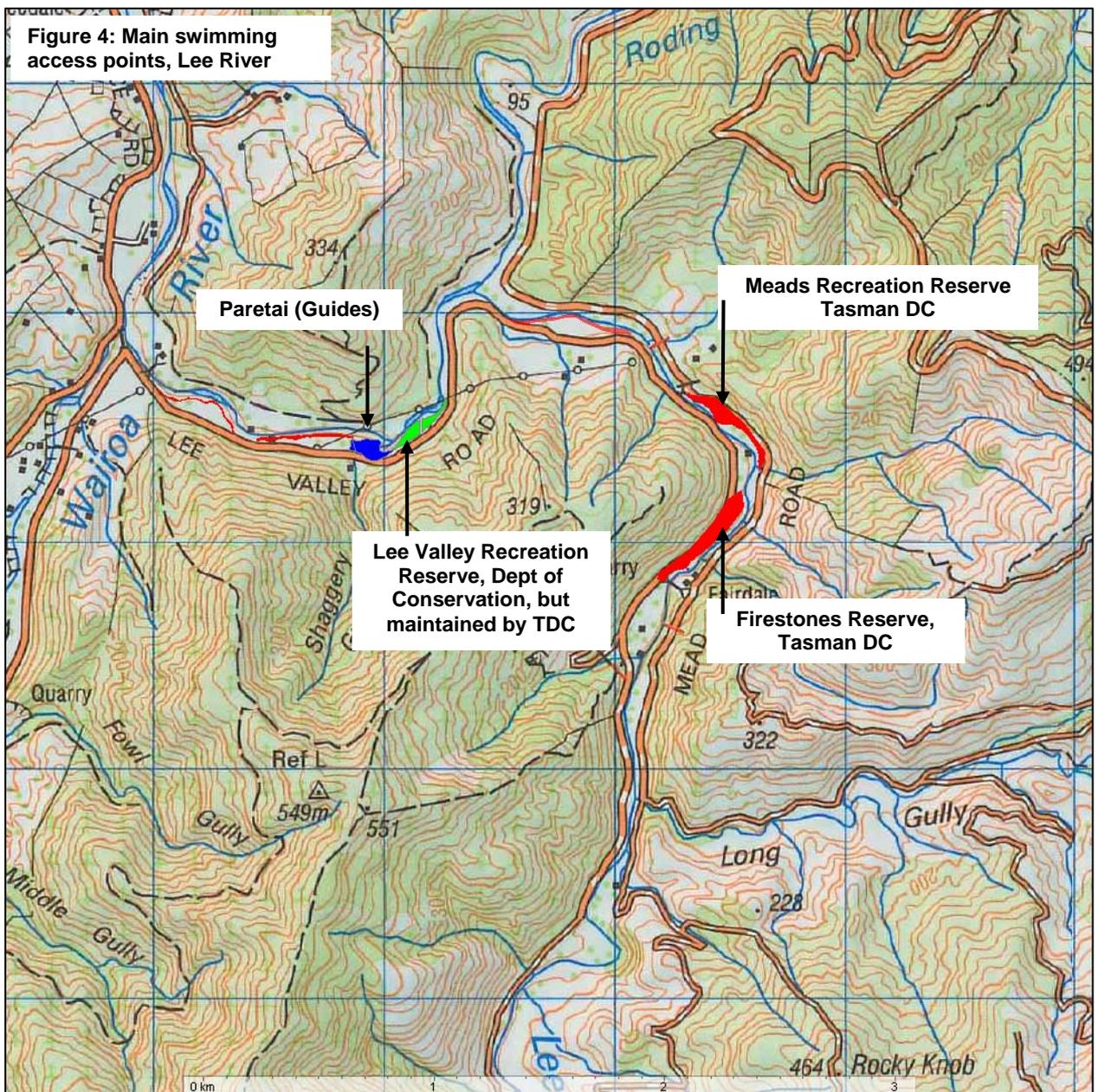
Road reserve and the river bed provide legal access into the upper Lee Valley. However, the route is in the riverbed itself and it is necessary to wade. While this is not easy and can be very cold, it is possible (Dean Walker, pers comm.). A benched track existed beside the Lee River above the locked gate and some formation remains, but this has not been maintained and until recently was not known to the Department of Conservation.

The Lee River below the locked gate is readily accessed from several road sites and reserves administered by the Tasman District Council (TDC).

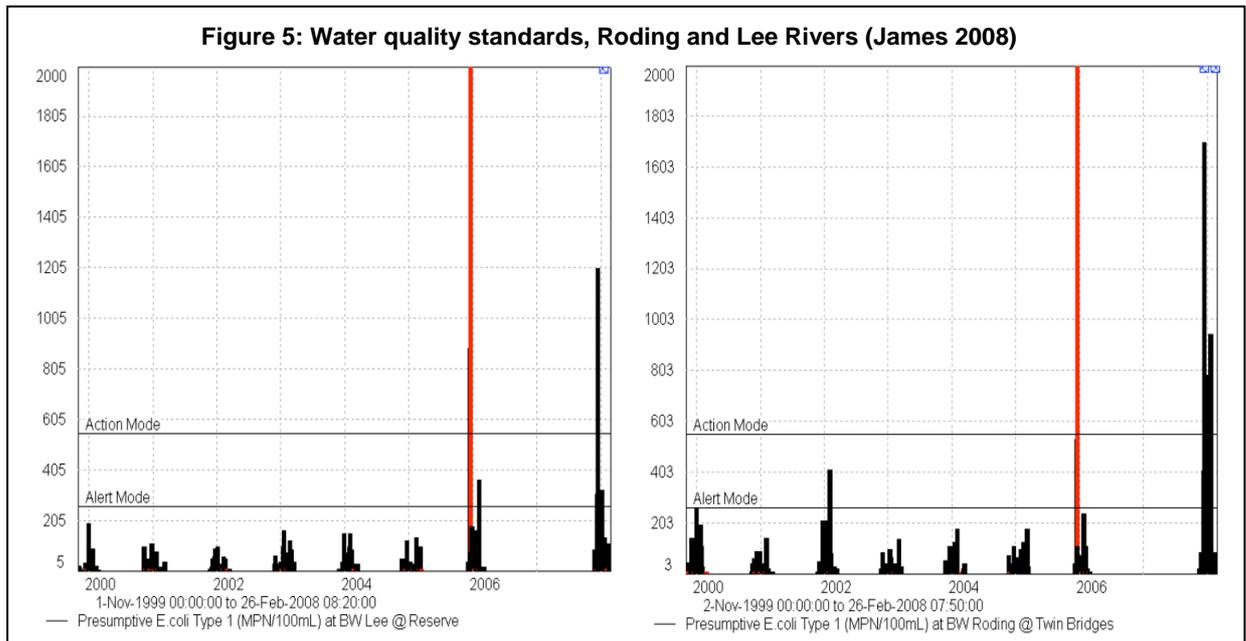
3.2 Contact recreation, swimming

Swimming is the dominant in-river recreation activity in the Lee, Wairoa and Waimea Rivers. Activity is concentrated where access and ancillary recreation facilities – such as picnic sites and toilets – are located. The Tasman District Council manages two reserves (Meads and Firestone) on the banks of the Lee above the Roding confluence, and the Nelson branch of the Girl Guides owns and operates Paretai, a regional camp at 129 Lee Valley Road, almost 1 km below the confluence of the Roding River (Figure 4). The Waimea East Irrigation weir provides a very popular swimming site on the Wairoa near Max's Bush. The Wairoa and Waimea Rivers provide many accessible swimming sites where public access allows.

The Lee River, between the proposed dam and the Wairoa confluence, was reported to be the second most used river recreation setting in the Nelson Bays region in the mid 1980s, after the Maitai River, with annual user days in the tens of thousands (Orr 1982, Fitzgerald & Shaw 1986). There is no more recent data, but there is no indication that use has declined.



The Tasman District Council monitors bathing water quality at 23 sites in the region, including the Lee, Roding and Waimea Rivers (James 2008). Sampling on the Lee River is carried out below the Roding confluence and recent exceedances of the national guidelines for freshwater recreation standards in the Lee appear to result from issues in the Roding catchment (Figure 5). No exceedances of the standards were recorded prior to 2006/07. The Roding catchment was identified in James (2008) as a priority for sanitary survey over the 2008/09 season.



3.3 Commercial recreation

No commercial recreation activities have been identified in the study area.

3.4 Trout fishing

The Sports Fishing Regulations 2009/10 allow angling all year for all legal methods on the Waimea River downstream of the Lee confluence and on the Wairoa River. For the Lee, Roding, Wai-iti and Wairoa River above the Lee confluence, the season is limited to between 1 October and 30 April using artificial fly or spinners only. The daily bag limit on all rivers in the catchment, including the Lee, is two brown trout of any size.

The catchment is mentioned in passing on the Fish and Game regional information website for Nelson/Marlborough¹:

Waimea basin catchments rise in the steep beech clad Richmond and Arthur ranges before flowing through intensely farmed lands growing pine trees, apples, kiwifruit and hops. Upper catchment rivers like the Wairoa, Upper Motueka, Wangapeka, Baton and Pearce are noted for their water clarity.

There is no specific mention of the Lee River on the website.

Comprehensive access pamphlets for rivers in the region are limited to the Buller, Motueka, Pelorus and Wairau Rivers and the Takaka and Aorere catchments in Golden Bay.

Three angling guides in the literature review refer to the rivers in the catchment. The major focus of these guides is on the Waimea River and little mention is made of the Lee, Wai-iti, Roding or Wairoa Rivers.

¹ <http://www.fishandgame.org.nz/Site/Regions/NelsonMarlborough/fishingAccess.aspx>

Kent's comprehensive (2006) *South Island Trout Fishing Guide* states, in reference to the Waimea River (p41):

The most enjoyable fly fishing water lies between SH 6 bridge and the weir at Max's Bush. Here the water is clear and the river quite boisterous in parts. The middle reaches are slower flowing, with long willow-lined glides and shallow, shingly runs. Despite the riverbed being rather unstable, there are reasonable numbers of brown trout in the 0.5-0.75 kg range. Fish are difficult to spot. The lower reaches are tidal but the occasional sea-run brown can be caught on spinning gear or a dark streamer fly fished through the deeper glides at night. Both the Wairoa and Lee tributaries hold a few fish, especially early in the season. Roads follow up both tributaries from Brightwater.

Busch (2003) offers six comprehensive pages describing the Waimea River below Max's Bush, noting (p43-48):

This gentle river bisects the Waimea Plains of Nelson, after gaining its source from three tributaries in the surrounding hills. The upper reaches are stocked with large trout, limited in numbers by a pristine environment. The water is filtered to incredible clarity by mountains of mineral rock. This creates a habitat of visual appeal, but means that the water is incapable of sustaining mosses, weeds or aquatic insects. The lower reaches, on the other hand, provide good conditions for anglers practising either the spinning or fly fishing method. They are well stocked with brown trout (not withstanding floods or droughts) and are accessible from a gravel road paralleling the river between stopbanks....

Although the river has sustained a good head of fish for the first 100 years, one must hold anxiety for the future well-being of the fishery. The low-water conditions that have been an annual summer event for the past 25 years have certainly, in my experience, damaged the habitat which in turn has undoubtedly diminished the trout population. Anglers visiting this river during the height of summer should heed this phenomenon, which will explain the possible lack of visible fish activity on an otherwise perfect day.

Moore (2002) states:

Waimea river and its tributaries: Nelson anglers like the Waimea because it is close to town - and because its clear waters are ideal for stalking large resident and sea-run trout. The lower section is modified to control floods but still produces large fish, the upper reaches and tributaries are gorgy in places with most trout more than 2 kg, in top condition, and exciting to catch. River levels rise quickly in heavy rain but fall and clear just as quickly. During a hot summer with low flows, fishing can be best at night. Fishing for sea-run trout in the tidal zone during October to December is popular.

The national angler surveys (Unwin 2009, Unwin & Image 2003, Unwin & Brown 1998) indicate the following seasonal pattern of angler activity within the catchment:

Table 1: Angler days per two month period, Waimea catchment (NAS results) ²							
	Oct - Nov	Dec-Jan	Feb-Mar	Apr-May	Jun-Jul	Aug-Sep	Total
Lee River							
2007/08				50 ± 50			50 ± 50
2001/02	<10	20 ± 10	50 ± 30				80 ± 30
1994/96	8 ± 7				122 ± 118		129 ± 118

² Data are taken directly from the source report. Row totals do not all match the sum of their contributing cells and it is assumed that rounding is the cause.

Table 1: Angler days per two month period, Waimea catchment (NAS results) ²							
	Oct - Nov	Dec-Jan	Feb-Mar	Apr-May	Jun-Jul	Aug-Sep	Total
Roding River							
2007/08							
2001/02			50 ± 50	20 ± 20			70 ± 60
1994/96							
Wai-iti River							
2007/08	110 ± 110		80 ± 60				190 ± 130
2001/02		30 ± 20	<10				30 ± 20
1994/96		71 ± 48				25 ± 23	96 ± 53
Waimea River							
2007/08	120 ± 80	190 ± 120	180 ± 100	<10			500 ± 170
2001/02	60 ± 40	30 ± 20	80 ± 40			70 ± 50	240 ± 80
1994/96	694 ± 205	491 ± 182	275 ± 163	4 ± 3	35 ± 34	284 ± 110	1783 ± 339
Wairoa River							
2007/08	30 ± 20		170 ± 120				200 ± 120
2001/02	50 ± 50	230 ± 90	120 ± 50	140 ± 80			550 ± 140
1994/96	45 ± 32	107 ± 60	55 ± 53	20 ± 17	0	52 ± 29	279 ± 93

The Waimea and Wairoa Rivers are the main angling destinations. Activity on the Lee has apparently declined since 1994/96.

3.5 Whitebaiting

The whitebait season for all of New Zealand, apart from the West Coast, is from 15 August to 30 November inclusive. Fishing is only permitted between 5am and 8pm or between 6am and 9pm when daylight saving is being observed.

An inventory of whitebaiting rivers in the South Island was completed by MAFFish in 1988 (Kelly 1988) which identified the Waimea River as of 'major recreational importance' and 'minor commercial importance' for whitebaiting, stating (p14):

A shallow, slow-moving river, the Waimea is formed from a group of small rivers and streams which flow from the surrounding hills to the south-east of Nelson. The main tributaries are the Wai-iti and the Wairoa Rivers. The river follows a low gradient as it flows north over the Waimea Plains. Only 2-3 commercial whitebaiters fish this river. However, depending on the conditions, it provides a valuable recreational fishery for up to 50 whitebaiters per day. Whitebaiters also fish the small creeks feeding the Waimea Inlet, which usually have 1-2 fishermen each. A recreational survey of the catchment (Nelson Regional Water Board 1986) found that 5% of users were whitebaiters.

3.6 Kayaking

The late Graham Egarr, one of the authors of the *New Zealand Recreational River Survey* (Egarr and Egarr 1981), penned comprehensive guides to kayaking and rafting in New Zealand. Two volumes were published, one focusing on the North Island and the other the South (Egarr 1995). In each he lists his choice of the best river trips and whitewater trips on each Island. The 'Waimea River system' – and specifically the Wairoa Gorge and the Lee River – is listed as one of 37 'most popular' river trips and the Wairoa River as one of 15 of the 'very best of the difficult whitewater

trips' in the South Island. The Wairoa section is, however, largely unaffected by any works on the Lee River as the get-in points are towards the confluence of the Left and Right Branches of the Wairoa River and the lower get-out point at Max's Bush.

Of the Lee River and reaches downstream, Egarr (1995) states (p26):

The Lee River joins the Wairoa at the foot of the Wairoa Gorge. It is accessible from the Lee Valley Road, which branches off the Wairoa Gorge Road and over a bridge. Drive to the quarry at the road-end. During summer the flows in the river will be too low to paddle and a lower put-in is needed. With high flows this river contains excellent grade III and IV rapids of tight chutes between rocky banks. Most have good pools below them, but at the high flows which are best to run this river, the flow will be very swift. Take-out at the Lee picnic area or go on down the Wairoa and take-out at the water level recording station or at Max's Bush. At low flows this river is a series of short grade II drops and quiet pools. It will rise quickly after rain. It also drops quickly, so it is best to run the river immediately after rain.

If running the Wairoa River beyond the Lee junction there is a take-out at Max's Bush (on right bank) just below the rock weir that has been built across the river (in which there are a number of gaps that can be run). For an easier take-out and shorter vehicle shuttle, use a track on the left bank just downstream of the water level recording meter above the weir. From Max's Bush down to the Waimea River and the Waimea estuary it is easy paddling over a shingle bed with a number of shallow shingle rapids.

Charles (2006) offers similar advice (p124):

Lower Wairoa Gorge: paddlers seeking a less demanding trip can put in at the take out for the Upper [Wairoa] Gorge section and take out directly above the weir at Max's Bush. This take out is approximately 1.5 kilometres below the WairoaLee confluence on river left. At 80-200 cumecs this section from the bridge consists of the occasional class II+ rapid. Lee River: the Lee River is the Wairoa's main tributary and is also worth a run at higher flows, especially in the upper reaches. Access to the Lee is from the River Terrace Road, turning left at the road turnoff by the WairoaLee confluence to follow the Lee Valley Road along the river's true left bank. The Lee is an easier version of the Wairoa, with similar ease of access and scouting from the road. Upper limit is at the Cement Works, where there is an access track to the river about 100 metres downriver from the locked gate at the end of the public road.

The Wairoa River is the key kayaking river in the study area, but the Lee provides some options for, particularly, slalom training (Trevor James, Nelson Canoe Club, pers comm.).

3.7 Terrestrial recreation

Walk Tasman (TDC 2008a) notes, amongst the 66 walks identified in the District, the Waimea Walkway on the true left bank of the Waimea River from Livingston Road to SH60. This was developed by the Tasman Environmental Trust. The route is also identified as a mountain biking track in the publication, Bike Tasman (TDC 2008b). The Two Rivers Walk, a circuit immediately north of Brightwater taking in the Wai-iti / Wairoa confluence, is also listed as a walk. A mountain bike circuit, starting in Brightwater, taking in the Wairoa Gorge and including Terrace Road from Brightwater to Wairoa Gorge Road, is identified in TDC 2008b.

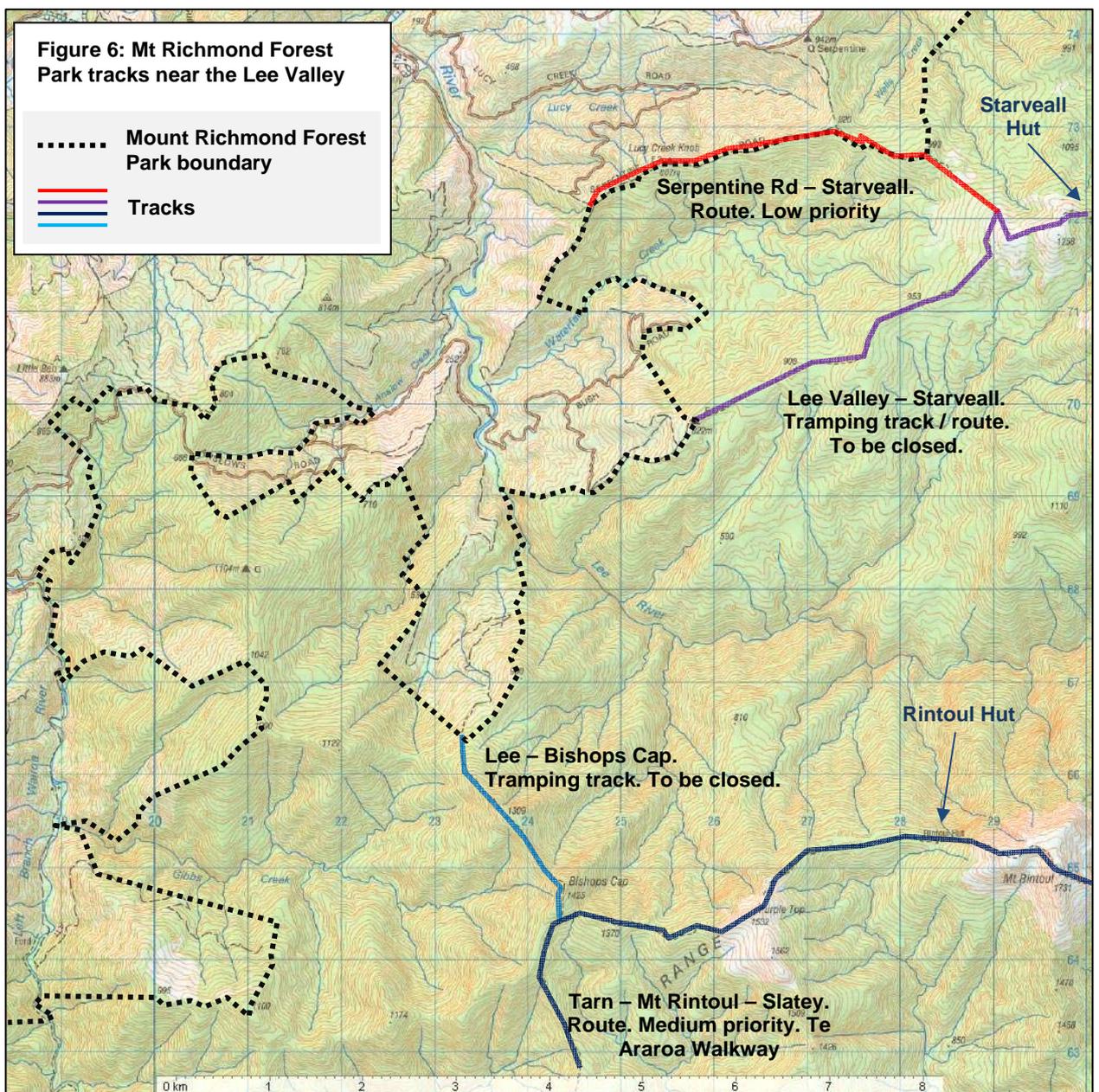
Harding (2008) describes these accesses as providing for, "a range of uses, including walking, cycling, running, picnicking, swimming, game-bird hunting, fishing, boating, horse-riding and vehicle use. The area provides a semi-natural setting for recreation within an otherwise intensively settled landscape." Harding recommends managing the Waimea River berm lands – the 'Waimea River Park' – as a Local Purpose Reserve under the Reserves Act 1977 to control and enhance

various values, including: flood protection and aquifer health, public access and recreation, nature conservation and commercial activities. The water augmentation scheme will enhance some of these values, but the process of creating a River Park is separate to this assessment process.

Aniseed Valley, including Whispering Falls, Hackett Hut and Chromite Mine, is commonly promoted as the most popular walking and mountain biking opportunity near the study area (eg TDC 2008a, Kennett et al 2002, Trafford 2004). Vehicle access to the Valley is separate from that to the Wairoa Gorge and Lee Valley.

The upper Lee Valley has no practical public access and no longer provides formal walking opportunities. A benched track existed beside the Lee River above the locked gate and some formation remains, but this has not been maintained and until recently was not known to the Department of Conservation. The potential exists to reinstate this route, but it is not a DOC priority (Martin Heine, DOC, pers comm.).

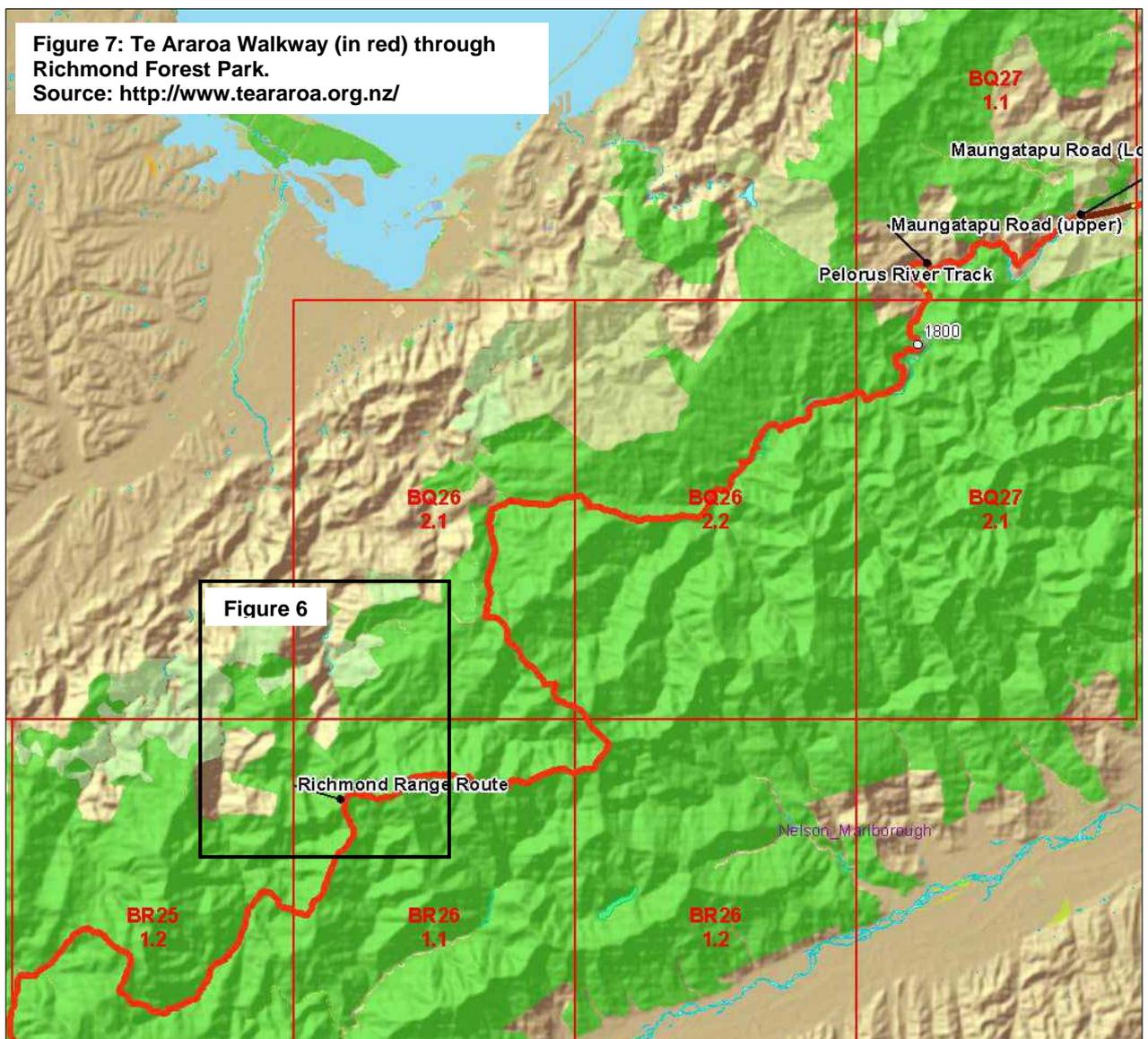
Historically, a Department of Conservation tramping track led from Bishops Cap in Mount Richmond Forest Park to private forestry land in the upper Lee catchment. This was provided as a direct route onto Purple Top and the alpine route over Mt Rintoul. The route also provided an emergency exit from the tops (Figure 6). Tracks also led from Mt Starveall to the ridges north and



south of Waterfall Creek in the Lee catchment. These tracks were identified as of low management priority by DOC (DOC 1996) with no practical public access from outside the Park. The routes are difficult to use, unreliable due to tree fall and require private landowner permission. Landowners have withdrawn their permission for public access to these tracks and maintenance of the Lee Valley accesses has now been ceased as a result. DOC is in the process of preparing a new Park map to show these changes and is investigating alternative all weather permanent public access options from Hackett Hut to Mt Starveall Hut, which is its main focus in the general area for public access to the Richmond Range (Martin Heine, DOC, pers comm.). Egress from Hackett Hut is currently difficult at times of high rainfall, since the track crosses Hackett Creek several times.

The north-western side of the Richmond Range has, in general, very poor public access, being bounded by large blocks of private forestry and forestry lease lands. DOC will continue to seek feasible permanent access options by agreement with land managers but recognises the issues which landowners have experienced with public access over their properties. DOC is also investigating the possibility of limited access by forest road to the high point above Lucy Creek, but this needs further work. The additional possibility of road access through plantation forests to Waterfall Creek is also a work in progress (Martin Heine, Martin, DOC, pers comm.).

The Te Araroa Walkway passes the length of the Mount Richmond Forest Park, including the Tarn – Mount Rintoul – Mount Starveall route (Figure 7).



3.8 Hunting

Due to difficult access, there is limited hunting in the upper Lee Valley. DOC reports pigs and goats as pest species in the area, but the level of hunting activity is very low. The area is relatively less important for pest control activity than other areas in the Mount Richmond Forest Park and holds biodiversity values which are well represented in many other areas (Martin Heine, DOC, pers comm.)

3.9 Girl Guides

The Nelson branch of the Girl Guides owns and operates Paretai, a regional camp at 129 Lee Valley Road, almost 1 km below the confluence of the Roding River. Accommodation includes a major facility sleeping 36, surrounded by additional space for camping, caravan and recreation space.

Guide leader Debbie Caldwell (pers comm.) advises that the Lee River is an important element of the camping experience and is used for swimming, tubing and stream crossing practice. The Lee River is very clean and has better water quality than the Roding River, which is also more slippery underfoot. It is also colder than the Roding. Camp activities can be affected by flood flows in the Lee, with problems in the past few years occurring in November, March and February. There is a small backwater near the camp, and this can be used at many flow levels.

Debbie Caldwell has not noticed any change in general patronage of the swimming opportunities in the Lee valley over the past decade.



3.10 Jet Boating

The Waimea and Wairoa Rivers are rated by Jet Boating New Zealand³ as Class 1 from the Lee confluence to the sea (*“easy boating / suitable for beginners / family boating”*), when *“600 mm above normal on staff gauge in Wairoa Gorge.”*

The Lee is not identified as a jet boating river.

Judith Haycock of the Nelson/Marlborough branch of Jet Boating New Zealand advises that the Waimea River requires a fresh to be boatable and it is not run under normal flow conditions. This is ‘short notice’ boating, with a group organised when conditions suit. The club periodically constructs a sprint course on the lower river upstream from SH60 which is popular, but is not generally affected by flow levels due to its construction method. The river is returned to its natural form after use.



“Nothing giant about this track, but a brilliant day on the Waimea last Sunday. Eleven drivers with five runs each. Water dropped a little but heaps for our little track, you could tell it was designed by a Workman!”
<http://www.nzjetboating.com/yabbse/index.php?topic=8453.msg97841#msg97841>

³ http://jbnz.co.nz/index.php?option=com_content&task=view&id=57&Itemid=97

4 Proposal

The Waimea Water Augmentation Committee proposes to construct a dam in the Lee Valley to create a reservoir of approximately 13 million m³ of water to be used to augment seasonal low flows in the Waimea River, supporting summer water supply demands and the aquatic health of the Lee, lower Wairoa and Waimea Rivers.

This section describes the predicated changes in the river flow regime and the fluctuations in reservoir levels as the basis for determining effects on the recreation resource.

All base data presented in this section is sourced from Tonkin & Taylor Ltd and is presented in the Water Resources report.

4.1 Proposed dam and inundation area

Figure 1 details the location of the proposed dam on the Lee River and the extent of the reservoir with a normal top water level of approximately 197 metres above sea level (masl), which is the current estimated full supply level of the reservoir. This represents approximately 65 hectares of surface water.

Figure 8 illustrates a model of the reservoir surface level between 1958 and 2007, with maximum supply at 197 masl. This shows that during the period, if the reservoir had been in place, there would have been frequent draw-downs of approximately five metres, and less frequent drops of up to ten metres. On three occasions the reservoir would have been substantially emptied in the modelled period. Approximately 50% of the years modelled show some degree of flow augmentation.

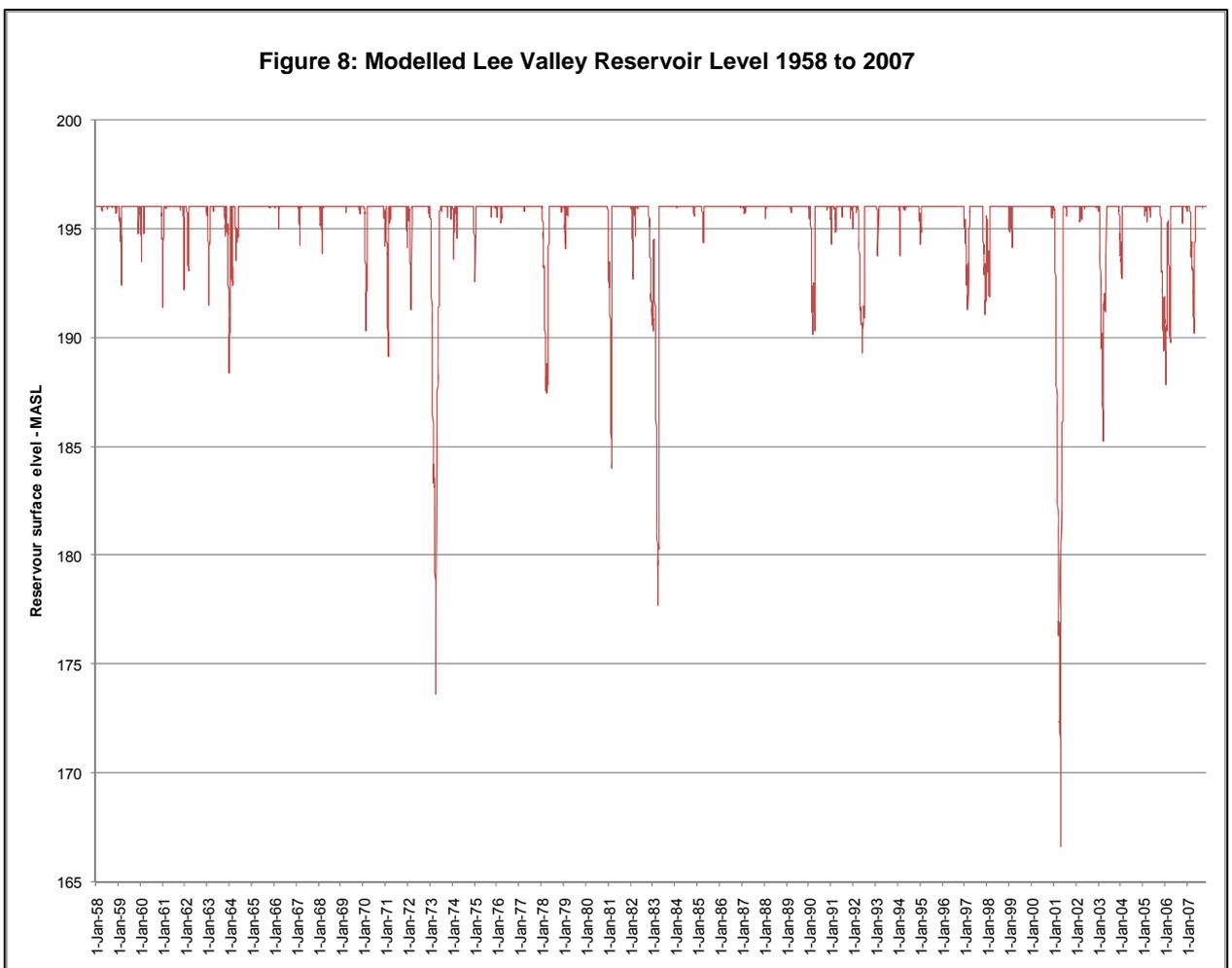


Table 2 provides a monthly analysis of the frequency of specific level ranges in the Lee Valley reservoir. February through to April feature the highest frequency of levels (up to 13% of days) below 192 masl – more than 4 metres below the maximum storage level. During winter and spring, the reservoir is consistently full.

MASL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
>= 195 m	81	68	78	83	89	96	99	100	100	100	95	90
195 -194	8	9	3	2	3	0	0	0	0	0	2	3
194 -193	5	7	2	1	2	0	0	0	0	0	1	1
193 -192	2	6	2	2	0	0	0	0	0	0	1	1
<192 m	4	10	13	11	6	3	1	0	0	0	0	5

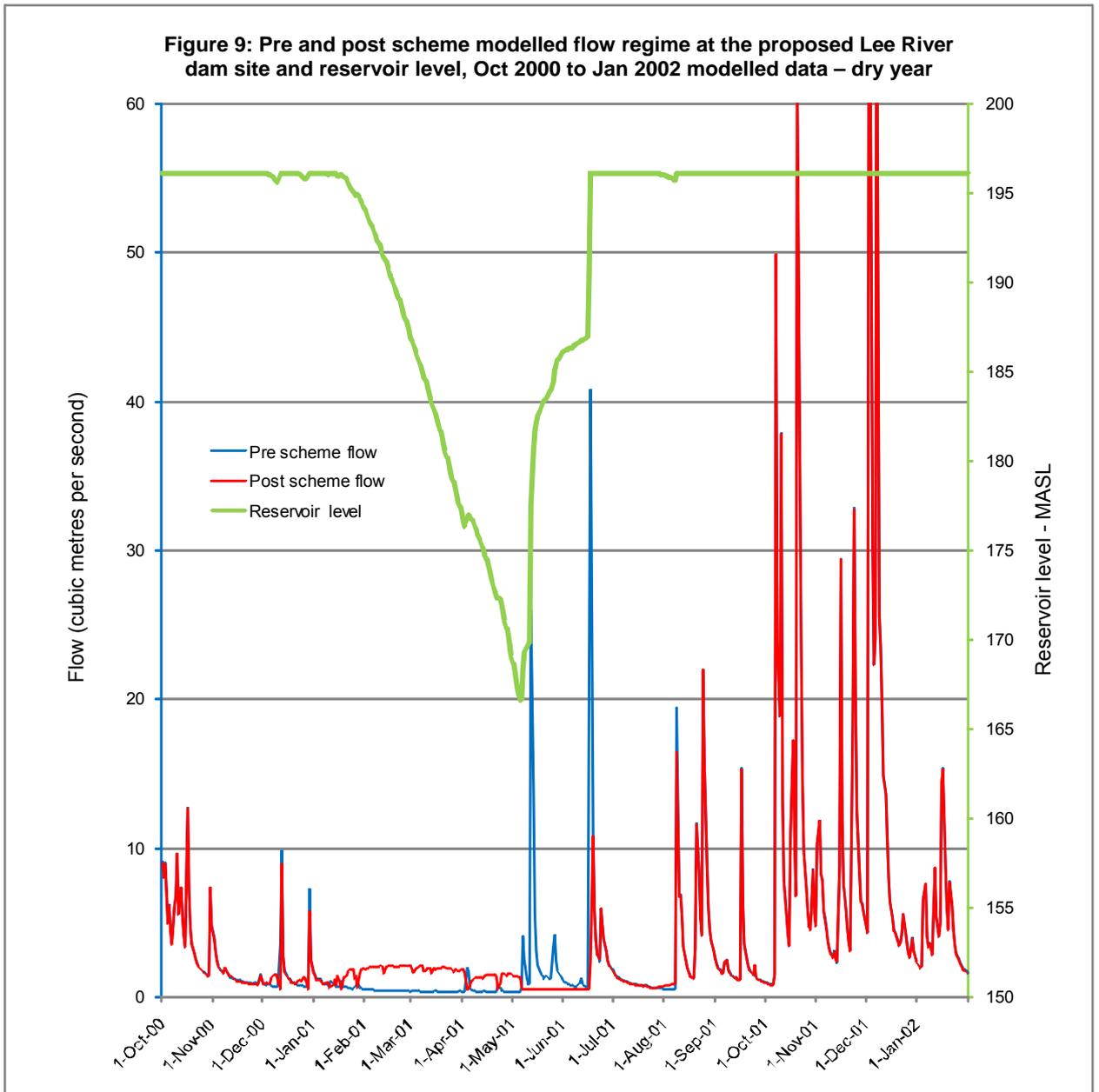
4.2 Flow regime below the dam and reservoir level fluctuations

The current mean flow of the Lee River at the dam site is 3.8 m³/s. The mean flow of the Wairoa River at the Wairoa Gorge, which includes the Lee and Roding River flows, is 16 m³/s. The proposed and modelled river flow regime below the dam, as measured at the Wairoa Gorge, represents a minor change in the normal flow regime. For 74% of the time, using modelled data between 1958 and 2007, flows will be reduced, but 93% of those flows will be reduced by less than 100 l/s (0.1 m³/s). For 26% of the time, flows will be augmented, and 35% of those flows will be increased by less than 100 l/s (0.1 m³/s). All flow increases are less than 2 m³/s, and 80% are less than 1 m³/s. Due to the lower mean flow in the Lee River, these changes will be more apparent in the Lee than in the Wairoa and Waimea Rivers.

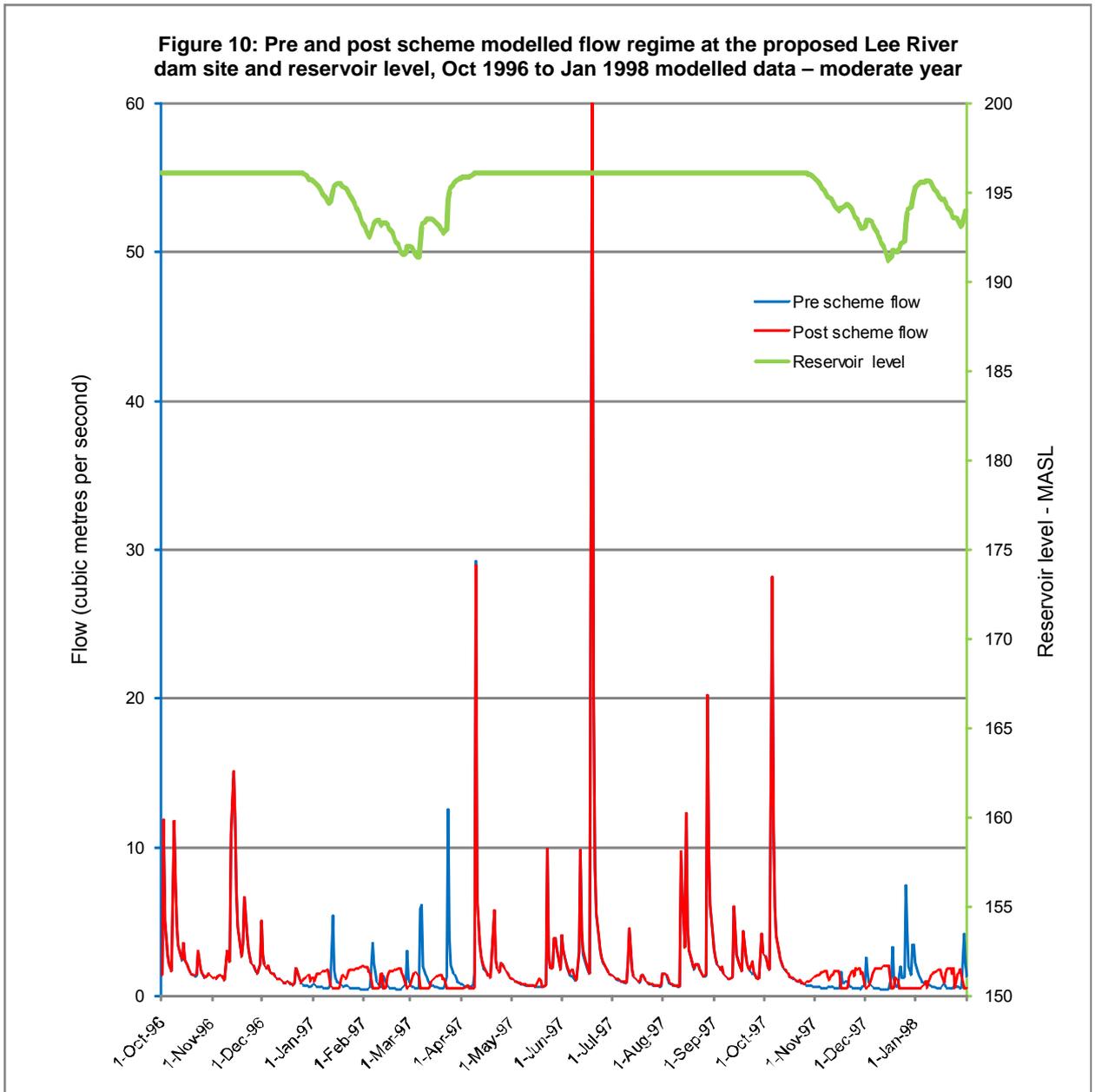
Although flow measurements are not given for the Waimea River, the flow in the Wairoa River as measured at Wairoa Gorge is taken as representative of changes in the flow regime.

4.2.1 Lee River

Figures 9 to 11 depict two-year flow scenarios for selected dry (2001), moderate (1997) and wet (1985) years as measured at the Lee River dam site. Pre-scheme flows represent the measured in-flow to the proposed reservoir, and post-scheme flows represent modelled reservoir outflows. The figures show both the fluctuations in the reservoir level and the flows in the river downstream of the dam (reservoir outflows).

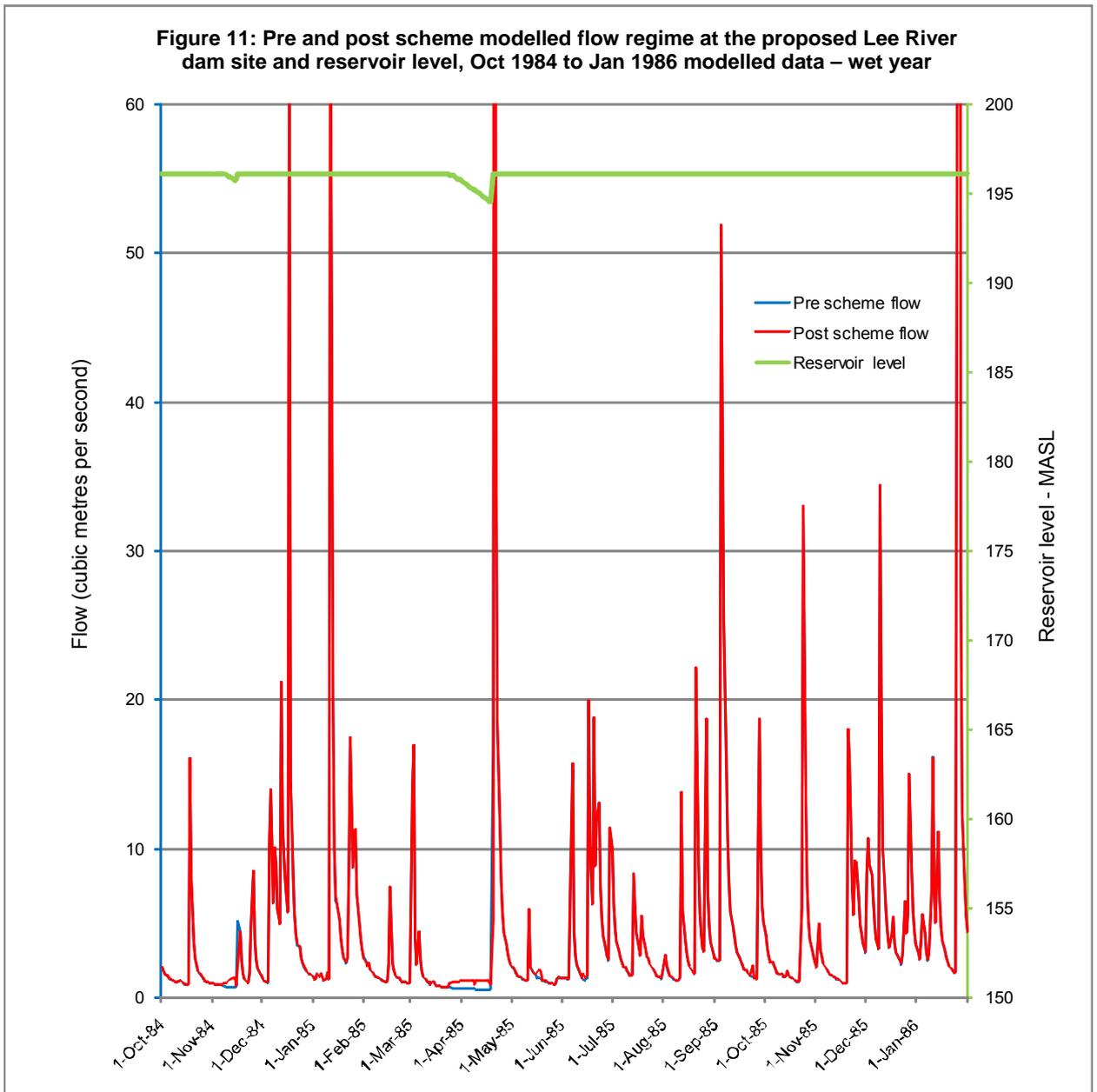


This dry year scenario shows significant draw-down on the reservoir and extended flow augmentation in the downstream river from January 2001 through to May 2001. Storage recovery is evident in the 'harvested' flow peaks during May and June. The maximum increase in post scheme river flow in comparison with pre scheme is 1.76 m³/s in late February.



This moderate year scenario shows minor draw-down on the reservoir and some river flow augmentation in January, February and March 1997, and again in November and December. Storage recovery is shown in the 'harvested' flow peaks during January, February, March and April. Augmented river flows are not required during freshes as the flow in the Wairoa River supports higher flows in the Waimea River. Flows are augmented by a maximum of 1.51 m³/s in late January 1997.

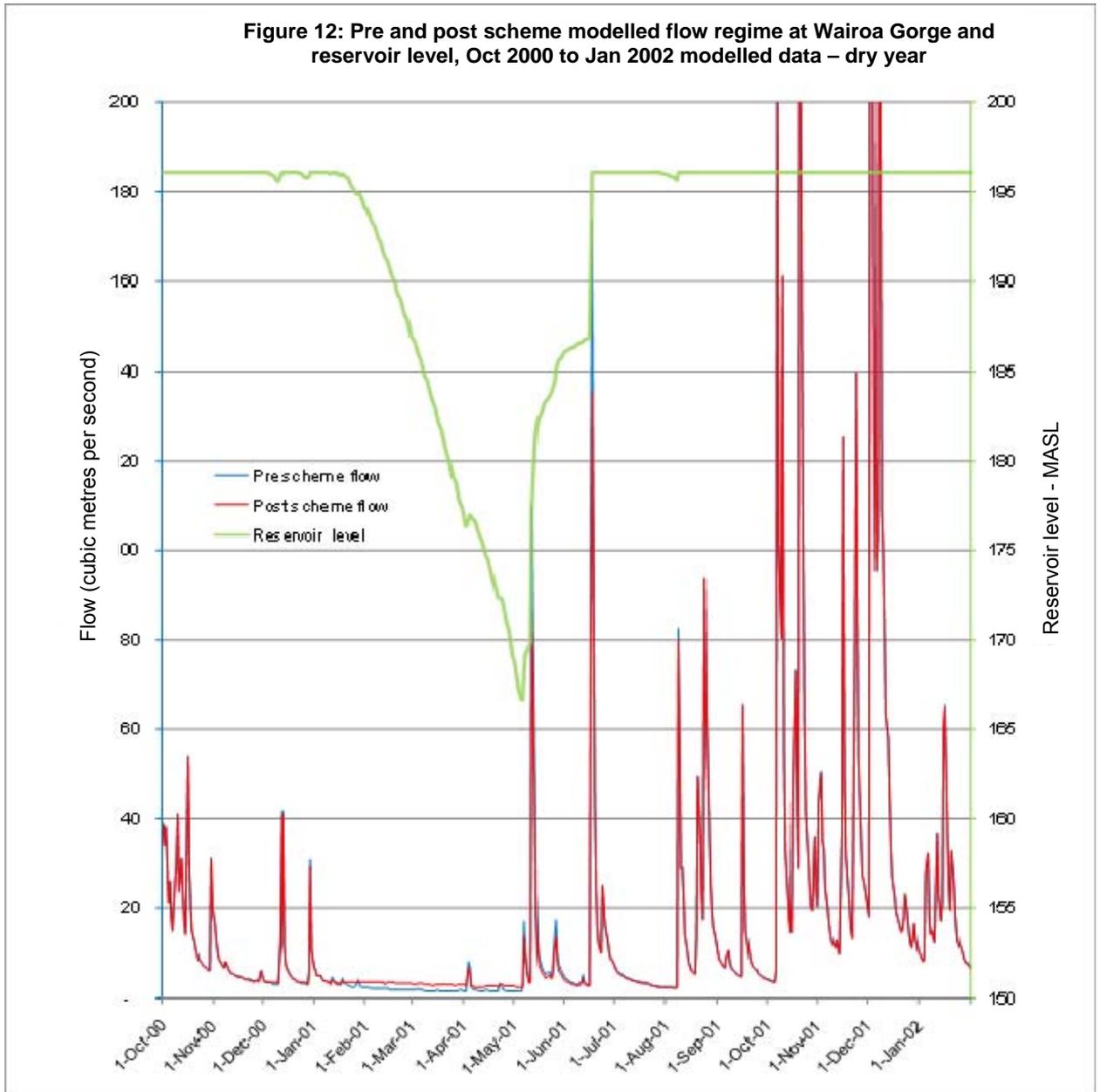
Figure 11: Pre and post scheme modelled flow regime at the proposed Lee River dam site and reservoir level, Oct 1984 to Jan 1986 modelled data – wet year



The wet year scenario shows little draw-down on the reservoir and very minor flow augmentation in the downstream river in November 1984 and April 1985. There is little effect on flows as a result of storage recovery, and pre- and post-scheme river flow regimes are very similar. Flows are augmented by a maximum of 0.60 m³/s in mid-April 1985.

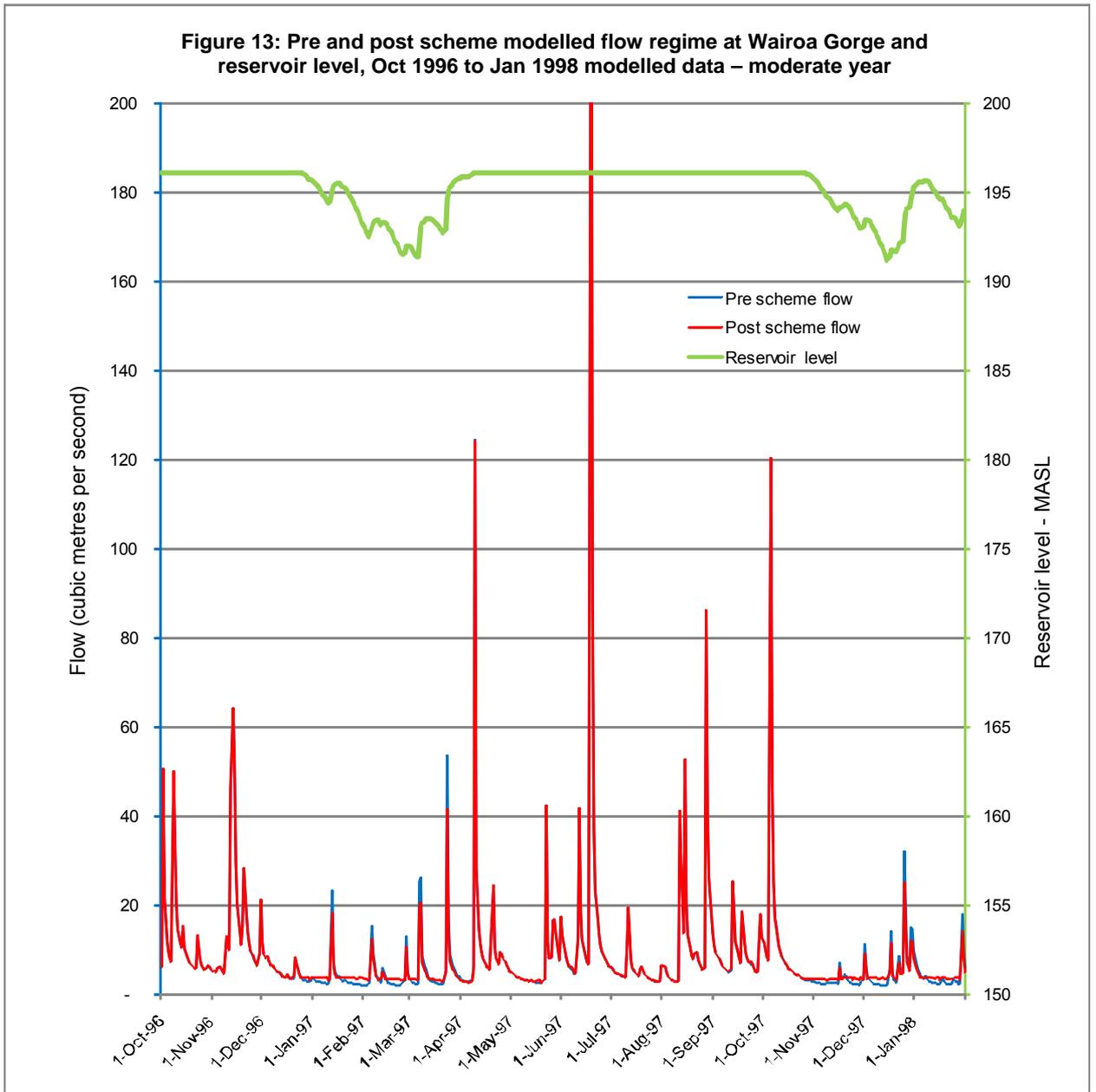
4.3 Wairoa and Waimea Rivers

Figures 12 to 14 depict two-year river flow scenarios for selected dry (2001), moderate (1997) and wet (1985) years as measured at the Wairoa Gorge.

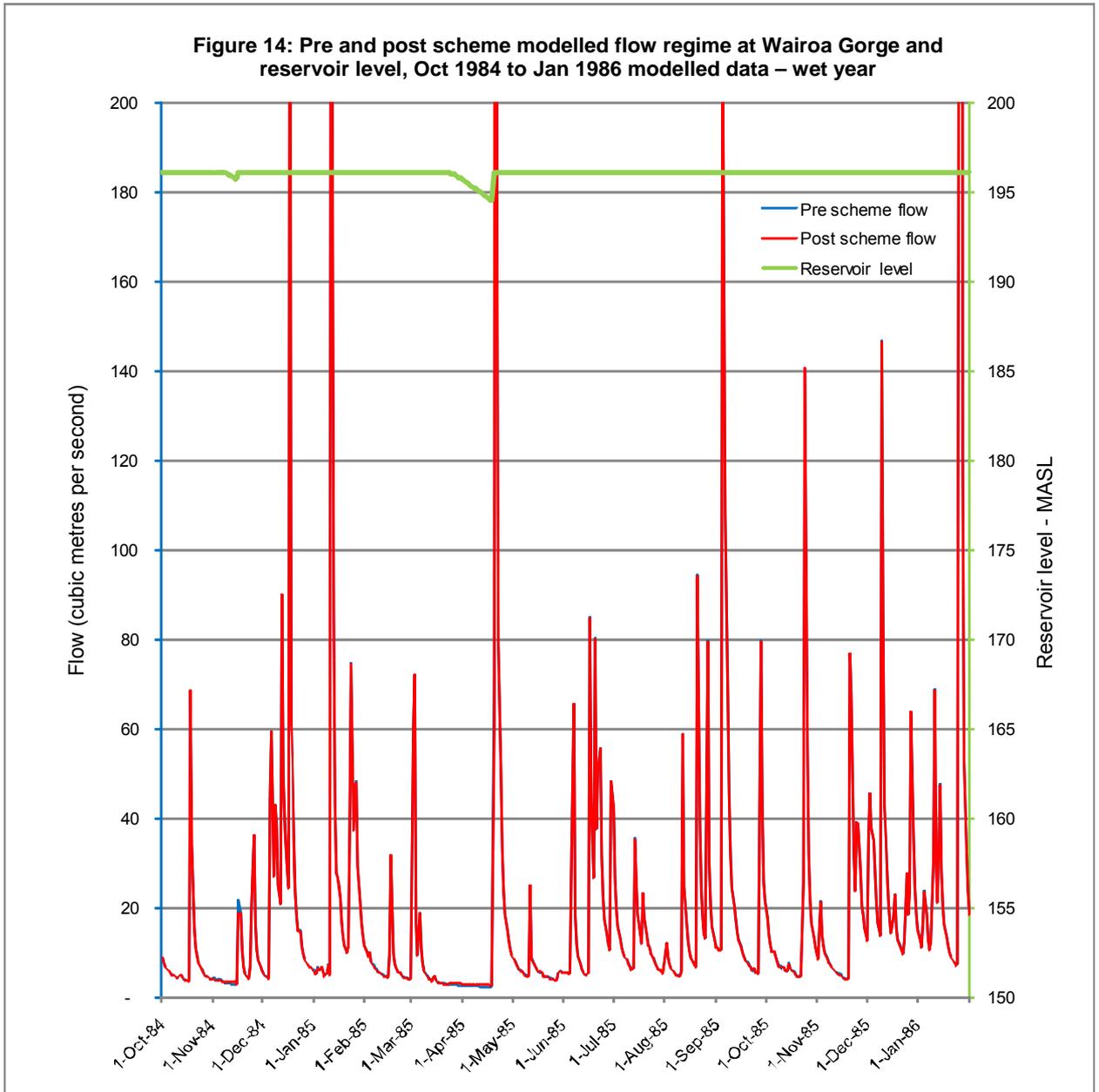


This dry year scenario shows significant draw-down on the reservoir and extended flow augmentation in the Wairoa River at the Gorge from January 2001 through to May 2001. Storage recovery is evident in the reduced flow peaks during May and June.

Figure 13: Pre and post scheme modelled flow regime at Wairoa Gorge and reservoir level, Oct 1996 to Jan 1998 modelled data – moderate year



This moderate year scenario shows minor draw-down on the reservoir and some flow augmentation in the Wairoa River in January, February and March 1997, and again in November and December. Storage recovery is shown in the reduced flow peaks during January, February, March and April.



The wet year scenario shows little draw-down on the reservoir and very minor flow augmentation in the Wairoa River in November 1984 and April 1985. There is little effect on flows as a result of storage recovery and pre and post scheme flow regimes are very similar.

5 Review of significance and summary of effects on existing recreation resources and values

This section summarises the effects of the Lee Valley reservoir, discusses the significance of the activities, and considers mitigation and/or enhancement opportunities.

The following tables summarise the effects of the proposed flow regime on the recreation values of each setting. Several terms applied in the assessment require definitions:

5.1.1 Significance

The Ministry for the Environment's (MfE) publication Flow Guidelines for Instream Values (May 1998, Vol A, p 76) discusses measuring significance thus:

"Measuring the 'significance' of a waterway for recreation is problematic. There is no clear indicator that tells us whether a resource is highly significant or not. A commonly used method for assessing 'significance' is in terms of locally, regionally, nationally or internationally significant:

An internationally significant river would offer some characteristic that attracted interest or use from outside the country (and may therefore be a valuable resource for tourism). There is often a feature that is unique, rare or unusual at an international level.

For assessing national significance, useful methods have been developed for Water Conservation Order hearings. An approach to nationally significant could be based on the 'disappointment factor'. A well-informed recreational visitor to an 'outstanding' waterway (see Water Conservation Orders for such waterways as the Kawarau and Buller) is very rarely 'disappointed' (that is, they know what to expect, and the waterway consistently delivers). Thus, if a resource that consistently satisfies a set of expectations is changed in some way, then the level of disappointment is likely to be extreme. This differs from a resource which rarely meets expectations (that is, it is highly variable or seldom reaches a minimum standard).

A regionally/locally significant river may offer an opportunity that is common nationally, and use is generally only from the regional/local area.

"It should be noted, however, that a waterway in some relatively rare state (e.g. flooding) may offer several special recreation opportunities (such as flood rafting or kayaking, or river surfing (using surf boards on standing waves), or it may only be raftable in flood conditions, for example). If an expectation exists that this opportunity may occur only occasionally, then the rare situation may also be highly valued...."

"Conversely, a resource that is used locally may still be highly significant. An alternative may be found locally or regionally, but any cost incurred in travelling to an alternative may preclude the activity. This would include especially the use of swimming pools in rivers, particularly when located near a population node or institution (marae, outdoor education school, etc)."

The factors discussed in MfE's report form the foundation of the statements of significance made in this report.

At the time of writing this report, a model for assessing the significance of recreation resources is being developed. The author of this report is reviewing various aspects of that work (Hughey et al, 2009).

5.1.2 Level of use

There is no quantification of the total recreation use of the proposal area. However, various sources have been used to provide indications, allowing relative comparisons to be made. In this case, an irregular activity such as tramping the upper Lee Valley is a low use activity, and an accessible and well-documented use such as swimming in the lower Lee Valley is a high use activity.

5.1.3 Scale of effect

The assessments refer to effects that are considered to be 'minor', 'more than minor' or 'significant':

- A 'minor' effect refers to a small change in the recreation setting, but where the original recreational activities can continue. This scale of effect is defined as much by the definition for 'more than minor'.
- 'More than minor' refers to an activity opportunity where a shift in the recreation setting may modify the characteristics of an activity – such as the frequency at which it may be undertaken, the location of the favoured sites, and some of the activity's qualities – but the activity setting retains most or many of its original values and the activity may continue to be pursued. 'More than minor' may also refer to a setting where mitigation measures would, on balance, afford a similar level of recreational benefit to the public as the status quo, although these benefits might accrue to a different group of river users – for example, flat water kayakers as substitutes for whitewater kayakers. However, in this latter scenario the specific effect on white-water kayakers as a group would remain 'significant'. This mitigation approach would also be unlikely to be acceptable in, for example, a nationally significant recreation setting for kayaking. An activity which may continue but has serious limitations on its potential might be described as 'significantly constrained'.
- A 'significant' effect would refer to an activity opportunity that was removed and for which no mitigation was possible (the potential of the setting for that activity would be significantly diminished).

Both 'minor' and 'significant' effects are generally easily identified. The scale of effect within which a 'more than minor' assessment can be made is more broad, and some interpretation of the type and degree of effect is necessary.

5.2 Effects by area

Tables 3 to 5 review the recreation values of each section of the study area and identify the potential adverse effects of the proposal on each value. Potential positive effects are discussed separately in Section 6.

5.3 Summary of recreation effects

The most important potential effects of the proposal are in regard to the swimming options in the lower Lee Valley during infrequent dry years. All changes are, however, within commonly experienced existing flow levels and the net effects are minor or less.

5.3.1 Effects above and within the reservoir footprint

Table 3: Effects above and within the reservoir on the upper Lee Valley				
Activity	Significance	Potential effects	Review	Outcome
Tramping and hunting	Low use tramping and hunting area. Emergency egress from Richmond Range. Difficult terrain. DOC ceasing maintenance on tracks and routes and seeking alternative permanent access options.	Access tracks and logging roads inundated.	Access for tramping and hunting into the upper Lee Valley from the west is dependent on agreement with land managers, and does not currently represent a long-term solution to recreational access to the eastern side of the Mount Richmond Forest Park. Long-term solutions are required and the proposal does not represent an important impediment to that work. Formal access through Lucy Creek is preferred, but is not currently available.	The proposal has minimal effect on the status quo.
Summary of effects	Effects of the proposal on recreational use of the Mount Richmond Forest Park and on the Mount Starveall and Mount Rintoul areas are minimal. The potential exists for various enhancement options via developments for recreation on and around the reservoir.			

5.3.2 Effects below the reservoir on the Lee River

Table 4: Effects below the reservoir on the Lee River				
Activity	Significance	Potential effects	Review	Outcome
Swimming – high use.	Regional significance	Change in setting due to modified flow regime. Reduced frequency of very low summer flows during dry years and moderate years. Limited changes to accessibility. Temporary adverse effects of construction traffic. Short-term potential for increase in periphyton. Short term potential for reduced water clarity.	Swimming in the Lee, Wairoa and Waimea Rivers is an important recreational activity for many people in the Nelson Bays area, and for visitors. Swimming occurs at many levels of flow. The range of changes in flow are within the normal existing flow range. The Aquatic Ecology (Hay et al 2009) report identifies mitigation options via a flushing regime for periphyton.	The net effect of the proposal on swimming in the Lee River will be minor or less. In more than 50% of years flows will be infrequently augmented. In 20% of years flows are occasionally augmented, and in only approximately 6% of years are flows consistently augmented over the summer and spring period. Conversely, some peak flows will be removed while the reservoir refills, but these will occur during rain events when swimming is less likely to occur. Flushing can manage periphyton and water clarity effects are minor and short term.

Table 4: Effects below the reservoir on the Lee River

Activity	Significance	Potential effects	Review	Outcome
Picnicking – high use	Regional significance	Landscape values only, although this activity is heavily correlated with swimming. Temporary adverse effects of construction traffic.	Flow changes within natural bounds.	No direct effect from the operation of the proposal. Temporary adverse effect from construction traffic.
Trout fishing – low use	Locally significant	Potential improvement to trout habitat.	The Lee River features low existing use for trout angling (50 ± 50 angler days in 2007/08 (Unwin 2009)) and the potential improvement in trout habitat in the Lee reported by Hay et al (2009) will only have marginal effects on the catchment's level of angling amenity.	Minor positive effect.
Kayaking – low use	Local significance	Potential improvement to kayaking opportunity in dry years, although augmented flows are likely to be too low for use. Some adverse effects due to infrequent 'harvesting' of flushes and freshes.	The Lee River is kayaked mostly during high flows and receding freshes and floods. The scheme will occasionally remove or reduce the scale of these peak flows while recovering storage in the reservoir. Augmented base flows may enhance some opportunity. Effects are likely to be very marginal considering relative value of Wairoa River.	Minor effects due to low frequency of adverse effects and low value of benefits.
Summary of effects	The lower Lee River is potentially the second most important freshwater recreation swimming resource in the Nelson Bays area after the Maitai River. Recreation values for swimming are greater than those for kayaking and trout angling throughout the catchment. Effects on swimming will be consequent on the frequency of augmented flows and changes to water quality, periphyton biomass and temperature. Augmentation effects will be most apparent in approximately 6% of years when the reservoir is substantially drained to augment base flows. These flows will be similar to those experienced in many, if not most years, and the net effect is likely to be minor or less. Periphyton and water clarity effects are likely to be short-term and periphyton managed via provisions for flushing flows. Any increase in temperature will benefit swimming (the Lee is reported to be very cold).			

5.3.3 Effects below the reservoir on the Wairoa and Waimea Rivers

Table 5: Effects below the reservoir on the Wairoa and Waimea Rivers				
Activity	Significance	Potential effects	Review	Outcome
Swimming – high use.	Regional significance	Change in setting due to modified flow regime. Reduced frequency of very low summer flows during dry years and moderate years.	Swimming in the Wairoa and Waimea Rivers is an important regional recreational activity, although less so than the Lee River. The scale of change in base flows during dry and moderate years will be insufficient to be registered by most river users in comparison with wet years.	Minor changes to the recreation setting. Swimming potential unaltered.
Picnicking, walking – high use	Regional significance	Landscape values only, although this activity is heavily correlated with swimming.	Flow changes within natural bounds.	No direct effect.
Trout fishing – moderate use	Locally significant	Improvement to trout habitat and adult brown trout numbers (+25%)	Maintaining a minimum baseflow of 1.1 m ³ /s in the Waimea River, up from the current minimum of 0.225 m ³ /s, is estimated to improve adult trout numbers by approximately 25% from 15 per km to 19 (Hay et al 2009).	Positive effect.
Whitebaiting – moderate use	Regionally significant	Minor positive effect on koaro habitat reported in Hay et al (2009).		Minor positive effect.
Jet boating	Locally significant	Minor changes in flow regime.	Minor augmentation benefits over extreme low flows for slalom events. Little effect the rest of the time - the Lee contributes 24% of the mean flow at the Wairoa Gorge, and the scheme proposal affects only a percentage of that during a very small proportion of freshes.	Minor positive effect.
Kayaking – moderate use	Regional significance	Potential improvement to kayaking opportunity in dry years, although augmented flows are likely to be too low to make much difference. Some adverse effects due to infrequent 'harvesting' of flushes and freshes.	The Wairoa River is kayaked mostly above the Lee confluence, and is the key white water kayaking resource in the study area. The scheme will occasionally remove or reduce the scale of the peak flows experienced below the Lee – Wairoa confluence while storage is recovered in the reservoir.	Minor effects only.
Summary of effects	The Wairoa and Waimea Rivers are important fresh water recreation resources for swimming, kayaking and trout fishing. Recreation values for swimming are greater than those for kayaking and trout angling throughout the catchment. Effects on adult brown trout numbers in the lower Waimea River are positive. Effects on the Waimea and Wairoa Rivers are moderated by the Wairoa River inflows, and will be less than those on the Lee River.			

6 Recreation enhancements

The scheme creates some new recreation potential in the region. The Phase 1 pre-feasibility study modelling undertaken by the Cawthron Institute resulted in the WWAC adopting an objective to have the scheme provide for a minimum flow of 1100 l/s in the Waimea River at Appleby. Cawthron's Phase 2 work (see Aquatic Ecology report (Hay et al 2009)) has assessed and recommended a minimum flow for the Lee River at the base of the dam. Both of these flows have been determined to provide appropriate instream habitat for the most flow-sensitive species – brown trout – and represent an improvement over the existing situation. Increased base flows in the Waimea River will therefore support an improved recreational fishery.

The reservoir will potentially offer a new lake-based recreation setting. However, access is likely to be limited by private land ownership and ongoing forestry activity.

Leaving aside issues of public access, the reservoir will be sufficiently high most of the time to provide kayak or canoe access into the upper Lee Valley. While the valley itself will retain its difficult walking and hunting options, canoe access would reduce the hardship, and the short paddle itself would offer some enjoyment.

A limited jet boating option will also be created, and water skiing would be possible, although it would be a tight fit. Access by jet craft would require a launching facility, whereas kayaks and canoes can be carried to the shore.

It is unlikely that the setting, considering recreation potential only, will warrant the development of facilities or access for recreation on a permanent or large-scale basis. Recreational users will be more likely to want to satisfy their curiosity rather than develop habitual visiting patterns. The setting may suit some multisport competition (cycle, kayak run) although this would encourage a desire for access for training.

Opening the reservoir for casual use over a confined period of weeks in the early summer may be sufficient to satisfy recreation demand. Recreation protocols would be necessary to ensure compatibility between different users.

Should a quality recreational fishery result, angling access would be of value.

7 Supporting data

This section reviews new and existing data to describe the recreation activities and values of the proposal area. As no quantified survey of recreational users of the catchment has been completed it is necessary to rely on a multi-method approach, and to triangulate between several data sources to support the assessment of effects.

This literature review includes reference to:

- Published recreation-related research on the Waimea catchment,
- Relevant and contemporary popular published guides to recreation in New Zealand,
- Relevant websites detailing recreation opportunities in the study area.

Website references are given in footnotes to the text of the report (all web references are based on searches carried out in January 2009). Full publication references are appended.

The results from these studies and reviews are used to identify the recreational uses of the waterbodies in the proposal area, and to advise the assessment of significance of each activity and each waterway. These assessments are presented in Section 5.

7.1 National inventory of wild and scenic rivers

In 1982 the National Water and Soil Conservation Authority released a draft inventory of wild and scenic rivers and sought submissions. A resulting document was published in 1984 (Grindel 1984), which provides a list of what were considered to be “*nationally important wild and scenic rivers*”. Approximately 40 rivers were identified in the South Island. Locally, the Motueka River was included from its source to the Dove River confluence. No rivers in the Waimea catchment were identified.

The Ministry of Agriculture and Fisheries made a substantial submission to the draft inventory in relation to freshwater angling values (Tierney *et al* 1982). The recommendations made in this document were based on the national anglers surveys carried out between 1979 and 1981, discussed in more detail in Sections 6.3 and 6.4 of this report. Again, no rivers in the Waimea catchment were identified.

7.2 A list of rivers and lakes deserving inclusion in a Schedule of Protected Waters

In 1986 the Protected Waters Assessment Committee released its recommendations for a, “*list of those lakes and rivers which the committee commends as suitable for inclusion in a Schedule of Protected Waters*” (Grindel and Guest 1986). The intention of the study was to advise the then Ministers of Works and Development and Conservation of, “*those waters deserving inclusion in a schedule of Protected Waters that can be attached to the Water and Soil Conservation Bill.*”

The committee’s analysis built on the *National Inventory of Wild and Scenic Rivers* (Grindel 1984), but expanded the scope of assessment from that study’s limit of wild, scenic, recreational and scientific values to include, in addition: fisheries, wildlife habitat, flora, tourism and cultural values.

In terms of recreational values, the relevant assessment procedure for identifying an outstanding waterbody was outlined. This process was drawn, in the main, from the approach used in the *National Inventory of Wild and Scenic Rivers*:

“This category includes those rivers where the existing water regime plays an essential and dominant role in providing an outstanding recreational experience or range of experiences. An area which has an unrealised potential for providing an outstanding amenity may be

considered. While the surrounding landscape may contribute significantly to those experiences the water, the river or lake bed and possibly a narrow riparian strip are the crucial elements for the recreational value. The recreations are mainly instream use (angling, jetboating, canoeing, packfloating, etc) but this committee recognised that picnickers, etc, also went there because of the water, not in spite of the water. An area may be considered outstanding because of one or more of a number of characteristics. It may provide a wide variety of recreational experiences and be used often by people within and, to an extent, outside its region. Or its present level of use may be low but provide an exceptional type of recreational experience, possibly requiring advanced skills so that people from other regions or overseas travel to the area to use it.

“Summary of characteristics

- a The characteristics vary and largely reflect the recreational uses for which the river is outstanding.
- b The river satisfies the recreational needs of a large number of people, or constitutes an amenity for a wide variety of recreational activities, or provides an outstanding recreational experience.
- c A river in this category may be under-utilised at present but have potential for varied, intensive or specialised use.
- d The area may be readily accessible, frequently by road. The surrounding land may show signs of human activity and settlement.
- e The water may be subject to some minor diversions and there may be some development such as bank protection works, but not to the extent that the river regime is controlled.
- f While there may be some waste discharges, the water will usually be of a quality compatible with the recreation activities.

“Rivers are the focus of a great variety of recreational activities. A range of recreational facilities for present and future recreationists must be protected throughout the country.

- a Wilderness and expedition type facilities : generally wild and scenic rivers of sufficient size to permit a range of recreational values.
- b White water : essential for whitewater rafting, canoeing, jetboating.
- c Placid water : essential for boating activities where coastal waters unsuited to boating.
- d Small urban streams : close to populated areas for general recreation and picnicking.
- e Routes as access and as a form of recreation.”

The committee developed a three tier classification (groups one, two and three) to define an order of importance for the waters identified as outstanding. Group one waters were deemed to be the most important. In terms of including the waters in a schedule of protection (p12), “anything less than the first group would provide an inadequate representation. If the Schedule should be bigger, then the second group should be used for making a selection. If the two together are insufficient then the third group should be used for making a selection.”

The Wairoa/Lee Rivers were identified in Group Two with the following description:

Scenic, high recreational use (canoeing, fishing, picnicking). Accessible.

The Motueka River, including the Wangapeka, Baton and Pearse Rivers, were identified as Group One rivers.

7.3 The 2007/08, 2001/02 and 1994/96 National Angler Surveys

The national angler surveys (NAS) completed for Fish and Game New Zealand by NIWA are useful for comparing the level of recreational use of the various waterbodies in the proposal area (Unwin and Image 2003 and Unwin and Brown 1998). Results from the latest survey covering the 2007/08 season will be released in 2009.

The NAS results are based on a national phone survey of a sample of licensed anglers, relying on their recall over a two month period. The sample size (those phoned and interviewed) relative to the target population (licence holders) varied between a high level of coverage in regions with low levels of licence sales (30% in Northland) and a lower level of coverage in areas with higher numbers of sales (5% in the Central South Island). Regional Fish and Game staff managed the respondent interviewing process at the regional level.

The survey process was complex and required a number of assumptions to be used in sampling and analysis, all of which are necessary and inevitable in studies of this complexity. However, without calibration it is impossible to check whether the assumptions and survey technique are in fact offering accurate data. As calibration has not been completed (Martin Unwin, NIWA, pers comm.), the NAS studies should be used only in a relative sense (comparing levels of use, rather than defining actual levels of use at specific sites) as any error is most likely to have been applied evenly across all data sets. This means that while the figure of 80 (± 30) angler days on the Lee River for the 2001/02 period covered by the national angler survey might be unreliable, it is possible to more confidently state that the Wairoa (550 ± 140) and Waimea (240 ± 80) Rivers are substantially more popular, and that the Motueka River (6390 ± 660) is more than seven times as popular for angling as the Lee, Waimea and Wairoa Rivers combined for the 2001/02 survey period.

Figure 15 shows that the Waimea catchment is a minor angling catchment in the Nelson / Marlborough Fish and Game Region. The Waimea catchment contributed 2.5% of angler days in 2001/02 for the Region.

Figure 16 illustrates the distribution of angling effort in the rivers in the northern South Island. The main rivers were the Buller, Wairau and Motueka catchments.

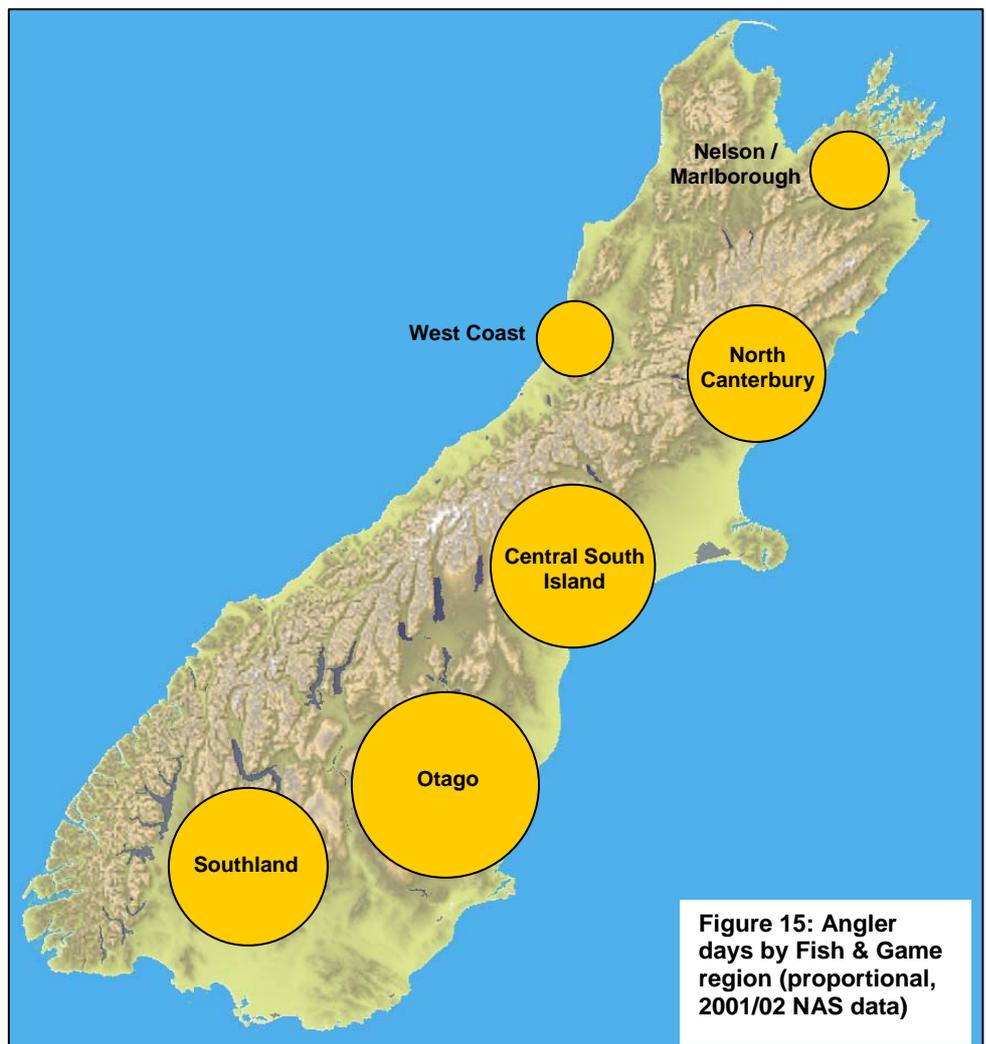


Figure 17 shows the local distribution of angling effort, with the Motueka catchment dwarfing the other local waterbodies.

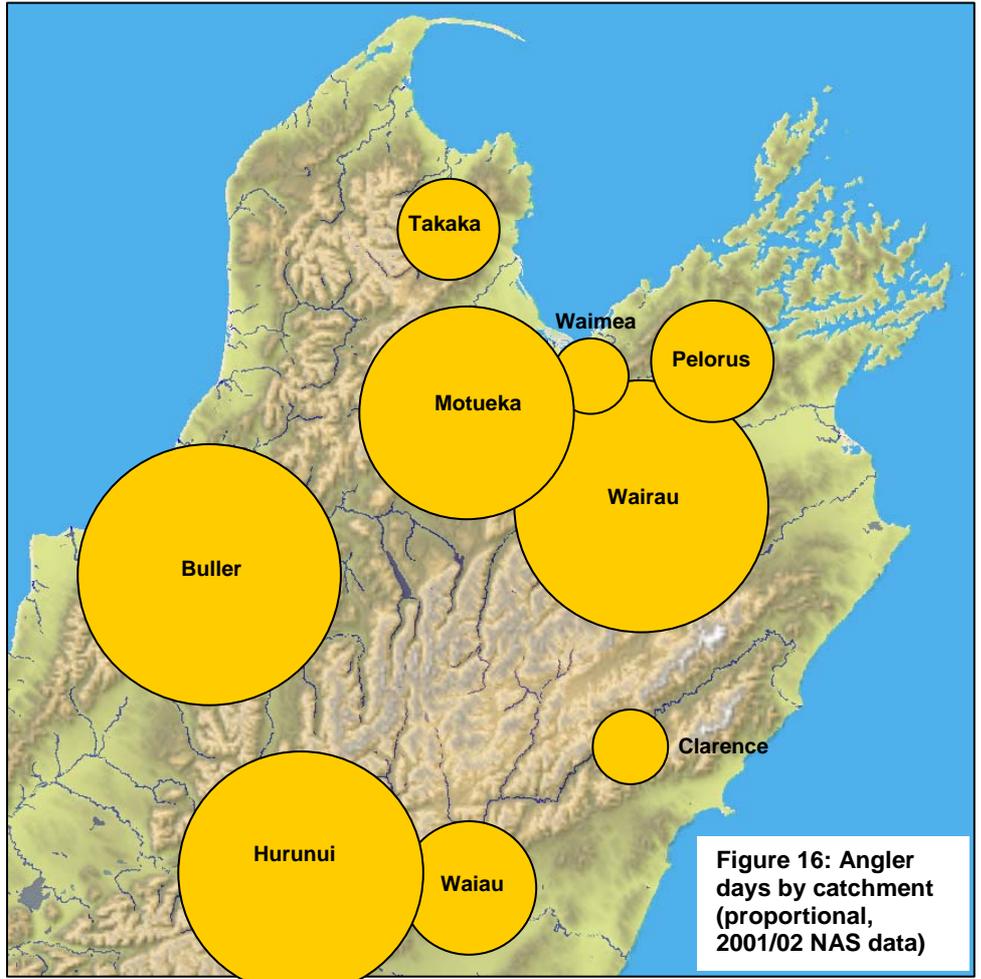


Figure 16: Angler days by catchment (proportional, 2001/02 NAS data)

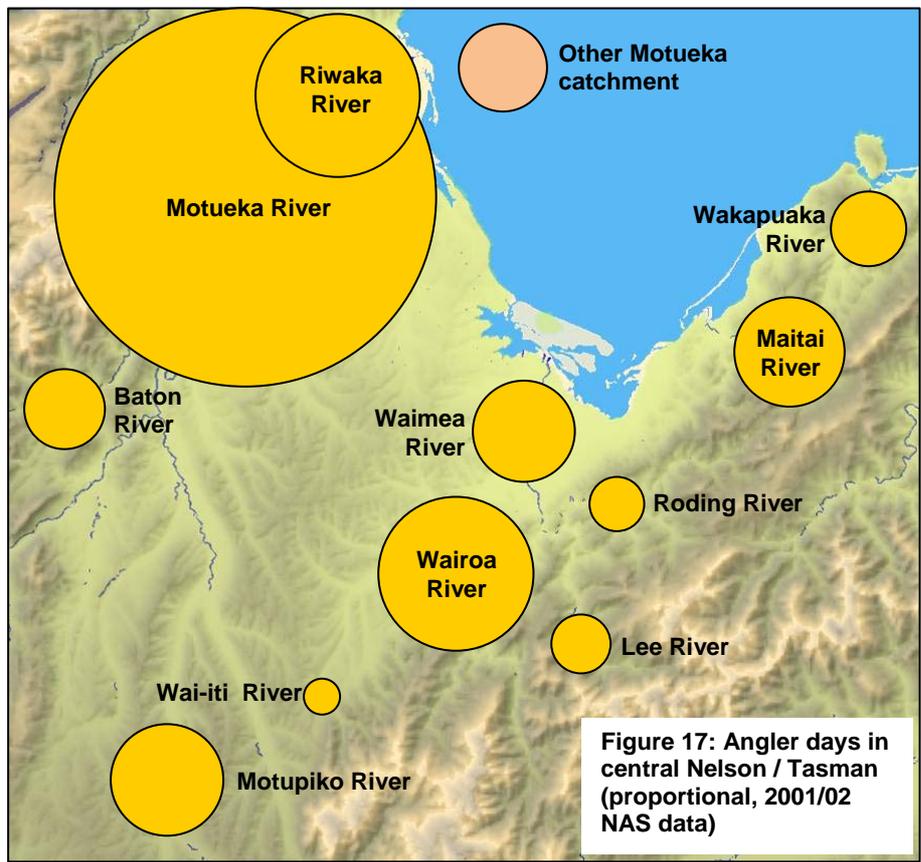


Figure 17: Angler days in central Nelson / Tasman (proportional, 2001/02 NAS data)

7.4 Relative value of Nelson Rivers to New Zealand anglers

In the 1980s, a series of New Zealand Freshwater Fisheries Reports was issued with the aim of identifying and assessing the local and regionally significant angling rivers of each region. These reports were based on the 1979 – 1981 national angler study developed to support the Fisheries Research Division submission on the *Draft inventory of wild and scenic rivers of national importance* (Teirney *et al* 1982). The submission, discussed in Section 6.2, was intended to identify rivers of national significance.

The Fisheries Environmental Report No. 45 (Richardson *et al* 1984) reported on findings of the postal survey in reference to Nelson rivers, which was responded to by 257 anglers from the Nelson region (from a target population of 398 which was randomly selected from 1870 holders of whole season adult licence holders). Of the 257 West Coast respondents, 53 respondents had fished the Waimea River, 35 the Wairoa, 13 fished the Lee River and seven fished the Roding and Wai-iti Rivers. The average annual number of trips reported for trout anglers on the Waimea was 5.8, and 4.0 for the Wairoa. An estimate of 480 anglers was generated for all use of the Waimea River, with an estimate of 2800 annual angler visits, at an average number of visits per angler of 5.9 per year (2800 / 480). For the Wairoa River, the figures were 320 anglers and 1300 angler visits. For rivers with fewer than 15 respondents, such as the Lee, Wai-iti and the Roding, no further analysis of the data was completed.

The Waimea and Wairoa Rivers were given an angling importance grade of three on a five point scale (mid-way between 'not highly valued' and 'very highly valued').

The authors state (p78):

"... we would emphasise that the main point of the NAS was to evaluate the relative [their underline] usage of the rivers in each district, and that any inherent bias in the usage estimates is unlikely to favour any one particular river.

"There has been no attempt to make a rigorous evaluation, which took into account all the variables within each sample, of confidence limits for estimates made in the above manner. Apart from the statistical difficulties involved, any such confidence limits would be only approximate because of the two assumptions above [that respondents and non-respondents had similar characteristics, and those anglers who did not specify which rivers they used had the same patterns of activity as respondents who did name their rivers]."

The narrative relating to the Waimea River is (p28):

The Waimea River flows north from the confluence of the Wai-iti and Wairoa Rivers. It is short (8 km) and enters Tasman Bay just west of Nelson city. The Waimea attracted the fourth highest number of anglers and visits in the district, undoubtedly because of its proximity to Nelson and its very easy access. However, respondents gave the attributes of scenic beauty, solitude, and catch rate some of the lowest ratings in the district and, over all, judged the river to be of average value. In addition, the trout in this river were fairly small, especially compared with those landed from other rivers in the district. Occasionally large sea-run trout (up to 5.5 kg) are caught in the Waimea (A.L. Savage pers. comm.) and this, no doubt, contributes to the river's attractiveness to anglers.

When information on the most popular sections (middle and lower reaches) was compared the lower reaches were rated more highly in almost every respect, and it was this section which attracted most effort. Unlike in other Nelson river fisheries, spinners were by far the most frequently used lure in the Waimea fishery. The only recreational pursuits that were combined with angling were picnicking and swimming, the latter being quite popular in the

lower reaches. Apart from two remarks about improving trout stocks in the middle reaches, anglers' comments were concerned with shingle extraction, low catch rate, and the crowded conditions of the Waimea.

Over the last decade, a transition from pastoral and mixed crop farming to intensive horticulture has led to a substantially increased demand for irrigation, to the point where water resources of the Waimea Plains are fully committed (Green and Shirley 1982). The Nelson Catchment and Regional Water Board have instituted a management plan for the Waimea, Wairoa, and Wai-iti Rivers, which makes provision for the supply of up to 0.7 m³/s to the Waimea East irrigation scheme. However, water extraction must at no time reduce the minimum flow in the Wairoa or Waimea Rivers below 0.225 m³/s. Lowest flows in the Waimea usually occur about 1 km upstream of the Appleby bridge. The flow from the Wairoa gorge gradually decreases to the bridge and increases again from there to the sea. When proposed developments on two other popular rivers close to Nelson (Maitai and Wairoa) go ahead, the Waimea could be subject to even more angling pressure. At present, it seems unlikely that the Waimea East irrigation scheme alone will have a significant impact on the Waimea fishery.

The narrative relating to the Wairoa River is (p29):

This flows off the Richmond Range and into the Waimea on the Waimea Plains close to Nelson. The river flows through a gorge for most of its length and, as a result, access was not thought to be as easy as it was to the Waimea. However, both scenic beauty and solitude were rated more highly for the Wairoa than for the Waimea.

Anglers on the Wairoa reported a low catch rate of average sized trout, the fish being comparable in size to those caught in the Riwaka and Motueka catchments. Some respondents emphasised the catch rate and size aspects with comments such as: "under-populated", "few fish", "no fish caught", and "fish few but large". The majority of angling occurred in the middle reaches and anglers used all angling methods, but preferred nymphs and spinners. Over 50% of the respondents combined a picnic with angling and 40% also went for a swim.

A combined irrigation and urban water supply dam on the Wairoa has been proposed and promoted by the Nelson Catchment and Regional Water Board. The dam (40-70 m high) would provide an irrigation supply for up to 8000 ha of the Waimea Plains (Winn and McBryde 1978). Although this scheme is still several years away, provisions for residual flows and/or fish passage need to be discussed in the early planning stages. The Wairoa, though not a particularly highly valued river, was popular with local anglers and, therefore, may be worthy of some protection of its fishery.

And of the Lee River (p30):

Another Waimea tributary, the Lee River, is physically very similar to the Wairoa though it has a lower flow. The Lee attracted only one third as many respondents as the Wairoa, but the anglers' assessment of the two rivers was nearly identical. The headwaters and middle reaches were the most popular reaches fished.

The report concludes by identifying four rivers in the Nelson region of national importance: the Motueka, Upper Buller and the Sabine and D'Urville Rivers. The Waimea River was identified as locally important for its recreational values associated with high use, close to home and exceptional access.

7.5 Recreation survey of coastal and inland waters in the Nelson Bays region, 1982

An intercept survey of 343 residents on the streets of Nelson and Tasman was completed in January 1982 to identify the general recreation patterns of residents in coastal and inland freshwater settings in the region (Orr 1982). The conclusions in reference to the Lee, Wairoa and Waimea Rivers were:

7.5.1 Lee River

In terms of the percentage of the sample making at least one visit in 1981, the Lee river was the second to most popular fresh water area [after the Maitai River]. 51.0 per cent, or 168, of the sample visited one or more times. The percentage of respondents making 1-5 visits was 36.4, slightly higher than for the Maitai River. But the percentages making 5-10 visits and 10 (or more) visits were lower, at 5.0 and 4.7 respectively.

The Lee River was also second in terms of respondents' preferred fresh water area with 16.3 per cent, or 56, liking it the most. As with the Roding, there were relatively few references to the Lee's proximity to respondents' residence (9). There were 14 references to peacefulness/few people. Most significant, however, was the river's appeal as a swimming spot. Thirty respondents referred to this. Again, the vast majority of these favouring the Lee came from Nelson City and environs.

7.5.2 Wairoa River

The Wairoa river attracted visits from only 30.6 percent of the sample in 1981. On this criterion, it was the sixth to most popular fresh water area of the ten dealt with here. 26.5 percent of the total sample made 1-5 visits, but only 2.0 percent 5-10 and 10 (or more) visits.

In terms of people's first preferences, the river gained 'the support of 3.5 percent. This was on a par with the Aorere River. Only the Waimea river was less favourably regarded. What little support the Wairoa did attract was mainly attributable to its peacefulness (6 references) and fishing (3 references). As with the Maitai, Roding and Lee Rivers, this support was almost entirely from residents of Nelson City and Environs. 28.0 percent of those surveyed made at least one visit, over against 17.9 percent from the Coastal Strip and 7.1 percent from Golden Bay. No respondent from any of the more inland regions visited the river in 1981

7.5.3 Waimea river

The Waimea river, although closer to Nelson City, was slightly less popular than the Wairoa in terms of the number of people in the sample who made at least one visit in 1981 – 100 or 29.2 percent. 21.3 percent made 1-5 visits, but 3.2 percent made 5-10 visits and 4.7 percent 10 (or more) visits. This indicates that while the Waimea river has less local users than the Wairoa river, those who do use it do so more intensively. Again the river's location probably largely account for the regional pattern of visits. 32.8 percent of respondents from Nelson City and Environs, 23.1 percent of those from the Coastal Strip and 20.0 percent of those from Moutere made at least one visit. But only 7.1 percent of Golden Bay residents surveyed visited, and no one from Waimea or Murchison. It should be borne in mind that the two Waimea respondents lived well inland, at Tapawera and Thorpe respectively.

7.6 Waimea Catchment recreation survey, 1986

The 1986 Waimea Catchment recreation survey (Fitzgerald & Shaw 1986) relied on a comprehensive survey technique, including:

- Headcounts at various times to assess numbers of visitors,
- Traffic counters on main access roads,
- User survey from questionnaires distributed to main recreational sites and posted back,
- Riverside interviews of users,
- Electoral roll postal questionnaires,
- Postal survey of residents of river valleys.

7.6.1 Lee River

Vehicle and head counts gave an estimate of a maximum of 3000 visitors per day to the Lee River during the peak visitor days in January, with a summer usage total of 91,200 user days. Self-reported use levels via questionnaires gave an estimate of more than double, and up to treble this figure. Half of summer visitors were reported to be visitors to the region, but contributed only 8.9% of the total summer use. That is, locals visited relatively frequently, compared with the few repeat visits by out-of-town visitors. December, January and February were the busiest months. The lower Lee River was shown to be the most popular freshwater recreation setting in the Waimea Catchment. The study concluded in reference the Lee River:

The Lee generally provides a social recreational experience, rather than an individual experience such as fishing. It is important for family groups, groups of friends and mixed groups, which average 6-8 people. Although quite large groups, up to 20-25, also used the valley, perhaps, because the facilities available could cope with such larger parties.

The main summer recreational activities generally fall into two types: river-based recreation, with swimming being by far the most popular; and river-environment recreation, with picnicking and barbequing the second most popular activity overall. Sunbathing, which complements both these activities, was the next most popular activity. During the winter the level of river-based recreation was very low, while river-environment activities were still undertaken, but at a reduced level.

Most people went to the rivers for recreation (active and/or passive). Most who used the Lee were drawn by the quality of the swimming holes while the natural beauty, tranquillity and facilities available were also significant reasons. In addition the privacy and uncrowdedness of the upper Lee area was important. All survey results agreed that the presence of sandflies was the greatest dislike. Questions on suggested improvements indicated desires for improvements to the toilets and that the river be kept in its present natural state.

7.6.2 Wairoa River

Vehicle and head counts gave an estimate of a maximum of 450 visitors per day to the Wairoa River during the peak visitor days in January, with a summer usage total of 47,000 user days. Self-reported use levels via questionnaires gave an estimate of treble this figure. Thirty percent of summer visitors were reported to be visitors to the region. The study concluded in reference the Wairoa River:

By comparison with the other rivers, the Wairoa had the highest proportion of persons over 50 and particularly 65 and over. Family groups tended to predominate over groups of friends and mixed groups, with the average sized group being 5 people.

Generally, swimming is the most popular summer activity, followed by the more passive pursuits of picnicking, driving for pleasure and enjoying the scenery. During the rest of the year, use is mainly car-orientated sight-seeing and picnicking, although walking is also important. For all the rivers in the study, the Wairoa has the highest level of participation in fishing. As expected, residents of the valley have a high level of use of the river and its environs.

The most popular stretches of the Wairoa were, as expected, the two sections with recreation areas and public access to the river section 6 (which includes Max's Bush) and the upper Wairoa, section 8.

The users postal survey revealed that 30% of the Wairoa users were making their first visit, and all except one were visitors to the Nelson region. Forty percent of the responses from those interviewed on why they used the Wairoa, related to the qualities of the river and its environs, while recreation accounted for 58%.

Max's Bush, in section 6, is considered a convenient uncrowded spot with good swimming and a tranquil atmosphere for relaxing. The upper sections (7&8) are regarded as having good swimming holes and qualities of "wilderness" areas – providing peace and quiet, beauty and freedom from human intrusion.

The Wairoa users had similar dissatisfactions with the sandflies, access road, litter and facilities. The main improvements suggested related to keeping the river in its natural (present) state in the establishment of toilet facilities in the Max's Bush area. Improvements to the gorge road and picnic/barbeque facilities at the present recreation areas were also suggested.

7.6.3 Waimea River

Vehicle and head counts were not carried out for the Waimea River, and self-reported use levels via questionnaires gave an estimate of 250,000 annual visit days – which was treble that estimated by Orr (1982). The study concluded in reference the Wairoa River:

Most of the recreational users of the Waimea tend to live comparatively close or have easy access to the river, ie Waimea has more localised appeal than the Lee, Roding and Wairoa. Visitors to the region tend to be very limited users of the rivers. The ages of Waimea users is representative of the study area population. Families were the predominant type of user group, however nearly a quarter of all users visited the river on their own. The average size of the groups was 6-7 people, the highest average for all the rivers in the study. Swimming is the most popular summer activity, followed by the complimentary passive activities of sunbathing and picnicking. Fishing attracts a relatively high level of participation and is the most popular off-season activity for Tasman users, while Nelson people use the river area for walking. Levels of use are comparatively low during non-summer months. Most summer use was on the weekend in the daytime.

The Appleby picnic area (section 1) was the most popular part of the Waimea River. It was the third most popular spot, overall in the study, in the users postal survey and the Tasman electoral survey. The Nelson electoral survey respondents rated section 2, above the Appleby Bridge as their third favourite section. The most common reasons for using the Waimea River were the quality of the fishing, close proximity to home or holiday accommodation, the swimming holes and the tranquillity of the area. The main

dissatisfactions mentioned were the presence of the Appleby rubbish tip beside the river and the litter and broken glass, and at some sites, a lack of shade and periodic overcrowding. Suggestions were made that toilet, picnic and rubbish disposal facilities could be improved.

7.7 Trout abundance in New Zealand Rivers

Teirney and Jowett (1990) report on trout surveys completed via drift dives of 158 river reaches nationally (commonly called the '100 rivers survey'). Local rivers surveyed included the Riwaka (1988), Motueka (1985), Baton (1985) and Wairoa (1987) Rivers. The results for the four sites are shown in Table 6.

Site	Visibility (m)	Brown trout / km			Biomass (kg / km)
		Large	Medium	Small	
Riwaka at Moss Bush	9.2	70	26	15	89.4
Motueka at Woodstock	7.2	94	123	58	149.6
Baton above concrete ford	4.5	16	24	17	26.5
Wairoa at gorge	10.0	16	29	22	28.6

The survey results have been grouped by the likes of Goldsmith and Ryder (2006) to compare rivers of high, medium and low trout abundance relying on trout biomass (kg per km) as the base measure. The Motueka and Riwaka Rivers have 'high' trout abundance: this category ranged, nationally, from 301.9 kg/km on the Buller River at the Lake Rotoiti outlet, to 35.1 kg/km on the Rangitikei River at Springvale.

7.8 Sustainable Water Programme of Action

The Ministry for the Environment (MfE) is completing a national review of the sustainable management of waterbodies to inform government policy. Various studies have been commissioned by MfE to identify and quantify various freshwater values, and a process of consultation completed.

Three studies commissioned by MfE are relevant to this exercise.

7.8.1 Potential waterbodies of national importance for recreation value

The Motueka and Aorere Rivers were identified in the Nelson and Tasman region by MfE within the report, *Potential Water Bodies of National Importance for Recreation Value* (MfE 2004a). The Motueka River was identified for angling values and the presence of a Water Conservation Order and the Aorere for whitebaiting values.

The MfE study appears to be based on a weak methodology (discussed below), and its findings would be open to challenge – although the report is designed to be a catalyst for discussion rather than to provide a conclusive analysis.

Six criteria were used to identify potentially national significant waterbodies:

- That the NAS results for the 2001/02 and/or 1994/96 showed at least 10,000 angler days for the waterbody: *The Motueka featured 10,700 in 1994/96.*

- Of a national telephone survey (Fink-Jensen *et al* 2004a) of just over 1000 'freshwater recreational users' at least ten⁴ respondents had to report use of a waterbody. Lake Taupo topped the list with 250 references, followed by the Lake Rotorua with 55 and the Lake Wakatipu at 52. For most waterbodies this represents a very small sample from which to draw any conclusions. Also, the response rate for the survey was only 21.5%, so the sample cannot be considered to be random: *Five respondents noted the Motueka River, two the Wairoa and one the Lee River. No data were provided on these respondents.*
- Selected recreation groups were requested to respond to an internet-based survey to identify significant waterbodies (Fink-Jensen *et al* 2004b). The threshold was a mention of a waterbody by more than ten people. Canoeists and kayakers were reported by MfE to be well-represented in this survey: *Two respondents noted the Motueka River as a recreation destination. No other local rivers were identified.*
- The presence of a water conservation order: *Relevant to the Motueka River only.*
- Priority listing as a 'Wetland of national importance to fisheries' in Davis 1987: *Not applicable.*
- Reporting of significance for whitebaiting by a number of key informants: *Relevant to the Aorere only.*

7.8.2 Waters of national importance for tourism

The Ministry of Tourism used the results of their International Visitor Survey (2002 data) and Domestic Travel Survey (2001 data) to describe how tourists use freshwater resources in New Zealand, and to locate their activities. The report uses these data to develop a list of waterbodies considered to be of national importance for tourism (Ministry of Tourism 2004).

For international tourists, the Ministry identified the top eight locations of importance for freshwater-based activities undertaken by international visitors, including those locations where more than 20,000 visitors participated in the activity in 2002. The regions in decreasing order of importance were:

- | | | | |
|---------------|------------|-----------------|-------------------|
| 1. Queenstown | 3. Rotorua | 5. Te Anau | 7. Hanmer Springs |
| 2. Waitomo | 4. Taupo | 6. Christchurch | 8. Auckland |

The most popular activities for these visitors included jet boating, visiting glow worm caves and going on scenic cruises.

The data from the Domestic Travel Survey (DTS) showed some parallels between international and domestic visitors and their preferred freshwater locations. The Ministry selected the top four locations from the DTS data, as these were the only statistically significant locations. The top locations for freshwater activity by domestic tourists were:

- | | | | |
|----------|---------------------|-------------|------------|
| 1. Taupo | 2. Hamilton/Waikato | 3. Auckland | 4. Rotorua |
|----------|---------------------|-------------|------------|

No Nelson or Tasman rivers were identified for their use values. However, the assessment listed a number of waterbodies that may be of national importance for tourism due to their scenic values, including Pupu Springs (Waikoropupu) and Nelson Lakes. No other regional waterbodies were identified.

⁴ The MfE report states 'over 10 people' as a measure in its text (p9), but uses ten (more than nine people) as the threshold in its summary table which presents the relevant rivers.

7.8.3 Sustainable Water Programme of Action: Potential water bodies of national importance. Technical Working Paper

This MfE (2004) report summarises the findings of a variety of studies into the significance of the nation's waterways, including the two studies listed above (although the technical report apparently pre-dates those).

The technical report notes the following 'assumptions and limitations' in the method applied to identifying waterbodies of potential national significance for recreation:

- *Some of the initial list (survey, angling and whitebaiting information) is based on numbers of people using water bodies for recreational activities. This approach assumes there is a correlation between the number of people who visit a water body and its value for recreation. Under this approach the very special and remote places that are not highly visited may be under represented.*
- *Some of the initial list is based on dated reports or unclear information.*
- *Comparison across the different sources of information may not be a valid approach.*

The technical report lists the Aorere and Motueka Rivers as of potential national significance for recreation.

7.9 New Zealand Recreational River Survey

Although almost 25 years old, the New Zealand Recreational River Survey (Egarr and Egarr 1981) is often quoted in recreation assessments as it is the only national analysis of recreational river values available based on actual site visits. As a result of the increased use of plastic kayaks, the growth of commercial rafting and the development of creek boating, many of the assessments made in the study are out of date. However, they can assist when identifying the significance of a waterway at a national scale.

The survey grouped river sections according to four categories:

Category A: Consisting of all rivers with:

Exceptional recreational value and exceptional scenic value.

Category B: All rivers with:

Exceptional recreational value and impressive scenic value,
High recreational value and exceptional scenic value.

Category C: All rivers with:

Exceptional recreational value and picturesque scenic value,
High recreational value and impressive scenic value,
High recreational value and picturesque scenic value,
Exceptional recreational value and moderate scenic value.

Category D: All rivers with:

High recreational value and moderate scenic value,
Intermediate recreational value and exceptional scenic value,
Intermediate recreational value and impressive scenic value,
Intermediate recreational value and picturesque scenic value.

The Waimea River was assessed to be of 'low' recreational value, and the Wairoa and Lee Rivers were both of 'exceptional' recreation value. Part III of the publication gives a complete description of all rivers in the catchment (p145ff):

168.0 WAIMEA RIVER CATCHMENT The Waimea River system is a complex network of small streams and rivers flowing from the bills to the south-cast of Nelson and onto the

Waimea Plains where they converge to form the Waimea River. The main components of the system are the Wai-iti and the Wairoa Rivers. The main feeders of the Wai-iti are Pigeon Valley Stream and the Eighty-Eight Valley Stream. The feeders of the Wairoa are the Roding River, Hackett Creek, and Lee River. The Waimea is important to the region as it feeds the Waimea Plains water supplies which form the basis of the horticultural irrigation. There is a proposal to construct a dam on the Wairoa to provide better flow for irrigation but unfortunately this scheme will destroy the present recreational patterns in the area. The Wairoa and the Lee are very heavily used by the river floaters.

168.1 WAIMEA RIVER

Location: The Waimea River flows north from the confluence of the Wai-iti and Wairoa Rivers. It enters Tasman Bay south of Rabbit Island.

Length: 5km. *Average gradient:* 1:425 2.4m/km.

Recreational use and scenic description: The Waimea River flows over the shingle-based Waimea Plains. The plains are predominantly dairy farms and orchards with some cropping. Small willows line the banks and from the river one can observe the surrounding countryside. Stopbanks enclose the river as it flows peacefully over shallow shingle. The river could be jet boated but is not used, mainly because it is so similar to the larger and better lower Motueka River. Because of the shallow water and lack of rapids, it is seldom rafted, drift-boated or canoed. The river is most used for swimming, particularly at Appleby Bridge.

Scenic value: Uninspiring. *Recreational value:* Low.

168.2 WAIROA RIVER

Location: The Wairoa River flows north off the Richmond Range through a short gorge to link with the Waimea River at Brightwater on the plains

Length: 41km. *Average gradient:* 1:105 9.5m/km.

Recreational use. Motor launches, jet boats: Too shallow. *Drift boats:* Smaller drift boats use the gorge. Some rapids are very steep and tight and have to be portaged. *Rafts:* Some use, mostly by smaller rafts. *Canoes/kayaks:* Considerable use, especially in summer during the long evenings. *Good quality white water very close to Nelson. Grade 3 water. Not greatly used below the Lee confluence. Pack floating:* Very high use by lilo and tyre floaters above the Lee. *Swimming:* Numerous large, deep pools. Considerable use.

Scenic description: Above the meeting of the right and left branches the Wairoa is very steep and shallow. Most trips begin where Pig Valley Stream flows into the river. The Wairoa flows in a deep gorge from the Pig Valley Stream confluence over difficult bouldery rapids which become easier further down the gorge. Boaters may launch at a position comparable to their ability. The gorge has a margin of totara, scrub and gorse along its rough rock walls but this bush is not always apparent from water level. Some small willows grow among the rocks at water level. The hills are cleared of bush cover but contain a significant amount of scrub, fern and gorse. The river bed reverts to shingle as the gradient eases, becoming placid below the Lee River confluence.

Scenic value: Picturesque. *Recreational value:* Exceptional.

168.3 LEE RIVER

Location: The Lee River originates on the Richmond and Bryant Ranges to the east of the Wairoa. It flows north and joins the Wairoa before it reaches the Wairua Plains.

Length: 28km. *Average gradient:* 1:105 9.5m/km.

Recreational use: The Lee River is similar to the Wairoa except that it has a lower flow. The gorge walls are much lower so that it is easier to scramble down the banks to the large pools of water and consequently, it has an even higher usage by swimmers and floaters. With high flow the Lee is preferred by all floating groups to the Wairoa as the rapids become much more difficult. The Lee and the Wairoa are used to the exclusion of most other Nelson rivers. Certainly the Pelorus, Baton and Takaka Rivers never offer the same combination of difficulty and accessibility. Being a greater distance from Nelson they are not in such high demand as the Lee and Wairoa. As far as is known, the Lee has never been jet boated.

Scenic description: The Lee flows down a gorge of low rock banks. There are numerous rock rapids and ledges offering good white water. Because the gorge walls are wider than those found on the Wairoa, the Lee in high flow offers more room for larger craft to run. There are numerous open spaces beside the river on the left bank where picnics are popular. One pool in particular (NZMSI, S20/506137) receives very heavy usage from picnickers and swimmers and is also used for canoe training. There are some willows in the short length of more placid river above the confluence with the Wairoa.

Scenic value: Picturesque. Recreational value: Exceptional.

168.4 RODING RIVER

Location: The Roding River flows south-west along the southern edge of the Barnicoat Range joining the Lee River and ultimately, the Wairoa and Waimea River system.

Average gradient: 1:150 6.7m/km.

Recreational use and scenic description: The Roding is a small river with some of its flow piped to Nelson for water supply. A short length of the river from Roding River Road down to the Lee River, has often been canoed and pack floated when flowing well above normal levels. The river flows down a narrow rock gorge with numerous rock and boulder rapids. It lies in steep scrub country of gorse and fern. There are a number of well-patronised swimming and picnic spots.

Scenic value: Uninspiring. Recreational value: Low

168.5 WAI-ITI RIVER

Location: The Wai-iti, with the Wairoa, is the principal feeder of the Waimea River. It carries less water than the Wairoa as it flows for its whole length over the shingle Waimea Plains.

Length: 30km. Average gradient: Slight.

Recreational use and scenic description: The Wai-iti River flows quietly over a wide shingle bed. Stony beaches flank the water channel with low stone banks in places. Willows line the banks. Since the river is used for irrigation it is too shallow for boating. There are no rapids, few deep pools for swimming, with some sheltered picnic spots below Wakefield.

Scenic value: Uninspiring. Recreational value. Low.

7.10 The Tasman District Council

The Tasman District Council administers two reserves in the Lee Valley: Meads Recreation Reserve and Firestones Reserve (Figure 18) and it maintains the nearby DOC Lee Valley Recreation Reserve (Figure 4). The Council's website describes its two sites⁵:

Lazy days up the Lee

You can discover the beauty of the Lee Valley by turning left into River Road at the main intersection at Brightwater. Just a few minutes drive takes you into one of the loveliest river valleys in the region. The Lee River has always been a favourite with picnickers and swimmers and there are a couple of Council reserves that give you the room to stay and play.

Meads Recreation Reserve is tucked away just over the Meads Road Bridge. Turn right just over the bridge and you can enter this 1.6 hectare reserve. It's on an undulating river terrace and the track may be tough going for some cars so keep an eye out for the dips.

The hilly terrain means there are plenty of lovely little spots to park up for a picnic with privacy even on busy summer days. A toilet, rubbish bins and picnic tables and platforms

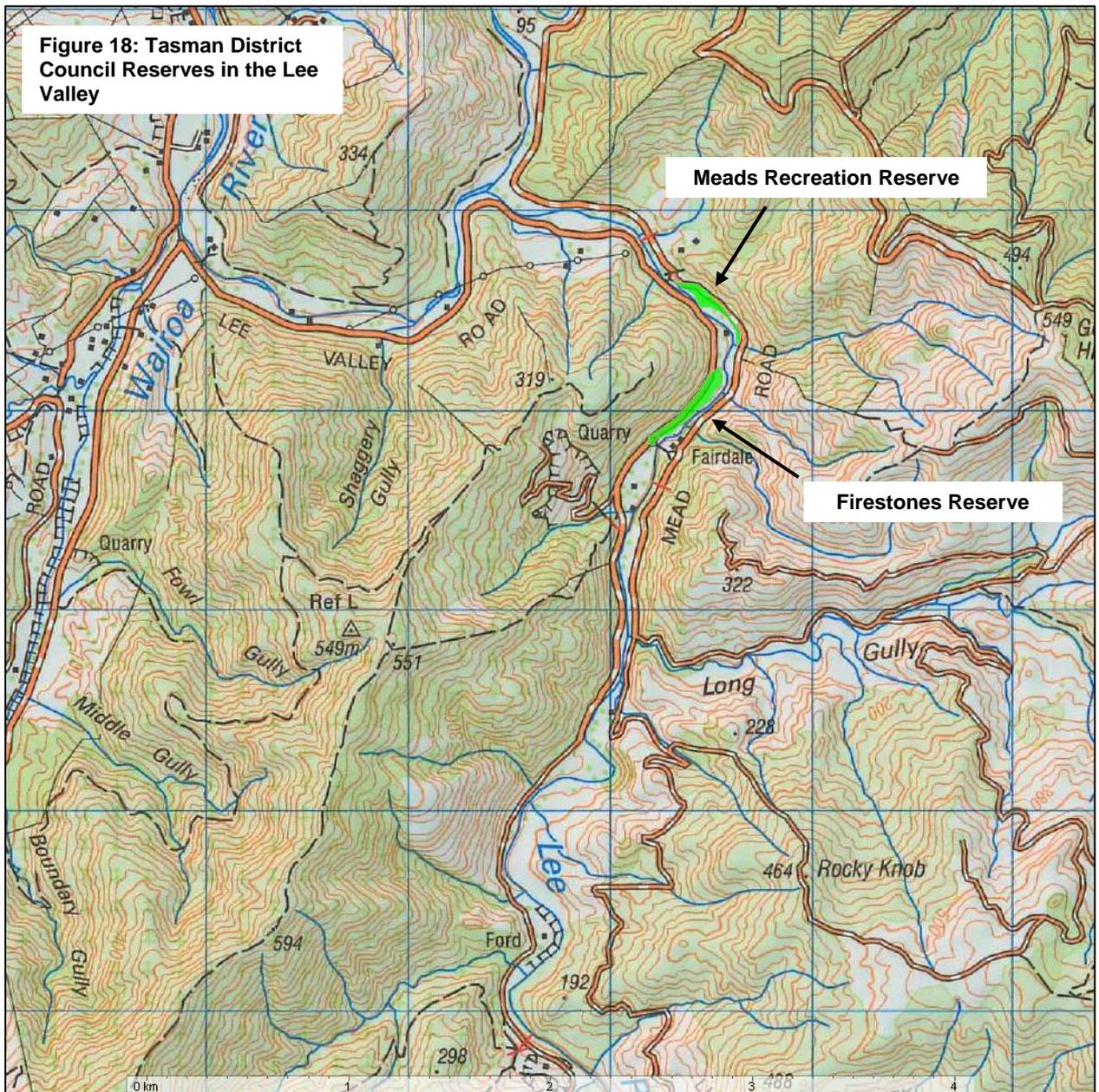


Figure 18: Tasman District Council Reserves in the Lee Valley

have all been provided for your convenience. It's right alongside the river so it's very popular for swimming too.

The land was purchased by Waimea County Council for a recreation reserve in 1976 and has been popular with locals and visitors ever since. While much of Meads Recreation Reserve is in grass there are still a good number of native trees to look out for including a small area of matai, totara, kahikatea, beech forest at the upstream end of the reserve.

If you want somewhere with a bit more open space, continue up Lee Valley Road just a few hundred metres past the Meads Road Bridge and you'll find Firestones Reserve on the left. This 2.2 hectare reserve covers a couple of broad terraces between the river and the road. On the top terrace there's plenty of room for an impromptu game of cricket or touch rugby or just to spread out for a family picnic.

Follow the vehicle track down onto the lower terrace and you'll have easy access to some of the best swimming holes in the Lee River. There are also picnic tables, platforms and metal barbecue stands for you to use. Firestone Reserve also boasts a couple of toilets on the upper level. There are plenty of shady spots alongside the river with plenty of native vegetation thriving there including kanuka and totara. There are also matai, totara, black beech and kanuka in the river edge forest. Access to the river is good along this lower part of the reserve, making it the perfect spot for a swim.

This reserve was also purchased in 1976 and Council's current management aims include protecting the existing native forest remnants, upgrading of the barbecues and further development of the reserve.

If you'd like a lazy day in the sun with the family try out either the Meads Recreation or Firestones Reserves. They're both stunning and have all the ingredients you need for a memorable day out this summer.

7.11 Department of Conservation

The Department of Conservation (DoC) administers the Mount Richmond Forest Park which surrounds the head of the Lee Valley (Figure 19). Three tracks lead from the head of the valley into the Forest Park (Figure 6). The Nelson/Marlborough Conservancy Conservation Management Strategy (CMS) (DOC 1996) defines two of these tracks as 'low priority' – Serpentine Road and Lee Valley to Mount Starveall. Starveall Hut, just northwest of Mount Starveall is rated as 'moderate priority'. The Lee to Bishops Cap track, which links to the Tarn – Mount Rintoul – Slatey track, is rated as of 'moderate priority'.

The Department periodically releases an update of the access options to Mount Richmond Forest Park⁶. The 15 January 2009 update describes access from Lee Valley Road above the cement works as a private road with no public access, but notes that an exit from Bishops Cap is permitted in emergencies only.

Promoted access to the Forest Park from near Richmond is via either the left branch of the Wairoa River, to the north of the Lee Valley, or via Aniseed Valley Road and Hackett Creek to Mount Starveall and onwards. This enables completion of the 'Alpine Route' via either the Wairoa road-end or the Goulter road-end on the southern side of the Richmond Range. The relevant DOC pamphlet describing the route (DOC 2007) notes with regard to the 'Rintoul Hut to Lee Valley emergency exit':

From Rintoul Hut the Alpine Route leads through mountain beech forest to climb the scree and rock faces of Purple Top (1532 m), before descending down the main summit ridge.

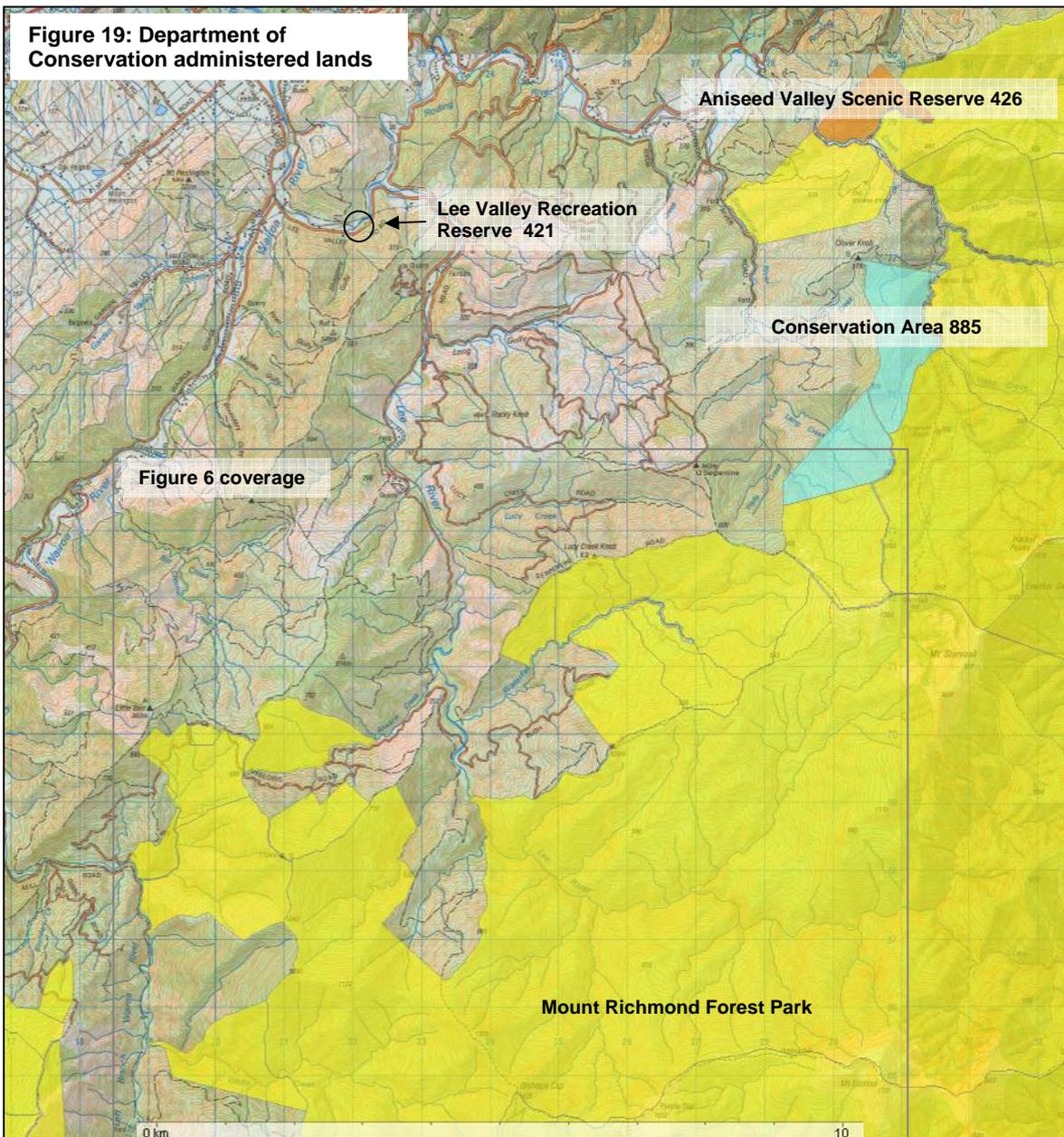
⁶ <http://www.doc.govt.nz/upload/documents/parks-and-recreation/places-to-visit/nelson-marlborough/access.pdf>

The route then sidles across the southern face of Bishops Cap (1425 m) to join the main forested spur to the south. At this point there is a sign-posted junction, with the right-hand track leading down to the Lee Valley emergency exit.

This option to exit from the Alpine Route is an emergency exit and only to be used for this purpose or when streams in the area are flooded. If this access has to be used do not enter areas where trees are being harvested or felled. Logging trucks may also be using the vehicle tracks.

The CMS (p299) notes in relation to access to the Mount Richmond Forest Park:

Access to mountain lands, lakes, rivers and the coast is frequently by the grace of the land managers. because the best access is across private land. Some of these access routes can be formalised through an access agreement or created through RM Act requirements for esplanade reserves on subdivision. Legal easements also provide for public access over some forest roads in former State Forest, especially adjacent to Mt Richmond Forest Park. The department may contribute towards the maintenance of them where they provide access to important areas administered by the department.

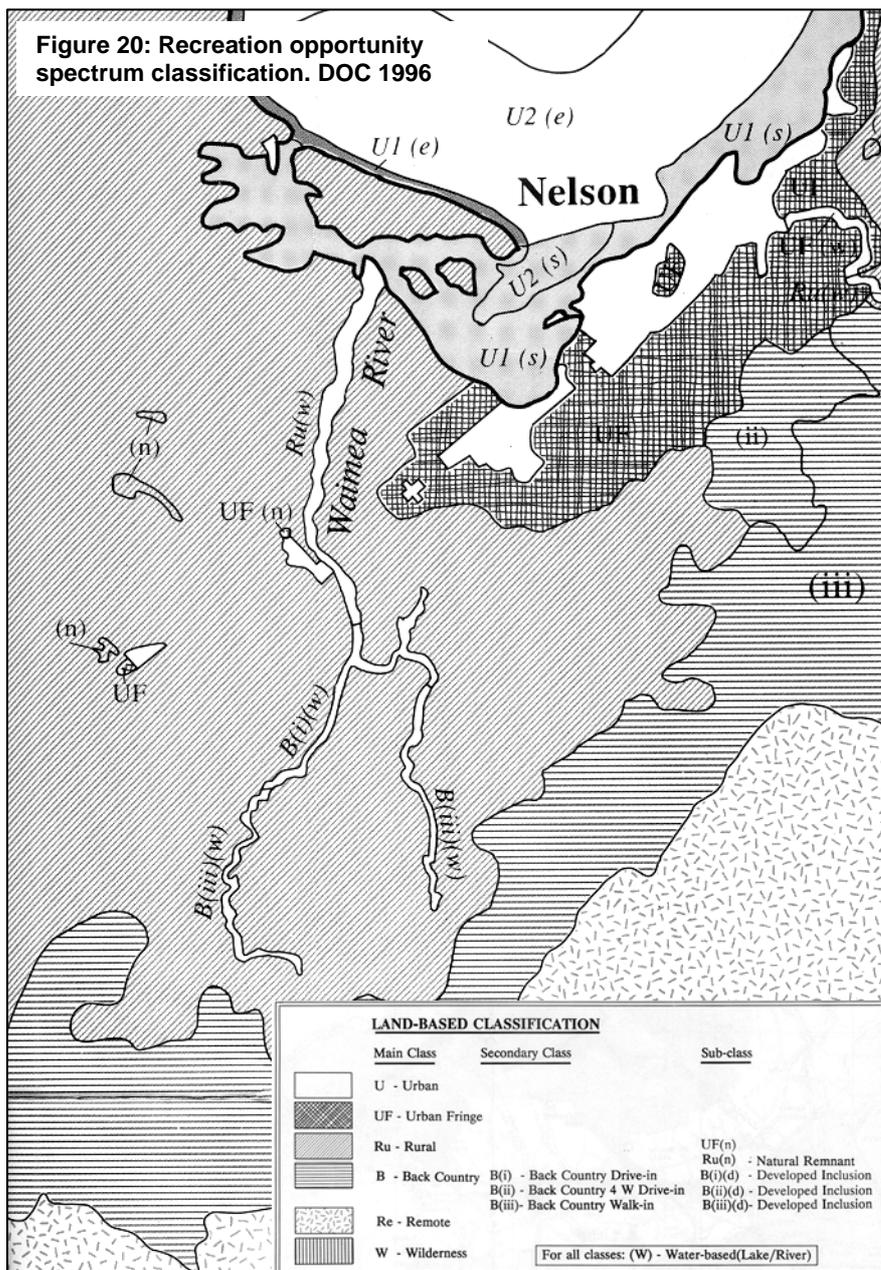


The CMS notes as an associated recreation management priority for the Waimea Basin and Upper Karamea River Management Unit (p384):

Maintain access through adjacent exotic forests to key areas of the Richmond Ranges.

The CMS does not appear to define the Lee Valley accesses as 'key areas'.

The CMS includes a recreation opportunity spectrum (ROS) map for the DOC region. Figure 20 details the ROS classifications applied to the study area. Definitions of the classifications are provided in Appendix 1 to this report. The lower Waimea River is defined as a rural setting, the lower Lee River near the Roding confluence is 'back country drive-in' setting and the upper Lee River as 'back country walk-in'. The land surrounding the upper catchment is classed as rural, passing into 'back country walk-in' in the Forest Park.



A national recreation opportunities review was carried out by DoC over 2003 and 2004 to identify service levels for its various assets: huts, tracks, structures, roads and amenity areas (such as car

parks). In 2004 the Nelson/Marlborough Conservancy released its *Recreation opportunities review submissions and decisions*. This document summarised decisions on approximately 200 proposed modifications to levels of service in the conservancy, few of which were located in the study area. Decisions included: passing management of the DOC Lee Valley picnic area and toilets to the Tasman District Council as it was, “not in line with DOC’s core facilities provision”; rationalising the three amenity areas provided in the Wairoa Gorge with only one continuing to be maintained.

A recreation strategy was completed by DOC for the Conservancy in 1990 (DOC 1990) but no findings or recommendations are relevant to this study.

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Appendix 1: Recreation Opportunity Spectrum setting characteristics⁵

Experience Characteristics

Urban	Urban Fringe	Rural	Backcountry			Remote	Wilderness	
			Drive in	4X4 Drive in	Walk in			
<p>The probability of experiencing and interacting with other groups and individuals is very likely. It is also highly likely that sites, facilities, services and opportunities are convenient, accessible and highly influenced by human activity. The challenge, risk and use of outdoor skills will be relatively unimportant. Purpose built sports grounds and complexes, amusement parks and other highly developed, and/or competitive recreation opportunities, along with the general urban environment will form the bulk of the opportunity.</p> <p>NATURAL REMNANT Occurring within urban recreation opportunity will be remnants of the natural environment. This open space parkland, and remnant natural environment offers the chance to experience a little bit of nature in the otherwise urban environment.</p>	<p>The probability of experiencing and interacting with other groups and individuals is highly likely as is the likelihood of encountering convenient sites, facilities and opportunities. The challenge risk and use of outdoor skills will not be particularly important. Experiences involving developed sites, facilities and opportunities such as sports grounds and amusement parks will be less prevalent than in the urban opportunity.</p> <p>NATURAL REMNANT The opportunities for experiencing open space and remnant natural environments are likely to be more pronounced than in the adjacent urban environment yet the presence of the urban environment with its associated civilisation invariably permeates this opportunity.</p>	<p>Being primary production land there is a variable but generally moderate to high probability of experiencing interaction with other uses or users, groups and individuals. This may be localised and concentrated. The challenge, risk and use of outdoor skills will not be so important though it may be more prevalent in some activities or at some specific sites.</p> <p>NATURAL REMNANT Within natural remnants visitors will be offered a moderate degree of natural environment experience, though the experiences might be quite modified. The sights and sounds of the rural or primary production environment generally pervade. Farming, forestry or hydro electric generation, for example, are readily apparent and would often surround the area. Natural experience in the rural opportunity may be highly-cant if the remnants contain unique or sought after scenic, conservation or recreation values.</p>	<p>The experiences in this opportunity have many human elements but there is an equal probability that users will at times experience isolation from the sights and sounds of humans. There will be good opportunities for interaction with nature. Challenge, risk and the use of outdoor skills will vary considerably depending mainly on activity. There may be good opportunity for learning outdoor skills.</p> <p>DEVELOPED INCLUSION These areas will offer experiences that are significantly human influenced and give feelings of still being in civilisation while in a natural environment.</p>	<p>The experiences in this opportunity will generally be readily accessible to visitors from highways or standard all weather two wheel drive roads on land or from trailed runabouts on water. The convenience of the vehicle with the shelter and security that this affords will be a significant part of the experience.</p>	<p>Experiences based on or that are influenced by off road vehicle access, jet boatable waters or back country airstrips predominate in this opportunity. Though activity may not be based on the use of a motorised vehicle the influence of vehicles, the safety afforded or the disturbance they create may be present and significant.</p>	<p>The experiences offered will give the visitor close contact with nature. The interaction with civilization and motorised access in particular will not be highly significant. The general sights and sounds of civilisation will be lower than for drive in. The use of outdoor skills may be important although people relatively inexperienced in the outdoors will often still be able to experience the environment in relative safety with the security of good tracks and shelter readily available.</p>	<p>There is a high probability of experiencing isolation from the sights and sounds of humans, and experiencing a closeness to nature. Outdoor skills, challenge and risk are important, though some reliance can still be placed on human modification, tracks and huts in particular.</p>	<p>There is an extremely high probability of experiencing complete isolation from the sights, sounds and activities of humans, with an extremely high probability of no interaction with other user groups (let alone individuals). Users will be totally reliant on their outdoor skills and it is likely that there will be a high degree of closeness to nature, with a sense of discovery, solitude and freedom.</p>

⁵ From: Taylor, PC. 1993. *The New Zealand recreation opportunity spectrum. Guidelines for users*. Dept of Conservation.

Physical Setting: Primary Characteristics

Urban	Urban Fringe	Rural	Backcountry			Remote	Wilderness
			Drive in	4X4 Drive in	Walk in		
<p>MODIFICATION Profoundly modified overall, few elements of the natural environment remain. Environment quality may be impaired. Generally constant noise from human activity.</p> <p>ACCESSIBILITY Very accessible to most members of the community. Many alternative means of transport. Public transport gives good access, very accessible by vehicle. Foot access well defined, surfaces hardened, hazards reduced, numerous alternative routes. Water access from land generally very easy with steps, ramps and paths. On water, access variable though often straight forward.</p> <p>SIZE No size criteria for defining urban area. As a guide, several hundred residents and several shops or 50 dwellings at a density of 4/ha with facilities, services, shops etc.</p> <p>BOUNDARIES The outer limits of the residential or industrial development. All land within or substantially surrounded by the sights and sounds of dwellings, industry and urban transportation network (highways, railways etc).</p>	<p>MODIFICATION Predominantly a cultural landscape with mixed urban-rural land uses. Adjacent to and readily accessible from an urban setting. Will only exist around larger urban areas. Sights and sounds of urban environment present.</p> <p>ACCESSIBILITY Very accessible from the urban/residential environment to wide cross-section of community. Generally within walking/cycling distance, often within 1 km of urban boundary. Urban/public transport to boundaries and through area. Walking opportunities well signposted, natural hazards reduced.</p> <p>SIZE No size criteria but as a guide urban fringe will only be located around larger urban areas.</p> <p>BOUNDARIES Identified by cultural features, roads, housing, dams as well as natural features, ridge lines, vegetation.</p>	<p>MODIFICATION Predominantly a cultural landscape with mixed land uses, mainly primary production, farming, horticulture and tones" with some tourist/visitor attractions. Will have a network of services and facilities, roads, power lines, buildings, small population centres, rural communities, villages.</p> <p>ACCESSIBILITY General network of roads and vehicle access throughout. Easy foot access.</p> <p>SIZE No size criteria but generally tens of hectares or larger.</p> <p>BOUNDARIES Boundaries are usually culturally defined, fences, road lines, built up areas, cultivation, developed pastures, plantations or extensive native vegetation as along back country or remote boundaries.</p>	<p>MODIFICATION A modified environment that is accessible to road vehicles and outboard motorboats, includes sealed roads, gravel roads, lakes and large/deep rivers but one that is generally dominated by natural vegetation and landscapes and is natural looking. Obvious elements of modification include roads, roadside facilities and some primary production, however these would all be isolated or extensive, generally not intensive. It may include small or environment based facilities.</p> <p>ACCESSIBILITY Generally within one kilometre of motorised access. Foot travel often facilitated by good standard tracks. If there are no tracks, access to the adjacent roads relatively easy.</p> <p>SIZE No size limit, however area must be large and feel like back country, generally 500 ha or more. If the area is adjacent to a back- country walk in or remote opportunity or has topographical isolation the this area may be smaller than 500 ha. As a guide the area may often be large enough to support centre-fire rifle hunting.</p> <p>BOUNDARIES The more remote boundary will usually follow ridge lines or natural boundaries. Cultural features, fence lines, cultivation, ate will often form the other.</p>	<p>MODIFICATION This is a modified environment but one that is generally dominated by natural vegetation or landscapes and is natural looking. It is all terrain vehicle or jet boat accessible country, that is traversed mainly by unformed or ungravelled roads, 4x4 accesses, motorbike tracks or back- country airstrips. Obvious elements of modification include roads, roadside facilities and small areas of farming or forestry. These would all be quite isolated or extensive and not intensive. It may include small or environment based facilities.</p> <p>ACCESSIBILITY Motorised access is along ungravelled or unformed roads that are off road vehicle accessible or shallow or difficult rivers that are jet boat accessible. Generally the area is within 1 km of motorised access. Foot travel often facilitated by walking or tramping tracks though where there are no tracks access back to the vehicle assess is relatively straight forward.</p> <p>SIZE No size limit, however area must be large and feel like back country, generally 500 ha or more. If the area is adjoining a back country walk-in, or remote opportunity, or has topographical isolation, this area may be smaller than 500 ha. As a guide the area may often be large enough to support centre-fire rifle hunting.</p> <p>BOUNDARIES The more remote boundary will usually follow ridge lines or natural boundaries. Cultural features, fence lines, cultivation, etc will often form the other.</p>	<p>MODIFICATION Predominantly natural environment, signs of earlier occupation of the land may exist, old fences, disused roads, etc, however nature now taking over or predominant. Facilities often limited to huts, tracks, bridges, signs.</p> <p>ACCESSIBILITY Aerial and motorboat access possible where permitted. Otherwise non-motorised access only. Foot travel facilitated by good tracks, (mostly benched) huts, campsites, bridges. All weather access under most circumstances. Generally further than 1 kilometre from formed roads, 11, to 1 km from all terrain access. Generally within 1 km of, or readily accessible on foot from, good quality or highly used tracks.</p> <p>SIZE No minimum size, but generally greater than 1000 ha.</p> <p>BOUNDARIES Delineated by topography.</p>	<p>MODIFICATION Highly natural landscape. Minimal apparent modification. Few facilities, limited to light tracks, with occasional bridges, huts and signs.</p> <p>ACCESSIBIL" Non-motorised access only. Access facilitated by some light tracks, bridges, etc, but often weather dependent. Minimum distance 1 km or ½ , day travel on foot from motorised access.</p> <p>SIZE No minimum size but generally greater than 1000 ha.</p> <p>BOUNDARIES Usually follow ridge lines or natural boundaries.</p>	<p>MODIFICATION Highly natural landscape. No huts, tracks, bridges, signs or other facilities</p> <p>ACCESSIBILITY Non-motorised access only. ½ -1 day's foot travel from motorised access or 4 km from 4x4, jet boat, airstrip access and 5 km from developed roads and readily accessible inland waterways. Foot access totally dependent upon the environment and resources and skill of the visitor.</p> <p>SIZE Minimum size 2000 ha. At least 2 day's foot travel to traverse.</p> <p>BOUNDARIES Boundaries clearly defined by topography, usually ridge lines.</p>