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Part A: River swimming in the Manawatu-Wanganui Region: Application of the River Values Assessment System (RiVAS)

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7.1 Introduction

7.1.1 Purpose

This section applies the River Values Assessment System (RiVAS) (Hughey et al., Chapter 3 herein). Its purpose is to provide a case study of how to apply the method to river swimming, using the Manawatu-Wanganui Region as an exemplar. Horizons Regional Council was the host for this case study.

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

The Expert Panel for the swimming trial in the Manawatu-Wanganui Region comprised Kay Booth (Lindis Consulting) and Barry Gilliland, Kate McArthur and Helen Marr (all of Horizons Regional Council). One member of the team was a frequent user of rivers in the region for swimming but otherwise no separate 'experts' were used. Rob Greenaway peer reviewed the work.

Credentials of the Expert Panel and the peer reviewer are provided in Appendix 7A-1.

7.1.3 Summary of this assessment

The Expert Panel identified nine resource and user attributes to assess 29 known river swimming locations in the Manawatu-Wanganui Region. The Panel identified that national significance did not apply to river swimming; therefore, the method was applied to differentiate swimming sites of regional significance from those of local significance. Two attributes proved particularly useful in defining significance for swimming sites: 'scenic attractiveness' and the 'presence of camping facilities'. Few data were available, so the Expert Panel relied on their own assessments for most attributes.

7.2 Application of the method

7.2.1 Step 1: Define river value categories, river sites and levels of significance

River value categories

The Expert Panel defined 'swimming' based on the following characteristics:

1. Contact recreation - participants get wet;
2. Site-focused - participants get in and out of the water at the same location;
3. No commercial dimension - swimming is not offered as a stand-alone[1] commercial recreation opportunity.

This definition encompasses swimming, playing around in the water and paddling. While these different activity styles may require different resource conditions (e.g., shallow slow-moving water c.f. deep holes) the Expert Panel believed they could be addressed collectively.

1 Some commercial recreation trips may incorporate swimming as part of the experience.

River sites

Swimming is site-specific. It was agreed that the method should be applied to specific river locations (sites) rather than river reaches.

Horizons Regional Council structures its freshwater management by catchment-based water management zones, as do some other regional councils in New Zealand.

Initially the method was applied to only the Manawatu River catchment, chosen because it offered a diversity of types of environments (urban, rural, remote) and a large number of potential swimming sites. Following the single catchment application, the method was applied across the whole region. It worked equally well at both geographical scales.

As part of a prior exercise, Council planners had identified sites for the swimming-spot health-risk monitoring programme, which were swimming locations considered to have high levels of use and that (with a few exceptions) were serviced by territorial authorities, e.g., rubbish bins, toilets, barbecues. This list of swimming spots was checked against the list of sites considered to have active and passive recreational values for the purpose of regional planning ('Amenity Sites') in the Council's *Proposed One Plan*[2]. A final list of 29 sites was derived for application in this study (see Appendix 7A-4).

Some swimming sites within the Region are not included. It has been assumed that any sites where swimming takes place which are not listed are of only highly localised value.

Levels of significance

The Expert Panel could not identify a circumstance where a river swimming site would have national significance and the decision was made that a national significance level would not apply to swimming for assessment within the method. Considerations in this decision were that swimming sites did not attract users to travel inter-island or internationally (although travel distance was not considered the sole arbiter of significance) and that the community of interest for swimming was likely to be local or regional (the question was posed: who would respond to any threat to the loss of swimming at the site?).

Outcomes

Treat swimming as one river value (no separate activity categories).

For the base list of swimming sites, use the list of swimming spots (from Council records) and any other lists of amenity sites (from Council planning documents) that are located alongside rivers.

Consider regional and local levels of significance (not national significance).

7.2.2 Step 2: Identify attributes

Attributes to describe swimming were structured around the following framework[3]:

1. *Social attributes* – users and their perceptions, behaviour and use;
2. *Amenity attributes* – managerial dimensions of the site (facilities, services, maintenance activities, regulations);

2 Horizons Regional Council has combined its regional policy statement and regional plans, termed the 'One Plan' (Horizons Regional Council, 2007).

3 Members of the Expert Panel were not familiar with the Recreation Opportunity Spectrum framework (Brown et al., 1978; Clark and Stankey, 1979), so it was not used to structure the attributes. However, it was used to check the comprehensiveness of the list of attributes.

3. *Aesthetic/scenic attributes* – natural character of the site;
4. *River attributes* – physical structure (morphology) of the river bed and shore; and
5. *Water quality attributes* – clarity, health risk and nuisance algal growths affecting water quality.

The Expert Panel felt that future or potential use was important but recognised that a focus upon existing use was the most practical approach. See Step 9 for reference to future use.
Two attributes were identified that referred to the collection of swimming sites rather than the individual site - the degree of scarcity of the experience within the catchment/region and site clusters offering choice to swimmers.

Attributes encompass three of the four well-beings defined in the Local Government Act 2002 (social, economic, environmental). Cultural attributes may be relevant for swimming (it was hypothesised that different ethnic groups may have different propensities to go swimming), but no data were available to evaluate this notion.

Outcome

A list of all attributes is provided in Appendix 7A-2, structured by the five categories identified above.

7.2.3 Step 3: Select and describe primary attributes

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

1. Expert Panel members' opinion about the ability of attributes to help differentiate regionally significant swimming sites from locally significant sites. Owing to a lack of data, Expert Panel judgement was the key means for identifying primary attributes;
2. Research literature on the attributes identified by swimmers as important (e.g., Fink-Jensen et al., 2004a, b; Galloway, 2008; Orr, 1982; TRC, 1992). Very few relevant data were identified;
3. Use of national environmental and health guidelines for water quality associated with contact recreation (MfE/MoH, 2009; Biggs, 2000);
4. Coverage of all five attribute categories (as outlined in Step 2) – each was considered to influence the presence and significance of swimming sites;
5. The need for pragmatism – only nine primary attributes were identified but these covered three of the four well-beings;
6. Acknowledgement that certain attributes represent desirable site characteristics for swimming – i.e., without these attributes, swimming may be absent from the site (discussed in Step 9). Some of these attributes were initially selected as primary attributes, but later rejected, as they did not differentiate sites – they were universally present and did not vary in quality;
7. Identification of some 'experience' attributes (e.g., perception of safety) that were not selected because they represent users' *evaluation* of other attributes (e.g., river morphology, water quality);
8. Recognition that some attributes contributed to the level of local use rather than helping to identify a regionally (c.f. locally) significant site (e.g., the presence of a community facility, such as a Scout den or a marae, next to a swimming site might increase use by local residents); and
9. Consideration was not given to the availability of existing data, as very few data existed.

Outcome

Appendix 7A-2 identifies the nine primary attributes (in bold) and describes them, with an emphasis on explaining each attribute's validity and reliability as a representative measure of swimming value.

7.2.4 Step 4: Identify indicators

One indicator for each primary attribute was identified, using SMARTA[4] criteria, based on:

1. Expert Panel judgment;
2. Existing data – available for some of the water quality and facility indices; and
3. Transferability - attempts to identify indicators that may be portable to other river values (e.g., 'level of use' and 'travel distance').

Appendix 7A-3 shows the assessment of each indicator using SMARTA criteria. No primary attributes were dropped owing to difficulty in devising measurable indicators.

Each indicator was considered carefully, including:

1. The presence of facilities was considered a good indicator because facilities are associated with high use sites and their presence is easy to measure. However, a 'feedback loop' was noted - facilities respond to demand (i.e., indicate high use) but they may also encourage use. Some district councils are more likely to provide facilities than others. This will affect the ranking of sites across individual districts and should be considered by the Expert Panel once site rankings are explicit (Step 8B).
2. The presence of a formal camping opportunity was considered to reflect the availability of a diverse range of recreation opportunities and/or sufficient use to warrant facility provision (by either a public or private provider). The presence of camping facilities was considered likely to increase users' propensity to travel a long distance in order to visit the site and the length of time (or number of swims) spent at a particular site (see 'level of use' indicator). This example illustrates the inter-connection of attributes.
3. The attribute *travel distance* is a surrogate for quality of the swimming site – it measures swimmers' willingness to pay for travel time/cost. This is a different measure from the site's proximity to a large population base (which may increase local use rather than signify regional importance). The choice between measuring travel time or travel distance was debated. Distance was selected on the basis that in the future (if data on users' home locations are available), this metric can be quantified using GIS. It also removed the complexities of different types of transport modes (car, bicycle, etc).
4. *Variable water depth* was chosen to represent the attractiveness of the physical structure of the shore/river bed for the range of styles of swimming (children's paddling, diving into deep holes, etc). Some depths are more attractive to certain styles of activity – so this indicator deliberately covers the range. It was considered that variability (the presence of shallow and deep water) was attractive for swimming. The indicator had to depict this in some meaningful manner. This proved a challenging task. Ultimately, pragmatism led to the choice of a simple measure – whether the river bed profile was flat or not. The profile of the shoreline (to facilitate easy access to the water) was also considered but dismissed owing to difficulty in quantification.
5. *Level of use* – the Expert Panel liked the metric 'angler days per annum' used in the National Angling Survey (Unwin, 2009). An equivalent measure (participant days p.a.) for all recreational activities would be ideal but requires a population-based survey (see Step 10). An alternative is to count users on-site (number of swimmers per peak use day).

Outcome

Indicators are listed in Appendix 7A-2 and assessed against SMARTA criteria in Appendix 7A-3.

7.2.5 Step 5: Determine indicator thresholds

Thresholds for each indicator were identified by the Expert Panel as follows:

4 Specific, measurable, achievable, relevant, timely and already in use.

1. *Level of use (number of swimmers on a peak use day)*: Since no data were available, the Expert Panel estimated swimmer numbers (high/low). Ideally, actual data would be used;
2. *Travel distance (number of kilometres travelled from home by swimmer)*: An initial analysis using the threshold of 30 km did not trigger any sites as regionally significant for this attribute, therefore the threshold was adjusted to 20 km (which did differentiate between sites and the division seemed appropriate);
3. *Toilet facilities (presence of toilets):* Maintained toilets available at the site;
4. *Camping facilities (presence of camp facilities):* Camp facilities maintained by the Territorial Authority, another public agency or a private provider;
5. *Perception of scenic attractiveness*. Since the Expert Panel assessed scenic attractiveness, the threshold was kept simple (high/low). Ideally, a professional landscape assessment or users' perceptions would be used. Outstanding natural landscapes identified within Regional Plans (or similar classifications in other planning documents) can inform this assessment;
6. *Swimming holes (maximum water depth)*. >2 m depth allows for diving (Expert Panel assessment) and, assuming high water clarity, visual identification of underwater obstructions;
7. *Variable water depth (river bed profile)*. The need for a simple metric that could be identified from a site visit (and was easy to implement) led to the choice of flat/variable river bed profile;
8. *Algae (compliance with periphyton and cyanobacteria guidelines)*. A breach of the draft national cyanobacteria guidelines (MfE/MoH, 2009) triggers the Regional Council to post public health warnings. Therefore, this indicator influences the public's perception of site safety, as well as providing a physical measure of public health risk and pollution. Other periphyton (filamentous algae and diatoms) may be a nuisance to swimmers and has national guidelines (Biggs, 2000). Compliance with both sets of national guidelines (MfE/MoH, 2009; Biggs, 2000) was chosen as the indicator. The assessment was kept simple – the indicator score being % time the site met both guidelines (threshold of 25% of the time). A scoring system that differentiated between public health (cyanobacteria) and nuisance periphyton was considered but dismissed owing to complexity. Repeated breaches of either health risk or nuisance algae guidelines diminishes the swimming value of the site; and
9. *Water clarity* (compliance with national guidelines). ANZECC (2000) guidelines for horizontal visibility were chosen as the indicator.

All indicators were scored on a dichotomous scale (1 or 2). Future applications of the method should apply a three-point scale (high=3; medium=2; low=1) where feasible (e.g., perception of scenic attractiveness).

Outcome

Thresholds are identified in Appendix 7A-2.

7.2.6 Step 6: Apply indicators and indicator thresholds

Expert Panel estimates were required for most indicators. Some data were available for four indicators: water clarity, algae, toilets and camp facilities.

Outcome

Data estimates are given in Appendix 7A-4.

7.2.7 Step 7: Weighting the primary attributes

The Expert Panel reviewed the nine primary attributes and considered whether some made a relatively greater contribution to the rating of swimming value.

The indicators *swimming holes* and *variable water depth* were combined (their weighting was halved). Results from this weighting scenario were compared with an equal weighting analysis, and the rank order of rivers examined. Fundamentally little changed, so the decision was reached to keep weightings equal.

Outcome

Equal weighting. See Appendix 7A-4.

7.2.8 Step 8: Determine river site significance

Step 8a: Rank sites

The spreadsheet was used to sum the indicator threshold scores for each swimming site. Since we had chosen to have equal weightings for the primary attributes, we did not have to first multiply the threshold scores by the weightings. The sums of the indicator threshold scores were placed in a column and then sorted in descending order. These sums were then converted into rankings (1st, 2nd, 3rd, etc) to provide a list of the sites ranked for their swimming value.

Step 8b: Identify river site significance

Using the ranked list from Step 8A, the Expert Panel closely examined the river sites and their attribute scores. After much discussion, the Expert Panel decided greatest importance should be placed on social attributes and the scenic attractiveness attribute, as these were felt to most strongly influence swimmers' site selection. In part this related to the inter-connection of attributes (e.g., physical river features are likely to underpin users' evaluation of scenic attractiveness). Also, the use of facility provision attributes allowed a very practical means to assess significance (easy to implement the method).

A threshold score of 1 (low) for *travel distance* appeared to be a strong determinant of the subsequent ranking of the site as locally significant for swimming. However, this did not hold true in all cases, so was not chosen as a criteria for local significance.

The significance criteria selected were:

Regional significance:

Criterion 1: *Presence of camp facilities* = 2, plus *scenic attractiveness* = 2; or
Criterion 2: 80% or more of the attributes = 2

Local significance:

Remaining sites on the list

Translation of these criteria to sites is shown in Appendix 7A-4. Some refinement of these criteria may be required once the method has been applied in other regions with different site conditions.

The Expert Panel examined the resulting river significance allocation and noted that the Manawatu River at Ashhurst Domain ranked 12th for swimming value but was designated of regional significance, while some rivers ranked higher but only achieved local significance status. The Panel confirmed that Ashhurst Domain should be designated regionally significant – it scores poorly for physical river features (swimming holes, variable water depth and algae) but otherwise is a very good recreation site which experiences a high level of use by swimmers – and confirmed all other site significance ratings.

Simplified assessment process

Based on the significance criteria, a simplified process was developed to assess significance for swimming (Figure **Error! No text of specified style in document.**-1). It recognises that only two primary attributes (scenic attractiveness and presence of camp facilities) determined six of the seven sites which rated as regionally significant for swimming. The purpose of this simplified assessment process is to offer a quick way to identify regionally significant swimming sites, as it removes the need to assess the other seven primary attributes.

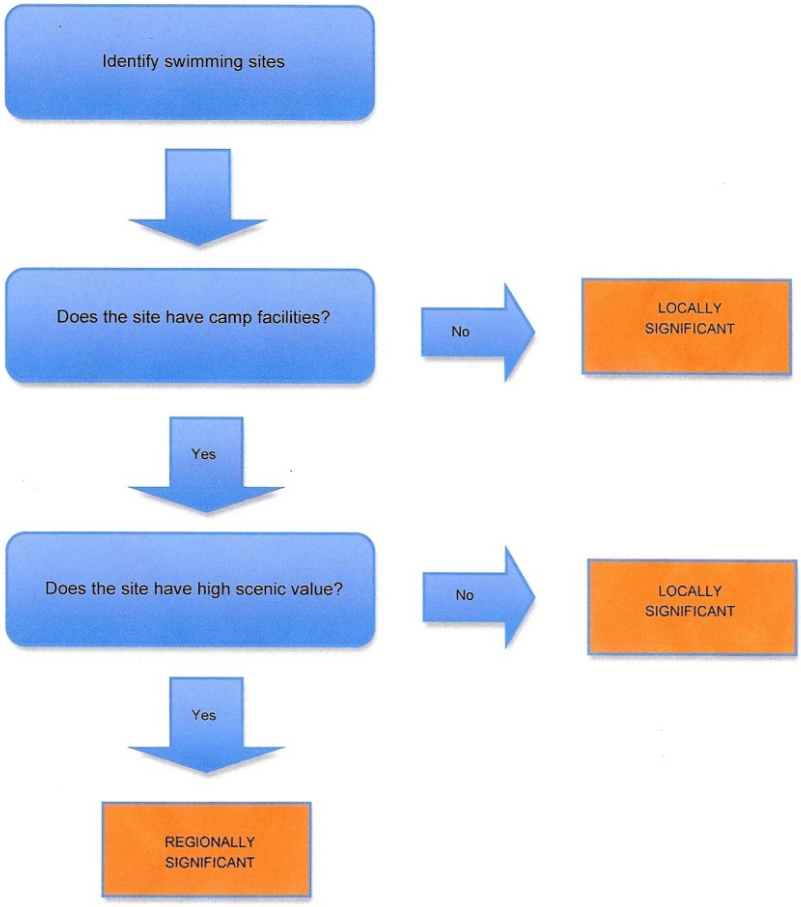
However, we believe the full method provides a more robust assessment and should be used wherever possible. In the Manawatu-Wanganui Region case study, one site (Tokomaru River at Horseshoe Bend) would not have triggered regional significance on the simplified criteria alone (because it does not have camping facilities).

Step 1: Identify swimming sites. Compile a list of swimming sites by asking district/city councils to identify locations where people swim. If a site is not known by district council staff, then it is unlikely to be regionally significant.

Step 2: Identify whether the site has formal camping facilities (designated camping sites, ablution block, camping signage, etc). If yes, go to Step 3. If no, the site is locally significant for swimming.

Step 3: Identify whether the site has high scenic qualities. If yes, the site is regionally significant for swimming. If no, the site is locally significant for swimming.

Figure Error! No text of specified style in document.**-1**
A simplified significance assessment method for swimming



Outcome

A list of sites ranked by a scoring system from highest to lowest, which represents an initial significance ranking list. See Appendix 7A-4.

Sites identified as significant at the regional and local level. See Appendix 7A-4.

Sites where people swim which are not listed have only highly localised swimming value.

A simple swimming assessment process identified (Figure **Error! No text of specified style in document.**-1).

1.2.9. ***Step 9: Outline other factors relevant to the assessment of significance***

This step comprises two parts: (1) identification of site characteristics desirable for swimming; and (2) discussion of factors which are not quantifiable but considered relevant to significance assessment (see also Appendix 7A-5).

Desirable site characteristics for swimming

Some site characteristics were identified by the Expert Panel as highly desirable for swimming – in most (but not necessarily all) cases, a 'good' swimming site will have all of these characteristics. A change in any of them may affect the ability to undertake swimming at the site or the perception of its attractiveness to users. See Appendix 7A-5.

Desirable site characteristics include:

1. Public access available;
2. Appropriate flow (velocity);
3. Adequate river width;
4. Perception of safety; and
5. Presence of beach.

***Other factors relevant to significance assessment*:**

- Future use of a site – the desire to avoid precluding swimming at a site in the future;
- Degree of scarcity of the experience.

Outcome

List and description of non-measured attributes (Appendix 7A-5).

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

Few data were available to inform this case study. Desired data are noted in Appendix 7A-6.

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Appendix 7A-1
Credentials of the Expert Panel members and peer reviewer

The Expert Panel comprised four members. Their credentials are:

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, having undertaken reviews of the research literature for outdoor recreation (for the Department of Conservation) and nature-based tourism (for the Ministry of Tourism). She has worked on a range of outdoor recreation planning projects, from the Molesworth Recreation Reserve management plan to the Milford Sound/Piopiotahi user monitoring programme. She has more than 30 peer-reviewed research publications and holds appointments on the New Zealand Walking Access Commission, the New Zealand Geographic Board and the New Zealand Conservation Authority.
2. **Barry Gilliland** is a resource management policy analyst with a work history focussed on water quality management at Horizons Regional Council. He has worked in the Manawatu River catchment since 1975 and the wider Manawatu-Wanganui Region since 1988. He set up the Regional Council's swimming site monitoring programme in 2004 and continues to manage this annual programme.
3. **Kate McArthur** is a senior scientist at Horizons Regional Council. She leads the State of Environment Water Quality and Aquatic Biodiversity programmes, project managing and co-ordinating input from other Council staff and external science providers. She also undertakes technical assessments of environmental effects for resource consent and compliance enforcement activities. At a personal level, she is a frequent user of swimming sites in the Region and has a sound practical knowledge of the needs of swimming site users.
4. **Helen Marr** is a senior policy analyst specialising in resource management and a qualified RMA decision maker under the 'Making Good Decisions' programme. She is currently the project manager of Horizons Regional Council's *Proposed One Plan* process.

The peer reviewer for this work was:

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.

Appendix 7A-2
Assessment criteria for swimming (Steps 2-4)

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR SIGNIFICANCE THRESHOLDS	DATA SOURCES (AND RELIABILITY)
Step 2: Identify attributes Step 3: Select and describe primary attributes		Step 3: Select and describe primary attributes	Step 4: Identify indicators	Step 5: Determine significance thresholds	
ATTRIBUTES ASSOCIATED WITH EXISTING USE					
Social	**Level of use**	High use implies high value. This may not hold true for two reasons: **Remote places**, which offer few encounters with other people, may be highly valued for their wilderness value and the experience of 'having the place to ourselves'. **Crowding** may occur at popular sites, which may turn people away. This may be anticipated and the site not chosen for a swim, or occur on arrival (displaced to another nearby site, if one exists).	Number of swimmers on a peak use day NOTES: An ideal indicator would be number of swimmer days p.a.	High (**score: 2**) Low (**score: 1**)	Expert Panel estimate (good)
	Travel distance	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 experience, the greater the distance users will be prepared to travel. A site close to a large population (short travel distance) will receive more use for reasons of convenience (close to home) resulting in a higher level of local use rather than necessarily signifying regional importance.	Number of kms travelled from home by swimmers NOTES: Travel time was considered but distance offers a more standard metric as time introduces the factor of travel style (e.g., walk, car, cycle).	High: >20 km (**score: 2**) Low: <20 km (**score: 1**)	Expert Panel estimate (poor)

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR SIGNIFICANCE THRESHOLDS	DATA SOURCES (AND RELIABILITY)
	Perception of safety	Overall evaluation that accounts for a range of perceptions (e.g., flow, water quality, presence of others). Outcome of swimmers' decision-making can be measured via numbers of swimmers attribute.	**Desirable site characteristic**		
	Other users and uses	This includes other users' demographics, their behaviour and the style of their use (e.g., organised events). The types of people who frequent a site may influence its perceived suitability (e.g., site popular with young males who 'take over the place').			
	Diversity of recreation opportunities	Swimming is often undertaken by groups with a range of activity interests. For example, young children who paddle with their parents, some family members who want to go fishing, others who want to sun bathe and swim to 'cool off'. The diversity of opportunities available to cater for different group members may therefore increase a site's attractiveness.			
Amenity / managerial setting	**Toilet facilities**	When a site is well used, councils provide facilities (such as toilets). However, the provision of facilities may also encourage use (people go to sites where there are toilets, which means they can plan to stay all day, for example). Since some councils provide a higher level of facility provision than others, the Expert Panel needs to maintain oversight of these data.	Presence/absence of toilets maintained by the Territorial Authority	High: Present (**score: 2**) Low: Absent (**score: 1**)	Council data (excellent)
	Camping facilities	As already noted, swimming is often associated with other recreational activities (picnicking, fishing, etc). Camping indicates significant length of stay and often a willingness to travel a long distance to the	Presence/absence of camping facilities (e.g., designated camping sites, ablution block,	High: Present (**score: 2**) Low: Absent (**score: 1**)	Council data (excellent) Expert Panel estimate

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR SIGNIFICANCE THRESHOLDS	DATA SOURCES (AND RELIABILITY)
		site. Camping facilities may be provided by different types of provider (public or private). Since some councils have a greater propensity to provide facilities than others, the Expert Panel needs to maintain oversight of these data. NOTES: This attribute was initially defined as the opportunity to camp, but this did not differentiate sites, given people can freedom camp near many swimming areas.	signage, etc).		(excellent)
	Maintenance activities	Some form of council maintenance (e.g., lawn mowing, rubbish collection, weed control) suggests high usage sites.			
	Public access - unrestricted public access; no access charges; easy practical access	Public access to the site and within the site to the water is critical. This attribute is one of the essential elements of swimming sites – without access, no swimming can occur	**Desirable site characteristic**		
	Jump-off points	A high point (e.g., bridge, rope swing) adds to the swimming site - amenity feature			
Aesthetic / scenic	**Perception of scenic attractiveness**	It is expected that there is a positive correlation between perceived scenic attractiveness and swimming amenity. This attribute refers to the integrated set of aesthetic components, many of which are listed as	Perception of high/low attractiveness		Expert Panel estimate (good)

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR SIGNIFICANCE THRESHOLDS	DATA SOURCES (AND RELIABILITY)
		separate attributes in this cluster (see next rows). Ideally a professional landscape assessment would be used or else the perceptions of users/residents. In the absence of these data, Expert Panel estimates were used.			
	Degree of naturalness	Amenity feature			
	Wilderness character	Amenity feature			
	Visual landscape back-drop	Amenity feature			
	Flora and fauna	Amenity feature			
	Open space	Amenity feature			
	Natural features that offer jump-off points (big rock, cliff, etc)	Amenity feature			
	Water temperature	Amenity feature			
	Cleanliness and tidiness	Amenity feature			
Physical river features	**Swimming holes**	The opportunity to dive and play around in deeper water was considered to be an attractive feature – people often talk about 'good swimming holes'	Maximum water depth	High: >2 m (**score: 2**) Low: <2 m (**score: 1**)	Expert Panel estimate (good)
	Variable water depth	A flat river bed was considered less attractive for swimming than a variable or asymmetric (shallow +	River bed profile	High: variable (**score: 2**) Low: flat (**score: 1**)	Expert Panel estimate

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR SIGNIFICANCE THRESHOLDS	DATA SOURCES (AND RELIABILITY)
		deep) bed profile.			(good)
	Width of river	A river needs to be wide enough to make it worthwhile for swimming	**Desirable site characteristic**		
	Flow	Velocity <1 m/s, as >1 m/s is too fast for an adult to wade (at depth of 1 m after which point person likely to swim rather than walk)	**Desirable site characteristic**		
	Hard/soft river bed bottom	Soft river beds are muddy and may be less popular			
	Natural jump-off features (e.g., large rock)	Amenity feature			
	Beach	Somewhere to sit and easy access to the water	**Desirable site characteristic**		
	Pools	Amenity feature			
	Pool/riffle/run sequences	Amenity feature			
	Rapids	Amenity feature			
Water quality	**Algae**	The presence of blue-green algae (cyanobacteria) presents a public health issue. Draft national guidelines (MfE and MoH, 2009) have been developed – cyanobacteria guideline breaches trigger the posting of public health warnings. Other periphyton (filamentous algae and diatoms) present a nuisance to swimmers and detract from aesthetic appeal (Biggs, 2000) rather than present a potential health issue. This attribute encompasses types of algae that relate	Compliance with national periphyton guidelines and draft national guidelines for cyanobacteria, i.e.: The maximum cover of visible stream or river bed by periphyton: filamentous algae more than 2 cm long shall not	**High**: Meet guidelines >25% of the time in past year (**score: 2**) **Low**: Meet guidelines <25% of the time in past year (**score: 1**)	Expert Panel estimate (fair) Some council data available (very good)

ATTRIBUTE CLUSTERS	ATTRIBUTE (primary attributes in bold)	DESCRIPTION OF PRIMARY ATTRIBUTES	INDICATORS	INDICATOR SIGNIFICANCE THRESHOLDS	DATA SOURCES (AND RELIABILITY)
		to a health risk (cyanobacteria) or a nuisance (filamentous algae/diatoms) for swimmers.	exceed 30%; diatoms more than 3 mm thick shall not exceed 60%; or cyanobacteria cover shall not exceed 50%		
	Blue-green algae	Covered above – initially separately identified owing to its importance for public health			
	Water clarity	Users prefer clear water	Compliance with ANZECC (2000) guidelines, i.e.: Horizontal visibility >1.6 m (black disc visibility)	**High**: >1.6 m horizontal visibility when river is below median flow (**score: 2**) **Low**: <1.6 m horizontal visibility when river is below median flow (**score: 1**)	Expert Panel estimate (fair) Some council data available (very good)
	Faecal contaminants	This is related to water clarity and flow (data indicate a positive correlation)			
	pH	Acid or alkaline pH may cause skin irritations and make eyes and cuts sting			
CONTEXTUAL ATTRIBUTES					
Collective value	Site clusters	The proximity of sites to each other may influence site selection, as it provides options (e.g., if one site looks crowded, users can go to a nearby site).			
	Scarcity	Where few swimming sites exist within an area, then each site is more significant			

Appendix 7A-3
Assessment of indicators by SMARTA criteria

Indicator	Specific	Measurable	Achievable	Relevant	Timely	Already in use
Number of swimmers on a peak use day	Yes	Number of swimmers	Requires on-site monitoring	Use implies site valued by user	Data not available (requires monitoring)	Standard recreation metric
Number of km travelled from home by swimmers	Yes	Number of km	Requires user survey to identify home location	Large travel distance implies high value	Data not available (requires user survey)	Question been asked in recreation surveys
Presence of toilets	Yes	Toilet present/absent	Data available for Council toilets; Non-council facilities known by Expert Panel	Facilities response to demand/high use	Data available	Data used by councils for other purposes
Presence of camp facilities (allocated camp sites, ablution block, signage)	Yes	Camp facilities present/absent	Data available for council facilities; Non-council facilities known by Expert Panel	Facilities response to demand/high use	Data available	Data used by councils for other purposes
Scenic attractiveness	Yes	Response to user survey rating scale question; Professional assessment by landscape planner	Requires site visit (planner) or else user survey	Likely to influence choice of swimming site	Data not available (but could obtain from site visit – user survey or professional assessment)	Assessments undertaken by landscape planners for other purposes; Question been asked in recreation surveys
Maximum water depth	Yes	Physical measure	Site visit required	Provides swimming hole	Data not available (easy to obtain from site visit)	No
River bed profile	Yes	Physical measure	Site visit required	Provides site conducive to swimming	Data not available (easy to obtain from site visit)	No
Compliance with periphyton and cyanobacteria guidelines	Yes	National water quality measures	Part of council monitoring programme	Triggers posting of health risk warning and/or nuisance	Data available	Data used by councils for public health warnings
Horizontal visibility	Yes	National water quality measure	Part of Council monitoring programme	Likely to influence choice of swimming site	Data available	Data used by councils for other purposes

Appendix 7A-4
Significance assessment calculations for swimming (Steps 1 and 5-8)

Swimming site	Description	Primary attribute, indicator, threshold and data source				SIGNIF CRITERION				SIGNIF CRITERION	Sum	Rank	River significance
		Water clarity Horizontal visibility 1<1.6m, 2>1.6m RC data + EP estimate	Swimming holes Max water depth 1<2m, 2>2m EP estimate	Variable water depth River bed profile 1=flat, 2=variable EP estimate	Algae G/lines compliance 1>25%, 2<25% RC data + EP estimate	Scenic attractiveness Overall rating 1=low, 2=high EP estimate	Origin of users Km from home 1<20km,2>20km EP estimate	Level of use No. swimmers/ peak day 1=low, 2=high EP estimate	Facilities Presence of toilet 1=no, 2=yes RC data	Camping opportunity Presence camp facilities 1=no, 2=yes RC data + EP estimate	Equal weight		
Pohangina R at Totara Reserve (Regional Park)	Rural/ remote	2	2	2	2	2	2	2	2	2	18	1	Regional
Managua o Te Ao R at Ruatiti	Rural	2	2	2	2	2	2	2	2	2	18	1	Regional
Rangitikei R at Vinegar Hill	Rural	2	2	2	2	2	2	2	2	2	18	1	Regional
Tokomaru R at Horseshoe Bend	Rural	2	2	2	2	2	2	2	2	1	17	4	Regional
Rangitikei R at Mangaweka	Rural	2	2	2	1	2	2	2	2	2	17	4	Regional
Ohau R at Kimberley Reserve	Rural	2	2	2	2	2	1	2	2	2	17	4	Regional
Pohangina R at Raumai Reserve	Rural	2	2	2	2	1	2	2	2	1	16	7	Local
Ohau R at Gladstone Reserve	Rural	2	2	2	2	2	1	2	2	1	16	7	Local
Mangahao R at Marima Domain	Rural	2	2	2	2	2	2	1	1	1	15	9	Local
Manawatu R at Woodville Ferry Reserve	Rural	2	2	2	1	2	2	2	1	1	15	9	Local
Oroua R at Londons Ford	Rural	2	1	2	2	1	2	2	2	1	15	9	Local

Manawatu R at Ashhurst Domain	Rural	2	1	1	1	2	1	2	2	2	14	12	Regional
Kahuterawa Stm at Reserve	Rural	2	1	1	2	2	1	1	2	1	13	13	Local
Mangatainoka R at SH2 Reserve	Rural	2	2	2	1	1	1	2	1	1	13	13	Local
Manawatu R at Albert St	Urban	2	2	2	1	1	1	2	1	1	13	13	Local
Kahuterawa Stm at Camp Kilsby	Rural	2	1	1	2	1	1	1	2	1	12	16	Local
Whanganui R at Cherry Grove	Urban	2	1	1	2	1	1	2	1	1	12	16	Local
Mowhanau Stm at Kai-Iwi Beach	Urban	1	1	1	2	1	1	2	2	1	12	16	Local
Whanganui R at Mosquito Point	Rural	1	2	1	2	1	1	2	1	1	12	16	Local
Ohau R at Kirkauldies Bridge	Rural	2	1	1	2	2	1	1	1	1	12	16	Local
Makakahi R at Bridge St, Eketahuna	Urban	1	1	2	2	1	1	1	1	1	11	21	Local
Oroua R at Bartletts Ford	Rural	1	1	1	2	1	1	1	2	1	11	21	Local
Oroua R at Almadale	Rural	1	1	1	2	1	1	1	2	1	11	21	Local
Whanganui R at Town Bridge	Urban	1	2	1	2	1	1	1	1	1	11	21	Local
Manawatu R at Maunga Rd	Rural	1	1	1	2	1	1	1	1	1	10	25	Local
Manawatu R at Weber Rd	Rural	1	1	1	2	1	1	1	1	1	10	25	Local
Oroua R at Timona Park	Urban	1	1	1	1	1	1	1	2	1	10	25	Local
Manawatu R at Kumeroa (Little Rd)	Rural	1	1	1	1	1	1	1	1	1	9	28	Local
Manawatu R at Hopelands Domain (River Rd)	Rural	1	1	1	1	1	1	1	1	1	9	28	Local

Appendix 7A-5
Other factors relevant to the assessment of significance for swimming (Step 9)

Desirable site characteristics for swimming
Public access The public must be able to access the site. Access for vehicles is important for most sites and includes space for parking (which may be informal). It was noted that access to most swimming sites is free of charge in New Zealand and this is expected by New Zealanders.
Flow (velocity) The water should be flowing (not stagnant) and able to be waded (<1 m/s at 1 m depth).
River width A river that is too narrow is unlikely to attract swimmers. The Expert Panel suggested a width of approximately >5 m.
Perception of safety Swimmers are unlikely to use a site they consider too risky.
Beach Ideally, the shore provides somewhere to sit and enables easy access to the water.
Other factors
Potential future use Some sites may receive a low level of existing use (or none at all) but have the potential to be well-used swimming sites (e.g., from a change to a desirable site characteristic).
Degree of scarcity of the experience Where few alternative (substitute) sites exist that suit swimming, then the degree of scarcity is high (and vice versa). This places greater significance upon sites. Conversely, where sites exist in close proximity, this may influence site selection as it provides options (e.g., if one site looks crowded, users can go to a nearby site).

Appendix 7A-6
Future data requirements for swimming (Step 10)

Data need
User monitoring at swimming sites on peak use days – numbers of users
Professional assessment of scenic attractiveness by landscape planner
User surveys at swimming sites (home location; perception of scenic attractiveness; use by different ethnic groups; satisfaction with visit)
Population-based survey (in conjunction with other recreation data collection) - to enable calculation of swimmer/days + evaluation of the overall importance of different sites for swimming