

Part A: Whitewater kayaking in the West Coast Region: Application of the River Values Assessment System (RiVAS)

Kay Booth (Lindis Consulting)
Andy England (Whitewater New Zealand)
Doug Rankin (Whitewater New Zealand)
Martin Unwin (NIWA)
Graham Charles (Kayaker)
Kevin England (Kayaker)
Keith Riley (Kayaker)
Dave Ritchie (Kayaker)

Peer reviewed by:
Rob Greenaway and Duncan Catanach

6.1 Introduction

6.1.1 Purpose

This section applies the River Values Significance Assessment Method (RiVAS) outlined in a companion chapter, *River Values Assessment System (RiVAS) – The Method* (Hughey et al. herein), and should be read in conjunction with that chapter. Its purpose is to provide a case study of how to apply the method to whitewater kayaking, using the West Coast region as an exemplar.

The application of the method for whitewater kayaking remains under development. It will be refined through application in other regions, and would be enhanced by research to inform underlying assumptions and replace data estimates (see Step 10). In particular, elucidation of the factors used by kayakers to value rivers is required.

6.1.2 Summary of the assessment

An Expert Panel identified eight (subsequently reduced to seven) resource and user attributes to assess 58 river sections in the West Coast Region for their whitewater kayaking value. Few relevant data were available, so the Expert Panel relied on their own assessments for all attributes. As a result of the assessment, river sections were classified for whitewater kayaking as follows: 28 high value, 29 medium value and 1 low value. River sections not assessed were either of negligible value, unknown value (never paddled), were not able to be paddled at the time of the assessment owing to access problems, or were inadvertently missed during the assessment.

6.1.3 Preparatory step: Establish an Expert Panel and identify peer reviewers

Two Expert Panels were used for this case study. The first Panel established the assessment criteria and reviewed the method (Parts 1 and 3 of the method). This Panel comprised Doug Rankin and Andy England (Whitewater New Zealand), Martin Unwin (NIWA) and Kay Booth (Lindis Consulting). Part 2 was undertaken by a second Expert Panel comprising whitewater kayakers familiar with West Coast rivers (Andy England, Graham Charles, Keith Riley, Dave Ritchie and Kevin England), facilitated by Kay Booth.

Simon Moran (West Coast Regional Council) and Ken Hughey (Lincoln University) acted as advisors. Rob Greenaway and Duncan Catanach peer reviewed a draft of this chapter.

Credentials of members of the Expert Panels, advisors and peer reviewers are provided in Appendix 6A-1.

The Expert Panels met separately (two weeks apart) to undertake the assessment. The idea of estimating data using the Delphi Technique (individuals transmit their assessments, without meeting, in an iterative manner) was discussed at the second Expert Panel workshop. Such an approach would be practical to administer but would inhibit debate and potentially preclude consensus decision-making. Therefore a face-to-face approach is recommended and was used in this assessment.

6.2 Application of the method

6.2.1 Step 1: Define river value categories and river segments

River value categories

Whitewater kayaking is a multi-dimensional form of recreation. It is undertaken by people with different skill levels and encompasses a range of types of experiences (e.g., easy introductory paddling to challenging exploratory descents). It may be undertaken as a commercial activity (e.g., skill instruction or river guiding) or competitively. Whitewater kayaking is usually undertaken in groups for safety reasons, giving the activity a strong social dimension. It is resource-dependent – it requires whitewater and is strongly influenced by the type and quality of whitewater. Whitewater kayaking is also a continually evolving activity, and has changed dramatically since the 1970s with the advent of plastic craft and the resulting ability to paddle increasingly difficult rivers. Kayak design continues to advance and a variety of boat options are available to suit different types of water and paddling styles.

Whitewater kayaking is undertaken using a double-bladed paddle with the kayaker in a sitting position and enclosed in a water-tight cockpit. However, this assessment also covers canoeing – where paddlers use a single-bladed paddle in a kneeling position. Other whitewater pursuits (e.g., rafting, river bugging and river boarding¹) were excluded from this assessment, because some different characteristics apply to them.

River segments

Using a list of rivers provided by the West Coast Regional Council, the second Expert Panel identified 41 rivers that were regularly kayaked, or had been recently kayaked and were expected to become popular within the next three years. This was based on Panel members' local knowledge and with reference to a whitewater kayaking guidebook (Charles 2006). Using this approach, the selected rivers represent the most valuable kayaking rivers in the region. Twelve rivers were subdivided into two, three or four segments (representing different kayak runs), giving a total of 58 river segments. The resultant list of West Coast whitewater kayaking river sections is presented in Appendix 6A-4.

Subsequent to the assessment, members of both Expert Panels identified river sections that had whitewater kayaking value but had been overlooked in the assessment. This suggests the need for early and careful identification of relevant river sections, and suggests that the West Coast assessment missed some valuable whitewater kayaking river sections.

West Coast rivers which were not included in the assessment were considered, by the second Expert Panel, to hold:

1 A river bug is a small one person inflatable craft specially designed for running rapids, propelled from a seated position by kicking with finned feet and paddling with webbed gloves. The participant moves downriver feet first. In river boarding (also known as whitewater sledging), the participant travels head-first downstream, using a river board that they partially lie on, and steers using fins on their feet.

1. Negligible value for whitewater kayaking: either they had no whitewater kayaking value (e.g., flat water) or they had been kayaked but were considered to hold low value (i.e., unlikely to become popular owing to factors such as unusual flow regimes or variable terrain); or
2. Unknown kayaking value (yet to be paddled); or
3. Known kayaking value but not accessible at the time of the assessment: the Panel noted that some highly valued kayak runs had been closed off because air access had been prohibited; or
4. Known kayaking value but had been inadvertently missed in the assessment (e.g., the Milltown run on the Arahura River).

Step 9 identifies that whitewater kayaking has been subject to rapid change. In response to technological advancements in kayaks, the range of river types able to be kayaked has increased and it is notable that some river sections included in the assessment had become known only very recently (first descents in the past couple of years). Furthermore, upper sections on West Coast rivers are susceptible to significant change from natural processes (e.g., river bed realignment from floods and damming from landslides). This means that the assessment of kayaking river sections in this study pertains to present-day kayaking opportunities.

Other

Both Expert Panels noted that the international whitewater difficulty scale provides a categorisation of rivers based on the degree of challenge or difficulty of the whitewater kayaking opportunity (Table Error! No text of specified style in document.-1).

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International scale of whitewater difficulty (Charles 2006:14-15)**

Grade I	Moving water with a few riffles and small waves. Few or no obstructions.
Grade II	Easy rapids with waves up to one metre. Clear channels obvious without scouting. The ability to move your craft across the current is not necessary.
Grade III	Rapids with high, irregular waves and narrow passages. The ability to spin and manoeuvre is necessary.
Grade IV	Difficult rapids requiring a series of controlled moves, cross-current and spinning in confused water. Scouting often necessary and a reliable roll is mandatory.
Grade V	Very difficult, long and violent rapids. Nearly always must be scouted. Definite risks in the event of a mishap. Requires a series of controlled, precise, ‘must make’ moves to navigate successfully.
Grade VI	Extreme, very dangerous and only for experts. Close inspection is mandatory and all possible safety precautions should be taken.

A river’s grade does not imply value (all grades may be equally valued) but provides a useful ‘check’ on the representativeness of the list of rivers compiled from this assessment. By checking the distribution of rivers by grade, the assessment can be reviewed for any tendency to favour one type of kayaking opportunity over another, in terms of their kayaking challenge or difficulty, bearing in mind the abundance of rivers by grade in the region. Therefore river grade was recorded as part of the process.

Outcomes

Treat whitewater kayaking as one river value (no separate categories).

Obtain a list of rivers from the regional council and select those rivers/reaches, using the knowledge of the Expert Panel and any existing data, on which kayaking currently takes place with some regularity (being aware that more difficult rivers will receive less ‘regular’ use) or is expected to be popular in the immediate future.

Include the whitewater difficulty classification system to identify the distribution of grades of the rivers selected (Step 1) and their ranking (Step 8).

6.2.2 Step 2: Identify attributes

Attributes which describe whitewater kayaking were structured around the Recreation Opportunity Spectrum framework (Brown et al. 1978; Clark and Stankey 1979) (see Appendix 6A-2). By following this framework, the kayaking assessment aligned with the method as outlined in Hughey et al. (Herein).

Most attributes relate to individual rivers. However, the first Expert Panel identified some attributes associated with a set of rivers or the connection between them (e.g., see the attribute *connectedness* in Step 9).

Both Expert Panels thought the assessment must focus upon present-day use and value, whilst acknowledging that future kayaking opportunities are important (see Step 9).

Attributes encompass three of the four well-beings defined in the Local Government Act 2002 (social, economic, environmental). Cultural attributes may be relevant for whitewater kayaking, but little was known about this.

Outcome

A list of attributes is provided in Appendix 6A-2.

6.2.3 Step 3: Select and describe primary attributes

From the list of attributes outlined in Step 2, primary attributes were selected to represent whitewater kayaking in the assessment. Selection was based on:

1. The first Expert Panel members' opinion about the relative contribution made by attributes to an understanding of whitewater kayaking opportunities. Owing to a lack of data, expert opinion was the main method for identifying primary attributes;
2. Research literature on the attributes identified by whitewater kayakers as important (Galloway 2008; Galloway in prep.). Very little relevant research was identified;
3. Greatest emphasis placed upon attributes that related to individual rivers. One primary attribute relates to the river's context within a wider set of kayaking opportunities ('scarcity value').
4. The need for pragmatism – only eight attributes were identified; and
5. An emphasis upon setting and activity attributes (e.g., river flows, access), which are those things that councils (and others) directly manage.

The attribute 'economic benefits from kayaking' was discussed but not selected as a primary attribute. It would be difficult to identify the contribution of an individual river to regional economic benefits associated with whitewater kayaking and this attribute is likely to be closely related to other primary attributes, especially the number and origin of users.

Outcome

Appendix 6A-2 identifies the eight primary attributes (in bold) and describes each, with an emphasis on explaining each attribute's validity and reliability as a representative measure of whitewater kayaking.

6.2.4 Step 4: Identify indicators

One indicator for each primary attribute was identified using SMARTA criteria (Appendix 6A-3), based on:

1. Expert Panels' judgment;

2. Existing data; and
3. An attempt to identify indicators that may also apply to other forms of river recreation (e.g., 'numbers of users').

Each indicator was considered carefully. Discussion included:

1. *Perception of scenic attractiveness (rating scale)*: Initially, the natural character scale used in the landscape case study (Boffa Miskell 2009) was adopted, which is based on the degree of modification:
 1. *Very Low levels of natural character due to Very High levels of modification.*
 2. *Low levels of natural character due to High levels of modification.*
 3. *Moderate levels of natural character due to Moderate levels of modification.*
 4. *High levels of natural character due to Low levels of modification.*
 5. *Very High levels of natural character due to Very Low or no levels of modification.*

However, subsequent discussion of drafts of this chapter highlighted dissatisfaction with this indicator. Natural character (measured inversely by the degree of modification) was felt to be different from scenic attractiveness. Subsequently, a different scale was suggested for future application of this method, namely that used in the 1991 River Use Survey (NZCA 1991), which incorporated elements of river scenery descriptors published by Egarr and Egarr (1981) and Egarr et al. (1979):

1. *Not attractive: river environs and surrounding country generally uninspiring, river water may be dirty or discoloured.*
2. *Moderately attractive: some local features of scenic interest, mixed with less attractive sections.*
3. *Attractive: scenic appeal is significant, but generally derived from local features such as bankside vegetation and the nature of the river environs rather than large scale grandeur.*
4. *Very attractive: river environs scenic and sometimes spectacular. Surrounding country provides striking views.*
5. *Inspiring: scenery spectacular and varied. Large scale vistas (e.g., mountains/bush/open country), and/or unique and striking river environs (e.g., rock formations, gorges, overhanging vegetation, deep and clear pools, rapids).*

It would be desirable to use kayakers' perceptions of scenic attractiveness, as perceived from river level. In the absence of such data, the second Expert Panel provided data estimates.

2. *Perception of wilderness character (rating scale)*: This measure was used in the 1991 River Use Survey (NZCA 1991). The second Expert Panel provided estimates for individual rivers, as the 1991 survey data were not available. The 1991 ranking scale was:
 1. *No wilderness feeling; road traffic or other human activity generally visible/audible from river. Highly modified river environment.*
 2. *Little wilderness feeling; roads/human activity readily accessible from river, even if not directly visible. River environment show obvious signs of modification.*
 3. *Some wilderness feeling; river environment may be modified, but canoeist is essentially isolated from immediate human activity. Roads generally reachable from river, but may involve some rough scrambling.*
 4. *Strong wilderness feeling; largely unmodified environment, with very limited access to any form of roading, Walking out from river feasible, but could take up to a day.*
 5. *Exceptional wilderness feeling; pristine environment, extreme sense of remoteness, walk-out long arduous, and difficult.*
3. *Density of high quality hydraulic features (rating scale)*: This indicator was defined as 'the number, variety and quality of hydraulic features (e.g., waves, holes, eddies, drops)' (Whitewater New Zealand 2009). The second Expert Panel estimated data for this indicator. It was noted that this is not the same as the whitewater difficulty scale (river grade) – any single grade may offer a high or low density of hydraulic features. The second Panel refined the definition of this attribute: initial emphasis (by the first Panel) had been placed upon diversity, the second Panel chose to place greater emphasis upon density as this was felt to

be more important and presents a more practical measure for any given river (count of features c.f. diversity rating).

4. *Flow reliability (% of time river is kayakable)*: This attribute was assessed with respect to the percentage of time the river is suitable for the particular kayaking opportunity for which it is valued (e.g., % time able to be paddled as an easy learn-to-kayak opportunity). In the absence of any empirical data, the second Expert Panel estimated data for this indicator. A positive relationship was agreed (high flow reliability corresponds with high kayaking value). It was noted that this attribute may not fit other regions well – where the norm may be that rain is required for the kayaking opportunity.
5. *Ease of access (mode)*: A positive relationship was suggested between ease of access and kayaking value (easy access contributes to a higher value assessment). Mode of access was chosen as a practical means to measure ‘ease of access’ (i.e., 2WD vehicle, 4WD vehicle, walk-in carrying kayak, helicopter). Two exceptions were noted: (1) helicopter access *may* contribute positively to the kayak experience, especially given it is rare nationally and internationally; (2) walk-in access may also contribute positively to the experience as it can add an additional element to the physical activity, enhance the kayaker’s relationship with nature and increase the challenge. Most helicopter and walk-in access is focused on Grade 4-5 kayak runs. There is not a linear relationship between river grade and ease of access (some Grade 5 rivers offer 2WD vehicle access). The second Expert Panel found this attribute troublesome, as they felt that mode of access did not represent the kayaking value of the river. Nonetheless, it was populated with data and tested as part of the method (but ultimately removed – see Step 7).
6. *Number of users (kayaker days per annum)*: A positive relationship between numbers and kayaking value is assumed, although high-skill (high river grades) and remote rivers will only be used by small numbers of kayakers and this does not mean those rivers have low kayaking value. Since no data were available, the second Expert Panel estimated kayaker numbers. This was informed by data from helicopter flight records, where relevant. Ideally, more robust user counts data would be used. Future work may refine this indicator to ‘kayak season’ – which is likely to vary by region and perhaps by river. This is relevant as decisions about water use may vary seasonally and it would be helpful for decision-makers to know times of year when rivers are used by kayakers. Kayakers who accompany rafting trips were counted.
7. *User catchment (home district/region)*: The greater the distance a kayaker travels to paddle a river, the greater the value. Kayaker origin was considered the most appropriate metric. ‘Travel distance’ was discussed but disregarded as it would be influenced by the geographic spread of the region and could result in a ‘local’ West Coaster skewing the ranking higher (greater travel distance) than someone from a geographically distinct region (e.g., Central Otago). This may have implications for other case study assessments. The scale chosen was:
 1. *Within district (live within territorial authority boundary in which river is located).*
 2. *Within region (regional council boundary) but outside home district.*
 3. *From neighbouring region (home region borders region in which river is located).*
 4. *Rest of New Zealand but beyond neighbouring regions.*
 5. *International.*

A threshold of 10% of users from the district/region was chosen to trigger the rank (e.g., ≥10% of users from other countries would receive a ‘5’; ≥10% of users from districts within the region but not the same district as that in which the river is located would receive a ‘2’).

In the absence of any pre-existing data, estimates of the second Expert Panel were used. To prompt discussion, the Panel sometimes started by considering how widely the section was known and whether it was a 'destination river' for national or international kayakers.

8. *Scarcity of the kayaking opportunity (rating scale):* A positive correlation between scarcity and kayaking value (the more scarce the opportunity, the greater the value). The 'kayaking opportunity' refers to the type of kayaking experience (e.g., paddle on a very scenic Grade 5 river with 2WD access). In the absence of data, estimates from the second Expert Panel were used for this indicator. Considerable debate took place around the geographical scale of application for this indicator, as it places an individual river within its broader context. Initially the first Expert Panel had suggested scarcity should be measured in the regional context. However, when populating this attribute, the second Expert Panel identified many cases where a river offered a rare opportunity nationally (sometimes internationally) but which was relatively common in the West Coast. Therefore, the scale was revised to recognise this diversity:
1. *Not scarce.*
 2. *Regionally scarce.*
 3. *Nationally scarce (irrespective of whether scarce regionally).*

International scarcity was noted in the *Comments* column of Appendix 6A-4.

Outcome

Indicators are listed in Appendix 6A-2 and assessed against SMARTA criteria in Appendix 6A-3.

6.2.5 Step 5: Determine indicator thresholds

Thresholds for each indicator were identified by the second Expert Panel, as shown in Appendix 6A-2. Explanations:

- Where a 5-point scale was used to measure the indicator (e.g., perception of wilderness), indicator scores were assigned to thresholds as follows:
 - High (3) = 4 or 5 score
 - Medium (2) = 3 score
 - Low (1) = 1 or 2 score
- User catchment (home district/region): An exception to the 5-point scale application, as follows:
 - High (3) = Rest of New Zealand, or International.
 - Medium (2) = Within region, or From neighbouring region.
 - Low (1) = Within district.
- Flow reliability (% of time river kayakable): Thresholds were chosen in equal divisions (thirds):
 - High (3) = > 66%
 - Medium (2) = 33-66%
 - Low (1) = < 33%
- Number of users (kayaker days per annum): Thresholds were selected so they would work at a national level (West Coast rivers have comparatively few kayaker days since most rivers are technically difficult).

Outcome

Thresholds are identified in Appendix 6A-2.

6.2.6 Step 6: Apply indicators and indicator thresholds

All data were estimated by the second Expert Panel.

Outcome

Data estimates are shown in Appendix 6A-4.

6.2.7 Step 7: Weighting the primary attributes

The second Expert Panel reviewed the eight primary attributes and considered whether some made a relatively greater contribution to the understanding of whitewater kayaking.

The following weighting regimes were considered and changes in the rank order of rivers examined (see Appendix 6A-4):

- Hydraulic features density = x 1.5;
- Flow reliability = x 1.5;
- Deletion of the attribute 'ease of access', both to the original dataset and the datasets pertaining to increased (x 1.5) weightings for hydraulic features density and flow reliability. This deletion followed extensive discussion which related to how well this attribute contributed to an understanding of kayaking value.

After analysis of the datasets, the second Expert Panel chose an equal weighting regime (with the access attribute removed) because weighting adjustments for hydraulic features and flow reliability did not fundamentally alter the river rankings, and no data were available about the relative importance of attributes to kayakers.

Outcome

Equal weighting with access attribute removed. See Appendix 6A-4 for weighting testing.

6.2.8 Step 8: Determine river value for whitewater kayaking

Step 8a: Rank rivers

The spreadsheet was used to sum the indicator threshold scores for each river and then sorted in descending order. This provided a list of rivers ranked by their value scores.

This step was undertaken for each of the weighting regimes described in Step 7, as it assisted the Panel to identify the differences between weighting regimes (i.e., it was easy to see which rivers moved up/down the rankings).

Large clusters of rivers were evident (rivers with the same total score) in the different weighting regimes. This can be explained by the nature of many West Coast rivers – which are a collection of rivers with similar attributes. The large number of rivers clustered in the upper values is explained by the fact that West Coast rivers provide a significant proportion of New Zealand's most difficult whitewater kayak runs (see Charles 2006) and only the most valuable kayaking rivers were included in this assessment (see Step 1).

The number and relative rank of rivers in the list attributable to each river difficulty grade was reviewed and no concerns were expressed about the distribution by the second Expert Panel.

Step 8b: Identify river's value to kayaking

West Coast rivers of high, medium and low value for whitewater kayaking were identified by applying thresholds to the final ranked list of rivers chosen in Step 7 (see blue highlighted column labelled FINAL in Appendix 6A-4).

Two approaches were trialled. The first was the selection of thresholds or cut-off points, following careful review of the list of rivers and their scores. As shown in Appendix 6A-4, chosen thresholds were 'high value' >17; 'low value' <10.

The second approach was to apply attribute rules:

- 'High value' river = five or more indicator scores of 3;
- 'Low value' river = five or more indicator scores of 1;
- The remainder classified as 'medium value'.

Rivers were rated as high, medium or low value using these attribute rules. One river was rated as 'medium' using this approach, even though it ranked third equal in the original river rankings (i.e., its value dropped substantially under the attribute rules approach). In addition, three river sections received 'high value' designation using the attribute rules, but had appeared lower in the original rankings than other rivers ranked as 'high value' by the attribute rules approach. Careful consideration of the kayaking value of these four outlier river sections suggested that the application of these attribute rules was not helpful. Therefore, the final assessment used cut-off points or thresholds in the ranked list of rivers to differentiate rivers' kayaking value.

Only one river was designated 'low value' – using both the attribute rules and the Panel assessment of appropriate threshold points. This was not surprising, for the reasons already explained.

No single attribute was considered to be a trigger for high value, although this point was debated during peer review of this chapter. It was noted that Water Conservation Orders often are based on a single outstanding resource attribute. One suggestion was that the presence of an iconic feature may represent such a 'trigger'; however this attribute was not selected as a primary attribute. This attribute, and the broader point about trigger attributes, deserves further consideration in future applications of the method to kayaking.

Outcomes

A list of rivers ranked by a scoring system from highest to lowest, which represents an initial ranking for kayaking value (see Appendix 6A-4 highlighted columns).

Rivers identified as high, moderate and low value for whitewater kayaking. See Appendix 6A-4.

Rivers in the West Coast Region not listed have either negligible whitewater kayaking value or hold value but are unable to be accessed by kayakers (as at October 2009). A small number of river sections were missed in this case study assessment.

6.2.9 Step 9: Outline other factors relevant to the assessment of significance

Five attributes of whitewater kayaking have been identified which are not quantifiable but are considered relevant to significance assessment. These attributes are discussed in Appendix 6A-5 in order to highlight their importance to a meaningful understanding of whitewater kayaking. The attributes are:

- Access – a prerequisite for kayaking;
- Connectedness – contribution to the suite of kayaking opportunities in region;
- Users' perceptions of the river's importance (including its 'status');
- Potential future kayaking use; and
- Existence and option value.

These attributes do not influence the numeric calculation of river significance, but are relevant to decision-making about whitewater kayaking.

Outcome

List and description of non-measured attributes (Appendix 6A-5).

6.2.10 Step 10: Review assessment process and identify future information requirements

Few published data were available to inform this case study. Desired data are noted in Appendix 6A-6.

Suggested further research includes:

1. Qualitative and quantitative research to identify the factors which influence kayakers' assessments of whitewater kayaking value (i.e., the primary attributes – Step 3), and the relative importance of these factors (i.e., their weightings – Step 7);
2. Data to populate the indicators.

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Appendix 6A-1

Credentials of the Expert Panel members and peer reviewers

First Expert Panel (Parts 1 and 3 of the method):

1. **Dr Kay Booth** is an outdoor recreation researcher and planner. She is the Director of Lindis Consulting and, until recently, a Senior Lecturer in parks, recreation and tourism at Lincoln University. She is conversant with existing data about outdoor recreation. With colleagues, Kay developed the significance assessment method on which this case study is based. She holds appointments on the New Zealand Walking Access Commission, the New Zealand Geographic Board and the New Zealand Conservation Authority. She is a novice whitewater kayaker.
2. **Andy England** is a member of Whitewater New Zealand based on the West Coast. He has been kayaking whitewater since he was a teenager growing up in the UK. Andy has competed in slalom kayaking and travelled the world to kayak and explore whitewater rivers in Norway, France, Austria, Italy, the USA, Canada, Nepal and New Zealand. He is qualified as a Level 1 kayak coach by the New Zealand Outdoor Instructors Association and has taught kayaking since 1988. In 1991 he moved to Scotland to be closer to more adventurous whitewater rivers and since 2001 has lived in Greymouth. Andy has kayaked rivers extensively on the West Coast. He is Deputy Principal of Greymouth High School.
3. **Dr Doug Rankin** is a member of Whitewater New Zealand, President of the BugSports Club, and a life member of the University of Canterbury Canoe Club. He has been kayaking (and more recently river bugging) whitewater both in New Zealand and overseas (France, Germany, Austria, USA) for over 35 years. In his professional life Doug is a scientist with AgResearch. Doug has presented evidence as an expert witness for the New Zealand Canoeing Association (now Whitewater New Zealand) on the utility and whitewater values of many of New Zealand's rivers to Special Tribunals and Environment Court Hearings, to gain protection for the recreation values of many of New Zealand's outstanding wild and scenic rivers.
4. **Martin Unwin** is a fisheries scientist with over 30 years experience, based with NIWA in Christchurch. He has contributed to, or had oversight of, the four National Angler Surveys and other related angler surveys. His current research interests include linking recreational usage data for New Zealand lakes and rivers to NIWA's River Environmental Classification (REC) scheme, so as to allow recreational activities such as angling and kayaking to be mapped and modelled in relation to hydrologic and catchment descriptors. In previous years he was an active social (i.e., Grade 3) whitewater kayaker, and continues to enjoy sea-kayaking and flatwater paddling in a Canadian canoe.

Second Expert Panel (Part 2 of the method):

1. **Andy England** (see above).
2. **Graham Charles** is a professional outdoors adventurer and the author of *New Zealand Whitewater: 125 Great kayaking runs*. He is a founding member of Adventure Philosophy, an outdoors team of adventurers, with which he has undertaken world-first expeditions to the Antarctic Peninsula, Darwin Cordillera and South Georgia. Graham is an outdoors photographer, writer and presenter. A former national representative in whitewater slalom racing, he has paddled and adventured in over a dozen countries and pioneered new ascents in the mountains and rivers of New Zealand.
3. **Kevin England** has been kayaking in various mountainous regions around the world for the past 20 years. Calling the West Coast home for the past three years, he has been active in exploring new runs and becoming familiar with the classic rivers of the West Coast. Kevin has worked in geological exploration, river guiding, river safety equipment design and is a regular contributor to New Zealand's whitewater kayaking media. Based at the West Coast Regional Council, Kevin is

currently studying towards a Master's Degree in Natural Hazard Management from the University of Canterbury.

4. **Keith Riley** has been exploring New Zealand whitewater for over 20 years. It is likely that he has paddled more South Island rivers than any other person. Keith has spearheaded numerous first descents of some of New Zealand's hardest stretches of whitewater. He has represented New Zealand at slalom kayaking and adventure racing. He currently works at Tai Poutini Polytechnic on the West Coast, where he teaches in the kayak, rock, mountain and bush programmes.
5. **Dave Ritchie** is a highly regarded river instructor and a New Zealand authority on instructing kayaking, rafting and river rescue. Dave has been kayaking and rafting internationally for over 20 years. He is currently programme coordinator for the Outdoor Recreation Department at Tai Poutini Polytechnic.

Advisors

1. **Simon Moran** is the Manager (Planning and Environmental) with the West Coast Regional Council.
2. **Prof Ken Hughey** is a professor of environmental management at Lincoln University. He is the Project Leader for the River Values project and led the development of the significance assessment method.

Peer reviewers

1. **Rob Greenaway** is a consultant recreation planner with over 20 years professional experience. His background includes event management, outdoor recreation research, recreation planning and impact assessment for territorial authorities and for private developers, and journalism. He is regularly called as an expert witness for RMA hearings associated with rivers, for which he advises on recreation and tourism. He is a member of the Sir Edmund Hillary Outdoor Recreation Council and is an active member of the New Zealand Recreation Association and New Zealand Association for Impact Assessment.
2. **Duncan Catanach** has kayaked for over fifteen years (up to Grade IV+ level) and has paddled extensively in New Zealand, Australia, Canada, Nepal and Tibet (including participation in two first descents). He is currently Vice President of Whitewater New Zealand (formerly the New Zealand Recreational Canoeing Association). Prior to this role, he was the North Island Conservation Officer for five years. He has a particular interest in freshwater management policy and has represented whitewater kayakers in a number of forums including the Land and Water Forum and is the principal author of Whitewater New Zealand's Conservation Policy (draft, currently out for consultation). He has a first class Honours degree in Economics from the University of Melbourne (including a sub-speciality in environmental economics) and post-graduate qualifications in econometrics (economic statistics).

Appendix 6A-2 Assessment criteria for whitewater kayaking (Steps 2-4)

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR THRESHOLDS	DATA SOURCES (AND RELIABILITY)
Step 2: Identify attributes Step 3: <u>Select</u> and describe primary attributes		Step 3: Select and <u>describe</u> primary attributes	Step 4: Identify indicators	Step 5: Determine significance thresholds	
ATTRIBUTES ASSOCIATED WITH EXISTING USE					
Users	Number of users	High use implies high value. However, this assumption will under-value special and remote places for several reasons, including: Activity specialisation. Resources suitable for highly specialised participants (high skill levels) will attract low numbers of users but may be highly valued and/or rare opportunities. Access. Restrictions upon access will reduce use and/or make it available only to some potential users due to cost, availability of time, specialised equipment or transport, physical capability, etc. Wilderness and remote areas. Areas that offer few encounters with other people may be highly valued for this attribute (amongst other things).	Number of kayaker days p.a.	High: >500 kayaker days p.a. (score: 3) Medium: 100 - 500 kayaker days p.a. (score: 2) Low: <100 kayaker days p.a. (score: 1)	Expert Panel estimate (fair)
	Level of commercial use	This may imply higher value (positive relationship with level of commercial use).			
	User catchment	Origin of users is suggested as an indicator of quality of the recreational experience, based on the assumption that the higher the expected quality of the	Kayaker's home district/region: 1=Within district (live	High: Rest of New Zealand, or International (score: 3) Medium: Within region, or	Expert Panel estimate (fair)

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR THRESHOLDS	DATA SOURCES (AND RELIABILITY)
		experience, the greater the distance users will be prepared to travel. A threshold of 10% of users from the district/region triggers the rank, e.g., 10% of users from other countries receive a '5'; 10% of users from districts within the region but not the same district as that in which the river is located receive a '2'.	within territorial authority boundary in which river is located). 2=Within region (regional council boundary) but outside home district. 3=From neighbouring region (home region borders region in which river is located). 4=Rest of New Zealand but beyond neighbouring regions. 5=International.	From neighbouring region (score: 2) Low: Within district (score: 1)	
Activity	Skill required	Correlates positively with the river's whitewater grade			
	Type of use	For example, beginner instruction; adventure kayaking			
Environmental setting: Water characteristics	Density of high quality hydraulic features	Number, variety and quality of hydraulic features (e.g., waves, holes, eddies, drops)	Kayakers' perception. Interim metric is Expert Panel estimate (5-point rating scale): 1=Very few features	High: High density (score: 3) Medium: Medium density (score: 2) Low: Low density (score: 1)	Expert Panel estimate (good)

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR THRESHOLDS	DATA SOURCES (AND RELIABILITY)
			to 5=Very many features		
	Flow reliability	Correlates positively with kayaking value, although some exceptions. Will influence user catchment – locals more able to take advantage of unpredictable flow events	% of time river is kayakable. Expert Panel estimate: bands of 10%	High: >66% (score: 3) Medium: 33-66% (score: 2) Low: <33% (score: 1)	Expert Panel estimate (fair)
	Whitewater character	Includes gradient and volume of river section (e.g., low volume, high gradient pool drop c.f. continuous low gradient but large volume river sections)			
	Continuity of whitewater features	How often features occur in a single run			
	Length of kayak run	Usually, the longer the run, the higher the value			
	Presence of 'play spots'	'Playing' does not involve travel downstream. Play spots may be present only in certain flows.			
	Presence of iconic river features	Examples – scenic gorge, cliffs faces (natural landscape features or human artefacts)			
	Water quality	Includes clarity, purity and ability to support ecosystems and species. High water quality is 'nice to have' and not essential but normally adds to a river's value.			
	Scenic attractiveness	A common attribute in (the few) river user surveys. Generally, it is expected that there is a positive relationship between perceived scenic attractiveness and kayaking amenity.	Kayaker's perception of scenic attractiveness. Expert Panel estimate (5-point rating scale): 1=Highly modified to	High: Barely modified / high scenic value (score: 3) Medium: Little modification with moderate degree of scenic value (score: 2) Low: Modified with little	Expert Panel estimate (good)

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR THRESHOLDS	DATA SOURCES (AND RELIABILITY)
			5=Not modified While this indicator was used for this application, see Step 4 of the chapter for the recommended alternative indicator.	scenic value (score: 1) While these indicator thresholds were used for this application, see Step 4 of the chapter for the recommended alternative indicator.	
	Wilderness character	This setting attribute has a positive relationship with kayaking amenity – the higher the perceived wilderness character, the higher the kayaking value.	Kayaker’s perception of wilderness character. Expert Panel estimate (5-point rating scale): 1=No wilderness value to 5=Exceptional wilderness value	High: Very high wilderness value (score: 3) Medium: Moderate wilderness value (score: 2) Low: Low wilderness value (score: 1)	Expert Panel estimate (good)
Social setting	Encounters with other river users	May influence (positively or negatively) the kayaking experience			
	Behaviour of other river users	May influence (positively or negatively) the kayaking experience			
Managerial setting	Ease of access (initially selected as a primary attribute, then removed)	Mode of access used as a surrogate for ease of access. Usually the easier the access, the higher the value, however helicopter access may be a positive aspect of the kayak experience and therefore reverse this relationship.	Transport mode: 1=helicopter 2=long walk-in 3=4WD vehicle 4=2WD vehicle	High: 2WD (score: 3) Medium: 4WD (score: 2) Low: helicopter, walk-in (score: 1)	Expert Panel estimate (very good)
Experiences	Perceptions of	Linked to river’s status to kayakers. Any future survey			

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR THRESHOLDS	DATA SOURCES (AND RELIABILITY)
	the importance of the river	of kayakers should ask this question, as has been done in the past. In a sense, it synthesises all other attributes			
Other outcomes	Economic benefits	Expenditure by kayakers in local area, region, nation			
	Non-economic benefits	For example, kayakers attracted to live in region owing to kayaking amenity			
ATTRIBUTES ASSOCIATED WITH A SET (RATHER THAN INDIVIDUAL) RIVERS					
Opportunity spectrum	Scarcity of the kayaking opportunity	The availability of similar opportunities influences significance. Opportunities that can be easily substituted (not scarce) are less valued than those that are scarce. It is possible to have opportunities that are common regionally but scarce nationally (and internationally).	Expert Panel estimate (3-point rating scale): 1=Not scarce 2=Regionally scarce 3=Nationally scarce	High: Nationally scarce (score: 3) Medium: Regionally scarce (score: 2) Low: Not scarce (score: 1)	Expert Panel estimate (good)
	Connectedness –suite of kayaking opportunities	See Step 9			
ATTRIBUTES ASSOCIATED WITH FUTURE USE					
Recreation opportunity	Potential future kayaking use - avoid precluding future uses	See Step 9			

Appendix 6A-3 Assessment of indicators by SMARTA criteria

Indicator	Specific	Measurable	Achievable	Relevant	Timely	Already in use
Perception of scenic attractiveness	Yes	Kayakers' response to rating scale question	Expert Panel estimate; ideally survey kayakers	Contributes to quality of kayaking experience	No data available	Yes (used in recreation surveys)
Perception of wilderness character	Yes	Kayakers' response to rating scale question	Expert Panel estimate; ideally survey kayakers	Contributes to quality of kayaking experience	No data available	Yes (used in recreation surveys)
Density of high quality hydraulic features	Yes	Kayakers' assessment	Expert Panel estimate; ideally survey kayakers	Whitewater kayaking experience dependent on quality of whitewater	No data available	No
Flow reliability (% of time river is kayakable)	Yes	Flows data assessment; kayakers' assessment	Flow data could be used in future; kayakers' assessment	Relates to opportunity to kayak	Flow data available but assessment not done; Expert Panel assessment	No
Ease of access (mode)	Yes	Kayakers' response to transport mode question	Expert Panel estimate; ideally survey kayakers	Relates to ease of opportunity to kayak	Guidebook assessment	Yes (used in recreation surveys)
Number of users (kayaker days p.a.)	Yes	Number of kayaker days	Expert Panel estimate; ideally count kayakers	Use implies value	No data available	Yes (used in recreation surveys)
User catchment (home district/region)	Yes	Kayakers' response to home location question	Expert Panel estimate; ideally survey kayakers	Greater distance from home implies higher value	No data available	Yes (used in recreation surveys)
Scarcity of kayaking experience	Yes	Rating scale	No data available	Indicator of significance	No data available	Yes (used in previous significance assessments)

Appendix 6A-4 Significance assessment calculations for whitewater kayaking (Steps 1 and 5-8)

Step 1: Define river segments			Step 6A: Apply indicators										Step 6B: Apply thresholds						Step 8: River value						Step 9: Issues									
River no.	River	Reach	Whitewater grade	Perception of scenic attractiveness (rating scale)	Perception of wilderness (rating scale)	Density of quality hydraulic features (rating scale)	Flow reliability (% of time river kayakable)	Ease of access (mode)	No. of users (kayaker days p.a.)	User catchment (home district/region)	Scarcity of kayaking opportunity (rating scale)	Scenic attractiveness	Perception of wilderness	Density of quality hydraulic features	Flow reliability	Ease of access	No. of users	User catchment	Scarcity of kayaking opportunity	Sum Weights 1	River rank 1	Sum Weights 2	River rank 2	Sum weights 3	River rank 3	Sum Weights FINAL	River rank FINAL	Sum Weights 5	River rank 5	Sum Weights 6	River rank 6	River kayaking value	Comments	
				1=highly modified to 5=not modified	1=no wilderness to 5= exceptional wilderness	1=very low density to 5= very high density	Recorded as 10% bands	Mainly: 1=helicopter; 2=long walk-in; 3=4WD; 4=2WD	Recorded as no.	1=intra-district; 2=intra-region; 3=bordering regions; 4=other NZ; 5=international	1=not scarce; 2=regionally scarce; 3=nationally scarce	1= 1 or 2= modified with little scenic value; 2= 3 = little modification with moderate degree of naturalness; 3= 4 or 5 = barely modified and highly natural	1= 1 or 2= low wilderness value; 2= 3 = moderate wilderness value; 3= 4 or 5 = high wilderness value	1= 1 or 2= low density; 2= 3= moderate density; 3= 4 or 5= high density	1=<33%; 2= 33-66; 3=>66%	1=1 or 2 helicopter or walk-in; 2=3 4WD; 3=4 2WD	1<100; 2= 100-500; 3=>500	1=intra-district; 2= intra- or bordering region; 3=rest of NZ or initial	1=not scarce; 2=regionally scarce; 3=nationally scarce	Equal weights		Hydraulic density x 1.5		Flow reliability x 1.5		No access attribute. Equal weights		No access attribute. Hydraulics x 1.5		No access attribute. Flow reliability x 1.5				More comments could be added to this column
908000	Arahura River	Newton Ck put in	4, 5	5	5	5	90	1	250	5	3	3	3	3	3	1	2	3	3	21	1	22.5	1	22.5	1	20	1	21.5	1	21.5	1	High		
906000	Hokitika River	Kakariki	4	5	5	5	80	1	150	5	3	3	3	3	1	2	3	3	21	1	22.5	1	22.5	1	20	1	21.5	1	21.5	1	High			
893250	Perth River	Five Finger	4, 5	5	5	5	80	1	160	5	3	3	3	3	1	2	3	3	21	1	22.5	1	22.5	1	20	1	21.5	1	21.5	1	High			
906055	Styx River	Tindall Creek	4, 5	5	4	4	90	2	200	5	3	3	3	3	1	2	3	3	21	1	22.5	1	22.5	1	20	1	21.5	1	21.5	1	High			
893000	Whataroa River	Lower	3, 4	5	5	5	80	1	160	5	3	3	3	3	1	2	3	3	21	1	22.5	1	22.5	1	20	1	21.5	1	21.5	1	High			
906140	Whitcombe River	Cropp	4, 5	5	5	5	90	1	200	5	3	3	3	3	1	2	3	3	21	1	22.5	1	22.5	1	20	1	21.5	1	21.5	1	High			
951000	Karamea River	Roaring Lion	4	5	5	5	80	1	80	5	3	3	3	3	1	1	3	3	20	2	21.5	2	21.5	2	19	2	20.5	2	20.5	2	High			
943000	Mokihinui River	Forks	4	5	5	4	100	1	40	4	3	3	3	3	1	1	3	3	20	2	21.5	2	21.5	2	19	2	20.5	2	20.5	2	High			
893250	Perth River	Scone	5	5	5	5	70	1	80	5	3	3	3	3	1	1	3	3	20	2	21.5	2	21.5	2	19	2	20.5	2	20.5	2	High			
911310	Taipo River	Julia Creek hut	4, 5	5	5	4	80	1	80	5	3	3	3	3	1	1	3	3	20	2	21.5	2	21.5	2	19	2	20.5	2	20.5	2	High			
906054	Toaroha River	Below T Canyon	4	5	5	5	60	2	100	5	3	3	3	2	1	2	3	3	20	2	21.5	2	21	3	19	2	20.5	2	20	3	High			
901000	Waitaha River		5	5	5	5	80	1	50	5	3	3	3	3	1	1	3	3	20	2	21.5	2	21.5	2	19	2	20.5	2	20.5	2	High			
897000	Wanganui River	Upper	4, 5	5	5	4	80	1	40	5	3	3	3	3	1	1	3	3	20	2	21.5	2	21.5	2	19	2	20.5	2	20.5	2	High			
897000	Wanganui River	Lower	3, 4	5	5	4	90	1	100	3	3	3	3	3	1	2	2	3	20	2	21.5	2	21.5	2	19	2	20.5	2	20.5	2	High			
901100	Kakapotahi River	Lower	4	4	3	4	80	4	200	5	2	3	2	3	3	2	3	2	21	1	22.5	1	22.5	1	18	3	19.5	3	19.5	4	High			
903000	Mikonui River		2	5	5	4	100	4	50	2	3	3	3	3	3	1	2	3	21	1	22.5	1	22.5	1	18	3	19.5	3	19.5	4	High			

929000	Totara River		4	4	4	5	10	4	150	5	3		3	3	3	1	3	2	3	3		21	1	22.5	1	21.5	2	18	3	19.5	3	18.5	6	High	
911310	Taipo River	Seven Mile	2, 3	4	4	4	90	3	160	3	2		3	3	3	3	2	2	2	2		20	2	21.5	2	21.5	2	18	3	19.5	3	19.5	4	High	
906000	Hokitika River	Mungo	5	5	5	5	40	1	20	5	3		3	3	3	2	1	1	3	3		19	3	20.5	3	20	5	18	3	19.5	3	19	5	High	
906000	Hokitika River	Serpentine	5	5	5	5	60	1	60	5	3		3	3	3	2	1	1	3	3		19	3	20.5	3	20	5	18	3	19.5	3	19	5	High	
906050	Kokatahi River	Crawford	5	5	5	5	60	1	50	5	3		3	3	3	2	1	1	3	3		19	3	20.5	3	20	5	18	3	19.5	3	19	5	High	Internationally scarce
868200	Landsborough River		4	5	5	3	80	1	50	5	3		3	3	2	3	1	1	3	3		19	3	20.0	4	20.5	4	18	3	19	4	19.5	4	High	
893250	Perth River	Upper	5	5	5	5	50	1	20	5	3		3	3	3	2	1	1	3	3		19	3	20.5	3	20	5	18	3	19.5	3	19	5	High	
864000	Waiatoto River		4	5	5	4	80	1	40	3	3		3	3	3	3	1	1	2	3		19	3	20.5	3	20.5	4	18	3	19.5	3	19.5	4	High	
893000	Whataroa River	Upper	5	5	5	4	40	1	10	5	3		3	3	3	2	1	1	3	3		19	3	20.5	3	20	5	18	3	19.5	3	19	5	High	
906140	Whitcombe River	Wilkinson	5	5	5	5	60	1	20	5	3		3	3	3	2	1	1	3	3		19	3	20.5	3	20	5	18	3	19.5	3	19	5	High	
906140	Whitcombe River	Prices	5	5	5	5	60	1	60	5	3		3	3	3	2	1	1	3	3		19	3	20.5	3	20	5	18	3	19.5	3	19	5	High	
	Crooked River	Upper	4, 5	5	5	5	30	2	100	5	3		3	3	3	1	1	2	3	3		19	4	20.5	5	19.5	8	18	3	19.5	3	18.5	6	High	
901100	Kakapotahi River	Upper	5	5	3	5	60	4	150	5	2		3	2	3	2	3	2	3	2		20	2	21.5	2	21	3	17	4	18.5	5	18	7	Med	
908000	Arahura River	Styx Saddle	5	5	5	5	50	1	10	2	3		3	3	3	2	1	1	2	3		18	4	19.5	5	19	7	17	4	18.5	5	18	7	Med	
868250	Burke River		5	5	5	5	60	1	10	3	3		3	3	3	2	1	1	2	3		18	4	19.5	5	19	7	17	4	18.5	5	18	7	Med	
	Red Granite		5	5	5	5	10	1	5	5	3		3	3	3	1	1	1	3	3		18	4	19.5	5	18.5	8	17	4	18.5	5	17.5	8	Med	Recently kayaked
	Roaring Meg		5	5	5	5	5	2	5	5	3		3	3	3	1	1	1	3	3		18	4	19.5	5	18.5	8	17	4	18.5	5	17.5	8	Med	Recently kayaked
906054	Toaroha River	Upper	4	5	5	4	50	1	10	3	3		3	3	3	2	1	1	2	3		18	4	19.5	5	19	7	17	4	18.5	5	18	7	Med	
914060	Arnold River		2	3	2	4	100	4	800	3	2		2	1	3	3	3	3	2	2		19	3	20.5	3	20.5	4	16	5	17.5	6	17.5	8	Med	
914000	Grey River	Gentle Annie	3	5	4	3	100	4	80	2	2		3	3	2	3	3	1	2	2		19	3	20.0	4	20.5	4	16	5	17	7	17.5	8	Med	
952000	Oparara River		5	5	5	5	10	4	20	3	3		3	3	3	1	3	1	2	3		19	3	20.5	3	19.5	6	16	5	17.5	6	16.5	10	Med	Internationally scarce
943000	Mokihinui River	North Branch	4, 5	5	5	5	30	1	20	2	3		3	3	3	1	1	1	2	3		17	5	18.5	7	17.5	10	16	5	17.5	6	16.5	10	Med	
	Stony River (Reefton)		5	5	5	5	10	1	10	3	3		3	3	3	1	1	1	2	3		17	5	18.5	7	17.5	10	16	5	17.5	6	16.5	10	Med	
906055	Styx River	Grassy Flats	5	5	5	5	20	2	20	2	3		3	3	3	1	1	1	2	3		17	5	18.5	7	17.5	10	16	5	17.5	6	16.5	10	Med	
866000	Turnbull River		5	3	4	5	40	2	40	3	3		2	3	3	2	1	1	2	3		17	5	18.5	7	18	9	16	5	17.5	6	17	9	Med	
906140	Whitcombe River	Saddle	5	5	5	5	10	1	2	2	3		3	3	3	1	1	1	2	3		17	5	18.5	7	17.5	10	16	5	17.5	6	16.5	10	Med	
914190	Ahaura River		2	3	4	3	90	4	20	2	2		2	3	2	3	3	1	2	2		18	4	19.0	6	19.5	6	15	6	16	9	16.5	10	Med	
947000	Falls Creek	Hokitika	5	4	4	5	10	4	50	1	3		3	3	3	1	3	1	1	3		18	4	19.5	5	18.5	8	15	6	16.5	8	15.5	11	Med	
924000	Fox River	Fox Glacier	3, 4	3	2	5	100	4	50	2	3		2	1	3	3	3	1	2	3		18	4	19.5	5	19.5	6	15	6	16.5	8	16.5	10	Med	
	Big Totara		4	4	4	4	10	2	20	2	2		3	3	3	1	1	1	2	2		16	6	17.5	9	16.5	11	15	6	16.5	8	15.5	11	Med	
914140	Blackball Creek	Smoke Ho	5	4	5	5	10	2	30	2	2		3	3	3	1	1	1	2	2		16	6	17.5	9	16.5	11	15	6	16.5	8	15.5	11	Med	
	Crooked River	Lower	3	5	2	3	50	4	150	3	2		3	1	2	2	3	2	2	2		17	5	18.0	8	18	9	14	7	15	10	15	12	Med	
868000	Haast River		5	4	2	3	90	4	20	3	2		3	1	2	3	3	1	2	2		17	5	18.0	8	18.5	8	14	7	15	10	15.5	11	Med	
	Chasm Creek		4	4	3	4	30	4	10	1	2		3	2	3	1	3	1	1	2		16	6	17.5	9	16.5	11	13	8	14.5	11	13.5	14	Med	
914170	Moonlight Creek	To bailey bridge	3	4	3	4	10	4	30	2	1		3	2	3	1	3	1	2	1		16	6	17.5	9	16.5	11	13	8	14.5	11	13.5	14	Med	
911380	Otira River		5	3	1	5	10	4	10	3	3		2	1	3	1	3	1	2	3		16	6	17.5	9	16.5	11	13	8	14.5	11	13.5	14	Med	
	Waimangaroa		4	3	3	5	40	2	50	1	2		2	2	3	2	1	1	1	2		14	8	15.5	12	15	13	13	8	14.5	11	14	13	Med	
	Waiho River		3, 4	2	2	4	90	4	40	2	1		1	1	3	3	3	1	2	1		15	7	16.5	10	16.5	11	12	9	13.5	12	13.5	14	Med	
932000	Buller River	Iron Br downstream	2	3	1	2	100	4	90	1	2		2	1	2	3	3	1	1	2		15	7	16.0	11	16.5	11	12	9	13	13	13.5	14	Med	
859000	Cascade River		4	3	3	3	40	4	10	1	2		2	2	2	2	3	1	1	2		15	7	16.0	11	16	12	12	9	13	13	13	15	Med	
906014	Bluebottle Creek		4	3	2	4	10	4	30	2	1		2	1	3	1	3	1	2	1		14	9	15.5	13	14.5	14	11	10	12.5	14	11.5	16	Med	
939000	Ngakawau River		5	1	2	1	30	2	5	1	3		1	1	1	1	1	1	1	3		10	10	10.5	14	10.5	15	9	11	9.5	15	9.5	17	Low	Scarce because poor quality

Appendix 6A-5

Other factors relevant to the assessment of significance for whitewater kayaking (Step 9)

<p>Access Access is a prerequisite for kayaking and will influence the pattern of use. Lack of legal or practical access may limit or completely restrict use, even to otherwise suitable sites.</p>
<p>Connectedness – the suite of kayaking opportunities in the region Individual rivers may contribute to a set of values found within a region or nationally – the sum may be greater than the parts. If parts of the collective are compromised, this may act as a ‘tipping point’ to reduce or negate the value of the collective. For example, the West Coast attracts international kayakers, partly because it offers multiple whitewater kayaking trips across a spectrum of rivers. There is an ‘itinerary’ of river trips, which builds up (by river) in terms of the kayaking skill required. Kayakers visit the West Coast because of this collective of high volume, technically challenging wilderness rivers, which occur in close proximity to each other. This argument mirrors biodiversity hot spots of endemism – hot spots for whitewater kayaking may occur that require protection.</p>
<p>Users’ perceptions of the river’s importance (including its ‘status’) Certain rivers have national or international status (reputation) within the kayaking community. The Expert Panels noted that many West Coast rivers have an international reputation or status. This makes the West Coast unique within New Zealand for whitewater kayaking value.</p>
<p>Potential future kayaking use This is about the potential to undertake kayaking in the future. The goal is to avoid precluding future recreational use. Kayaking has been subject to a dramatic increase in the type and number of rivers that are able to be paddled in the last 20 years primarily as a result of technological advancements in kayak design and materials. Changes in access similarly may alter use. As a result, existing use patterns may be poor indicators of future use value. The best example of this phenomenon is the work by Egarr and Egarr (1981). Their assessment of the recreational potential of New Zealand rivers nearly three decades ago does not match the current use patterns owing to the sort of factors already outlined. For this reason, ‘future proofing’ for potential recreational value is required. Some decisions may inadvertently preclude future recreational options. The goal is to avoid this outcome.</p>
<p>Existence and option value Existence value - Some river sections are valued because they have not been paddled (e.g., Morgan Gorge, Waitaha River) or can only be paddled by the elite few who have the technical skill to do so. Option value - For the West Coast, option value is particularly associated with kayakers’ aspirations to paddle challenging whitewater river sections, once their kayaking skills have developed to that level.</p>

Appendix 6A-6

Future data requirements for whitewater kayaking (Step 10)

Data need
Testing the attributes identified for whitewater kayaking and identifying their relative contribution to whitewater kayaking value
Users' perception of scenic attractiveness
Users' perception of wilderness character
Hydraulic morphological index (for hydraulic density indicator)
Data for flow reliability indicator
Number of kayaker days (by time period over which river is kayaked)
Users' home location
Data for scarcity of kayaking opportunity indicator
Users' evaluation of the overall importance of the river