A POTENTIAL METHOD FOR THE ASSESSMENT OF CRITERION VII WORLD HERITAGE CONVENTION

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PURPOSE

In 2013, IUCN published: *Study on the application of Criterion VII* regarding the nomination of sites under the World Heritage Convention. Criterion VII provides for the nomination of sites which *contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance*. The report examined the development of the Criterion and its application in several nominations, differentiated between *superlative natural phenomena* and *exceptional natural beauty and aesthetic importance*, examined trends and issues in its application, and examined methods for assessing natural beauty and aesthetic importance.

The purpose of this paper is to describe and demonstrate a method by which *areas of exceptional natural beauty and aesthetic importance* may be assessed and quantified. The paper summarises the findings of the IUCN report and then describes an alternative method that will fulfil IUCN requirements for a systematic, rigorous and transparent method.

KEY FINDINGS

The report made the following key findings:

Criterion VII contains two distinct ideas, firstly, *superlative natural phenomena* and secondly, *exceptional natural beauty and aesthetic importance*. The first concept includes animal gatherings and migrations and the highest, biggest, deepest or largest examples of physical features such as cliffs, mountains, canyons, waterfalls, glaciers, caves and trees all of which should be judged objectively on a global basis. The latter concept addresses people's subjective perceptions of aesthetic beauty contained in the natural environment. Nominations can be under either one or the other concepts, or both; most nominations cover both, (perhaps because the distinction has not been clear). Assessment of *exceptional natural beauty and aesthetic importance* is regarded as the harder of the two.

Criterion VII has the same standing as other criteria under the World Heritage Convention and refers clearly to natural beauty.

In respect of *exceptional natural beauty and aesthetic importance*, the challenges are, firstly, to assess it in a systematic, rigorous and transparent way; secondly, to conduct a comparative analysis at a global scale to enable nominations to be assessed in context; and thirdly, to clarify the relationship of aesthetic values applying to natural beauty with the aesthetics of cultural features.

Many national parks and areas have been dedicated on the basis of their scenic beauty. An extensive, multidisciplinary body of research has developed on assessing the aesthetics of natural environments. Because vision is the dominant sense, most research focuses on the visual quality of landscapes while acknowledging the influence of sound, smell and experiential and emotional responses. While some researchers assert that the assessment of natural beauty requires scientific knowledge of the landscape, others contend that while knowledge can inform, aesthetic judgement is not based on cognition but on preferences. Preference-based research has indicated that the positive preferences are evoked from water, topographic variation, woodlands and naturalness.

The report draws heavily on the landscape character assessment approach, developed furthest in the UK, which is based on accurate descriptions of the landscape upon which, it is asserted, qualitative judgements can be made. The reliability of the method – the commonality of judgements by different assessors (which is rarely tested), is important along with ensuring that what is being assessed can validly represent visual quality. Descriptive accounts of the nominated area are often used, and comparisons with other areas are generally descriptive rather than quantitative.

While most nominations have relied on expert aesthetic assessments, there is increasing recognition of the need to involve public and stakeholders in the assessment. There is uncertainty regarding differences between cultures in their aesthetic judgements.

While nominations should be based on measurable indicators of scenic beauty along with quantified comparisons of natural beauty and aesthetic importance, few nominations have attempted this, relying instead on qualitative descriptions. One measurable indicator used is tourism data (which is only a surrogate of scenic beauty and is influenced by affluence, accessibility and interest). Providing only photographs of the area is judged as inadequate.

Social science literature indicates that there is a range of methodologies for measuring scenic beauty together with knowledge and experience available which can strengthen nominations under Criterion VII. Mapping of attributes is required in nominations. The methodology should make assessments more systematic and rigorous and enhance objectivity, transparency, validity and reliability.

Recommendations cover:

1. Nominations to clarify whether they contain *superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance* or both and what values are conveyed;

2. Nominations should provide a rigorous and systematic identification of attributes;

3. Nominations should provide the same degree of global comparative analysis as expected under other criteria, including of natural beauty and aesthetic importance relative to other areas;

4. Global typologies should be further developed as a framework for comparing properties internationally;

5. The relationship between natural and cultural beauty should be further developed and should examine cultural perspectives (i.e. influences) of landscape preferences.

The report addresses the very difficult area of aesthetic quality and of the need to make judgements between areas on the basis of their significance relative to other areas. It makes a valiant attempt and covers the field very well. It does however tend towards maintaining the present expert-based qualitative assessment of aesthetic quality and fails to examine further the methodologies that have been developed to quantifiably assess aesthetic quality of natural beauty. While it emphasises the need for reliability of assessments, by which it means that different expert assessors will reach the same result, it does not examine whether in practice this actually occurs and it is probable that commonality is rarely achieved.

DESCRIPTION OF A METHOD TO FULFIL REQUIREMENTS

Based on the science of psychophysics and drawing on the literature of the past forty years, I have developed a method for measuring and mapping landscape quality at a regional level and applied this method in a dozen studies in Australia and England. The method fulfils the criteria of being systematic and rigorous, and achieves objectivity, transparency, validity and reliability. Moreover it is a pragmatic and robust method which provides quantified results that are easy to comprehend and which can be defended as representing community preferences rather than that of individual experts.

Most expert-based methods assume that aesthetics can be judged cognitively and measure everything in the landscape that is measurable – the height and steepness of landforms, the extent and nature of vegetative cover, water bodies, the land uses, colours and a host of other attributes in the expectation that through doing so, a measure of landscape quality would emerge. It never does.

The reason is that as a subjective quality, landscape quality can only be assessed via our affective capacity, our likes and dislikes, our aesthetic preferences, not via our cognitive abilities which analyse and logically comprehend the environment. The error lies in confusing paradigms, using the cognitive analytical approach to measure a subjective quality. The paranoia of analysts not to be subjective misses the point; it is possible to *objectively measure subjective qualities.*

Dictionaries reinforce the distinction between the cognitive and the affective in their definition of aesthetics as "things perceptible by the senses *(i.e. affective)* as opposed to things thinkable or immaterial *(i.e. cognitive)* (Shorter Oxford, 1973). Blaise Pascal's (1623 – 1662) pithy dictum: *the heart has its reasons which the mind cannot comprehend*, illustrates the dichotomy.

Using an analogy from music, an individual's liking for music does not derive from an analysis of the use of instruments, the number and range of notes, the scoring for the orchestra, or a detailed analysis of the score. Rather it is immediate and without analysis. The same can be said of our preferences for coffee, chocolate, holiday destinations, even love…

In my 1999 paper (Lothian, 1999) which was quoted by the IUCN report, I traced the philosophy of aesthetics and showed that up to the 18th century, philosophers regarded beauty as inherent in the physical landscape but following Locke, Hume, Burke and particularly Kant, philosophers came to regard beauty as a product of the mind, lying in the eyes of the beholder. The shift paralleled the emergence of psychology and the development of psychophysical methods for analysing subjective assessments of physical phenomena.

These two different paradigms to the way that landscapes are viewed are absolutely fundamental, either the landscape quality is regarded as intrinsic to the landscape or it lies in the eyes of the beholder, it cannot be both. Gobster & Chenoweth (1989) touched on the difference, stating:

> "All physical descriptors relate to the external dimensions of the environment - what is 'out there' versus what is 'in the head' - and herein lies a critical distinction between physical and psychological descriptors."

Table 1 summarises the differences between these two paradigms.

Table 1 Objective (physical) and Subjective (psychological) Paradigms

Objective (physical) paradigm Beauty - an intrinsic quality of the landscape.	Subjective (psychological) paradigm Beauty - a quality in the eye of beholder.
What we see as landscape beauty is assumed to be part of the landscape.	What we see as landscape beauty is our perception of the landscape.
Subjective evaluation presented as objective.	Objective evaluation of subjectivity.
Generally lacks any theoretical framework.	Often derives from a theoretical framework.
Seeks understanding of the landscape's physical attributes, often for management purposes.	Seeks understanding of human preferences to understand the physical components which contribute to landscape quality.
Differentiates landscape quality on the basis of implicit assumptions.	Differentiates landscape quality on the basis of human preferences explicitly derived.
Silent on causal factors.	Seeks explanation of causal factors.
Empirical; application of an approach.	Experimental; tests hypotheses and extends approach.
Lack of standardisation - uses different and unique methods and techniques.	Standardised research instruments & statistical tools, although used in a variety of ways.
Site and area specific; results generally cannot be extended beyond area of study.	Not area or site specific; seeks results for wider application.
Does not seek explanation.	May be applied to understand preferences in different landscapes.
Assessments are often field based.	Mainly uses surrogates (photographs and rating scales) for assessments.
Relatively easy, inexpensive and rapid to undertake.	Relatively difficult, expensive and slow to undertake.
Does not use respondents to evaluate landscape quality so cannot account for differences in preferences.	Quantifies influence on preferences of respondent characteristics - age, gender, education, socio-economic, culture.
Non-replicable and unique: application of approach by different individuals likely to result in different assessments of landscapes.	Replicable: providing the sample is adequate, the preferences identified should be consistent across a range of studies.
Being subjective and non-replicable, the results may be of questionable value and of short-lived application.	Being objectively analysed and replicable the results extend knowledge and are relatively permanent for a given community.
Unable to be used in a predictive sense except generally.	Capable of predicting effect of landscape change on landscape quality.

The UK's landscape character assessment method (Countryside Agency, 2002), which the IUCN report regards favourably, is essentially a cognitive analysis of the landscape and its aesthetic attributes; it provides no place for the affective judgement of landscape quality. Table 2 lists aspects that could be covered but emphasises that the list is not exhaustive and surveyors are free to introduce their own words, thus introducing further variation.

Table 2 Aesthetic aspects of landscape character

SCALE	Intimate	Small	Large	Vast
ENCLOSURE	Tight	Enclosed	Open	Exposed
DIVERSITY	Uniform	Simple	Diverse	Complex
TEXTURE	Smooth	Textured	Rough	Very rough
FORM	Vertical	Sloping	Rolling	Horizontal
LINE	Straight	Angular	Curved	Sinuous
COLOUR	Monochrome	Muted	Colourful	Garish
BALANCE	Harmonious	Balanced	Discordant	Chaotic
MOVEMENT	Dead	Still	Calm	Busy
PATTERN	Random	Organised	Regular	Formal

Source: Countryside Commission, 2002

The checklist contained in Table 2 has the effect of rendering aesthetic judgement a cognitive analytical process rather than a product of affect, the likes and dislikes of the landscape.

The basis for measuring landscape quality lies in the science of psychophysics which was developed by Gustav Fechner (1801 – 1887), an early German psychologist. Psychophysics measures the effect on the brain of stimuli from the senses – sight, sound, taste, touch and smell. A vast literature has developed in psychophysics.

In the 1980s and 1990s, psychologists in the US, turned their attention to applying psychophysical methods to understanding how humans comprehend landscape quality. Researchers including Greg Buhyoff, Terry Daniel, Philip Dearden, Paul Gobster, Thomas Herzog, Bruce Hull, Stephen and Rachel Kaplan, Herbert Schroeder and Roger Urlich have carried out numerous studies which established a methodological framework and greatly enhanced understanding of human-landscape interaction.

The method that the researchers established has the following three common components:

- Rating scale Use of a rating scale such as 1 (low) – 10 (high) by which the landscape quality can be judged. The scale is a surrogate for landscape quality and forces the participant to condense their assessment of the scene into a number. Experience of thousands of participants in the surveys that I have conducted indicates that this is not difficult and the results reflect closely their perception of landscape quality. Ratings on a 1 – 10 scale provide an absolute measure of landscape quality at the interval scale which can be analysed statistically. Rankings (i.e. scene 1 is better than scene 2) by contrast compare one scene with another and are only an ordinal measure which cannot be analysed statistically.

- Survey instrument Use of a survey instrument – a paper form provided to participants, or an on-line survey that they are invited to enter. The survey contains photographs of the area being assessed together with the rating scale.

- Participants Access to a large number of participants in the survey to achieve statistical validity.

Figure 1 illustrates the method. The independent variable is the landscape being assessed while the dependent variable comprises the human assessment of the landscape quality. A survey is conducted to ascertain community preferences in relation to the landscape quality and the analysis of these preferences provides an understanding of the attributes that drive landscape quality and enables its mapping.

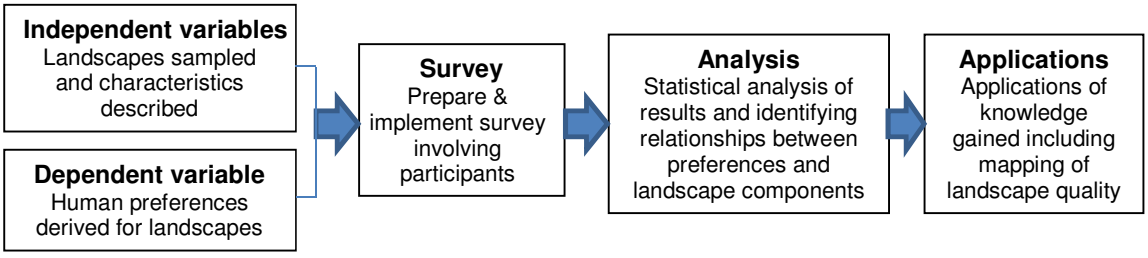

Figure 1 Landscape quality assessment method

The Community Preferences Method that I have developed involves the following steps:

1. Photograph the region. This may include seasonal change in the landscape to quantify how much landscape quality changes across the seasons. The use of photographs as a surrogate for in-field assessments of landscape quality has been thoroughly researched. Daniel and Boster, 1976; Dunn, 1976; Shuttleworth, 1980; and Trent, Neumann & Kvashny, 1987 established that the results of photographs could be comparable with field assessments. Applying meta-analysis to existing studies, Stamps (1990) found a correlation of 0.86 in the ratings of photographs and on-site assessments.

   Photographs provide significant advantage in not having to transport large groups of participants through the countryside. They also enabled areas remote from each other to be assessed on a comparative basis which would not be possible through field assessment, and for the effects of temporal landscape changes such as seasonal colour to be assessed. Finally, photographs enable the visual effects of hypothetical changes in the landscape such as new developments or changes in land use to be assessed using scenes with and without the change.

2. Classify the region's landscape into landscape units of similar character. Geomorpho-logical analyses of the area together with data on land cover and land use can provide the basis for landscape character definition. The purpose is to provide the basis for the selection of scenes that will adequately represent sample the range of landscapes present in the region.

3. Select a set of 100 – 150 photographs to sample the landscape units. I have found that a survey of 150 scenes can be processed by most participants very quickly, say 10 - 15 minutes. The aim is to draw on the person's affective judgement, not on their cognitive processes which involve analysing each scene. Their rapid assessment is more valid than a slow assessment as it better reflects their affective judgement which according to Kant is immediate.

4. Prepare an Internet survey containing the scenes and instructions. The survey commences with an explanation of its purpose, provides instructions, urges participants to use the entire rating scale and to judge each scene on its merits – to trust their initial instinct and to not analyse their response. Basic respondent demographic data (age, gender, education and birthplace) is requested and the survey also gauges their familiarity with the area. Four sample scenes are then shown prior to the survey scenes and these cover the range of landscape quality and cue participants to the highs and lows they will encounter in the survey. The survey randomises the scenes and automatically enters the ratings into the data base. Finally it provides a contact point for questions, offers the respondent the opportunity to comment on the survey and to register to receive a summary of the results.

5. Send invitations by email to potential participants to log onto the Internet survey and rate the scenes on a 1 (low) to 10 (high) scale; the survey may be visited by several thousand over one month.

6. Invite up to 30 participants to score the scenes for the visual significance of various characteristics (e.g. trees, landforms, water, diversity, naturalness); this scoring is carried out via additional Internet surveys. The landscape scores when combined with the scene ratings enable their contribution to landscape quality to be quantified.

7. Prepare the data set comprising the survey ratings and the landscape component scores. Conduct various statistical tests on the data to ensure their quality and check for strategic bias (e.g. all ratings of 1 or 10 where the participant uses the survey for their

own objectives such as diminishing or enhancing the rating of the area) - such ratings are deleted.

8. Analyse the influence of participant characteristics (e.g. age, gender, education) on ratings, compare the characteristics of the participants with those of the wider community, and assess the influence of the participant's familiarity of the region on their ratings.

9. Analyse the ratings commencing with the general and moving progressively to the specific. Mean ratings are derived for the landscape units and the range of landscape characteristics, and ratings are analysed against the landscape scores (e.g. ratings vs scores for land form).

10. Derive predictive models using multiple linear regression to combine the ratings (dependent variable) with the scores of landscape characteristics (independent variables) thereby identifying the contribution of the landscape factors to landscape quality. The models may be tested against the ratings of each scene.

11. Examine comments of the participants on the survey or its subject, classify the comments, and provide examples where relevant.

12. Use the detailed knowledge gained from the analysis and the models to map landscape quality for the region.

13. Report on the survey and the mapping.

The steps of the method are outlined in Figure 2. The method is quite economical; the Lake District study, an area of 2,292 sq. km. took approximately 1500 hours, i.e. 1.5 hours per sq. km. If I had charged for the study, my fee would have been approximately US$100,000, or $67/hour average.

Crucially the study method is replicable; i.e. if other practitioners used the same method they would reach essentially similar results. Moreover because the results represent the ratings of hundreds, even thousands of participants rather than the "expert" judgement of a few practitioners, they are robust and more likely to withstand appeal in a court of law.

The Community Preferences Method fulfils the need to involve the public and stakeholders in the assessment of scenic quality through their direct participation in the survey. My surveys have involved thousands of people from the regions providing their assessments of landscape quality.

The IUCN report proposed that nominations should be based on measurable indicators of scenic beauty along with quantified comparisons of natural beauty and aesthetic importance. The Community Preferences Method achieves this aim and provides very accurate ratings of landscape quality. This is illustrated by the following scenes from the Lake District study together with their ratings (1 low – 10 high). The ratings are based on 430 respondents all from the UK.

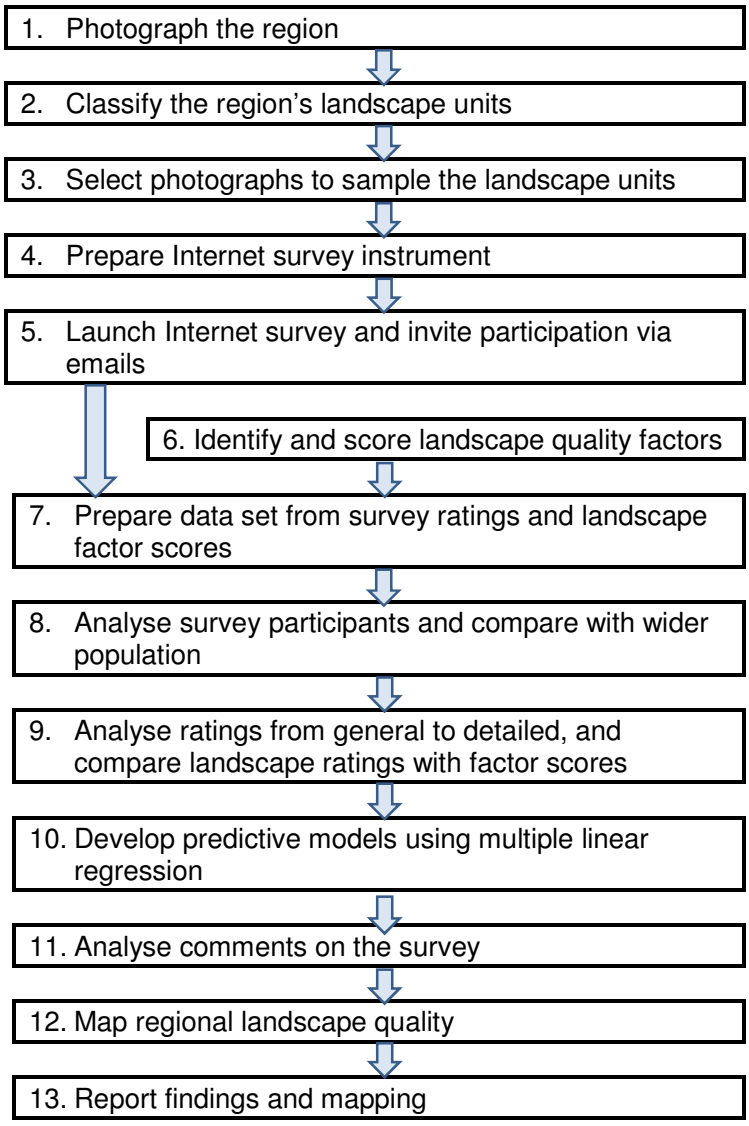

Figure 2 Steps in the landscape quality assessment method

Rating 7.55

Rating 5.50 With sheep & walls

Rating 7.03

Rating 4.87 Without sheep

Rating 7.59

Rating 5.61 Without sheep & walls

The scenes on the left show typical scenes of the Lake District, respectively Wast Water, Tarn Hows and Derwentwater. On the right is the same rural scene with and without sheep and stone walls and the ratings indicate their influence on landscape quality. The study of the Lake District also quantified the visual effects of electricity transmission towers, roads, lakes, seasonal colour and trees.

Table 3 summarises the generic ratings derived from the ratings for the Lake District, and Table 4 summarises their application showing the area and percentage of the total region for each rating. Figure 3 maps the landscape ratings for the Lake District.

Table 3 Generic ratings of Lake District

Landscape	Rating
Plains	4
Low fells	5
Valleys without lakes	6
Valleys with lakes	6/7
High rounded fells	5
High steep (≥30%) fells	6
High fells culminating in rockfaces	6
Mountains (≥700 m – 850 m)	7
Mountains > 850 m	8

Table 4 Summary of area ratings

Rating	Description	Area ha	Area %
Unrated	Towns	1,223	0.53
4	Plains	36,020	15.71
4	Pine forests	12,948	5.65
5	Low fells, Moderate sloping high fells	144,061	62.84
6	Rivers Valleys w/o lakes 4 Lakes Steep high fells	23,868	10.41
7	12 lakes Mountains 700-850 m	10,489	4.58
8	Mountains 850+ m	627	0.27
Total		229,236	100.00

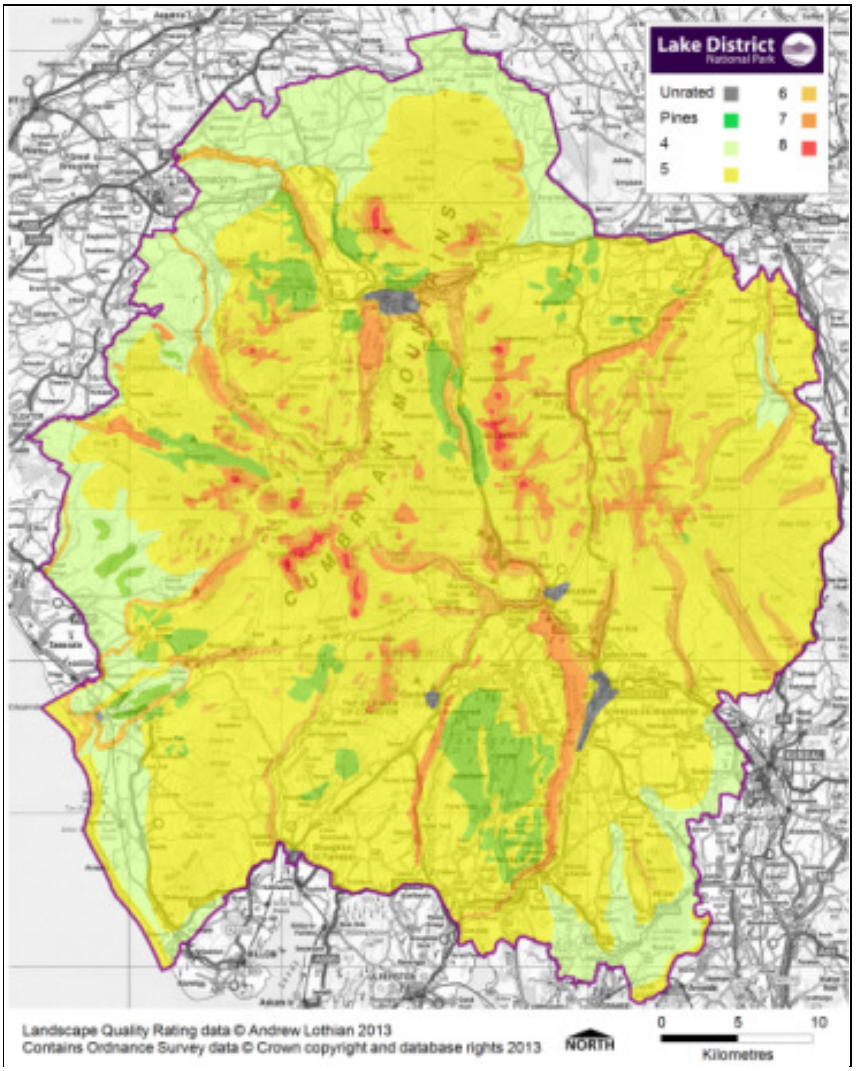

Figure 3 Lake District Landscape Quality (1 - 10 scale)

In the Lake District, the 5 rating dominates with 144,061 ha or nearly two-thirds of the Park area. The high rated areas 6, 7, and 8 total 34,984 ha or 15.26% which is a substantial proportion of the Lakes District and reflects the popularity of its landscapes. Nearly 5% (4.85%) is rated the very high 7 or 8 which is a very large proportion. By comparison, in my home State of South Australia, only 2.66% of the area is rated 6, 7 or 8 and only 0.48% rated 7 or 8. The Flinders Ranges in that State, a spectacular arid range, has 16.77% rated 6, 7 or 8, but only 3.35% rated 7 or 8.

The proportions of high ratings provide the basis for the global comparative analysis recommended by the IUCN report. The method provides a quantitative basis for such comparison. Obviously this would require other areas of potential World Heritage standing to be assessed in a similar manner but the method proposed provides an objective and practical means for doing so.

World Heritage standing could be assigned to those areas which contain a significant proportion of high rating (say 8 and above) landscapes. These are often dispersed through an area and it would be pointless to accord World Heritage ranking only to the high rating landscapes while ignoring the wider area in which they occur. Thus in the case of the Lake District, the entire National Park would be eligible for World Heritage status on the strength of the high proportion of its high rating landscapes (as well as its cultural content).

The IUCN report found “preference-based research has indicated that the positive preferences are evoked from water, topographic variation, woodlands and naturalness.” My research supports this finding but adds diversity as an important component. Diversity in landscapes is the total “busyness” of the scene – the contribution of its land forms, land uses, land cover (vegetation), water and other physical components. Naturalness and diversity have been found to be the topmost indicators of landscape quality.

The reports of my studies, including the Lake District, are available on my website: www.scenicsolutions.com.au/Projects.html

CONCLUSION

This paper seeks to demonstrate that a viable method does exist to provide “measurable indicators of scenic beauty along with quantified comparisons of natural beauty and aesthetic importance.” The Community Preferences Method draws on the affective judgements of the participants and enables landscape quality of a region to be measured and mapped. It thereby provides the basis for global comparative analysis as recommended by the IUCN report.

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