

## 1. INTRODUCTION

### 1.1 PROJECT BACKGROUND

The project commenced on 5 May 2005. Its origins derived from recognition by the Barossa & Light Regional Development Board (BLD) that the very success of the wine industry had the potential of destroying the region's scenic quality.

In an insightful report, *Wine Industry Impact Review* (2004), the Board found that the Barossa's "beautiful countryside and scenery" were among the top attractions identified by visitors. Furthermore this feature was rated far higher in the Barossa than in any other Australian wine region.

Cellar door surveys conducted in the region found that while 59% of participants identified "beautiful countryside and scenery" in the Barossa, the figures fell to 36% for the Clare Valley, 29% for the McLaren Vale, 15% for the Adelaide Hills, and even lower for interstate wine regions.

The Review noted that the "natural and cultural resources of the Barossa are of critical economic, social and environmental value to the tourism industry." and "Visitor perception relates primarily to the region's natural beauty, European heritage and reputation as a quality wine producing area."

Visitation to the region is very high: in 2002 there were 688,000 day trips and 241,000 overnight visitors, a total of 929,000 visitors. Of these 132,000 (14.2%) were international visitors to the region.

Arising from the study, the Board concluded that:

"(The industrial impact) has the potential to destroy the rural values that are vital to the continuing success of export wine marketing and the critically important tourism industry."

"Protection and enhancement of the landscape is critical to maintaining the Barossa's viability as a tourist destination.

The Board recommended action to "identify and protect characteristics and key landscapes that are fundamental to the Barossa."

### 1.2 PROJECT BRIEF

The Project Brief was prepared jointly by Planning SA, the Barossa and Light Councils, and BLD. The Brief (see Appendix 1) identified the scope, methodology, management and reporting and staging and timing. The project's aim was to "assess the scenic quality of the Barossa Valley Region rural landscapes outside of townships."

It required a "publicly defensible and repeatable valuation of the scenic quality of the landscapes and landmarks of the area, giving a value to every landscape unit."

The landscape units would be based on view sheds, but may be divided or aggregated based on similarities or differences in elements such as land forms, vegetation, land use, cadastre and buildings. Significantly the project was required to include both natural and cultural elements e.g. land form and buildings.

The outcomes of the project were intended to contribute to the setting of "clear strategic directions for the use of land within the Barossa and Light region."

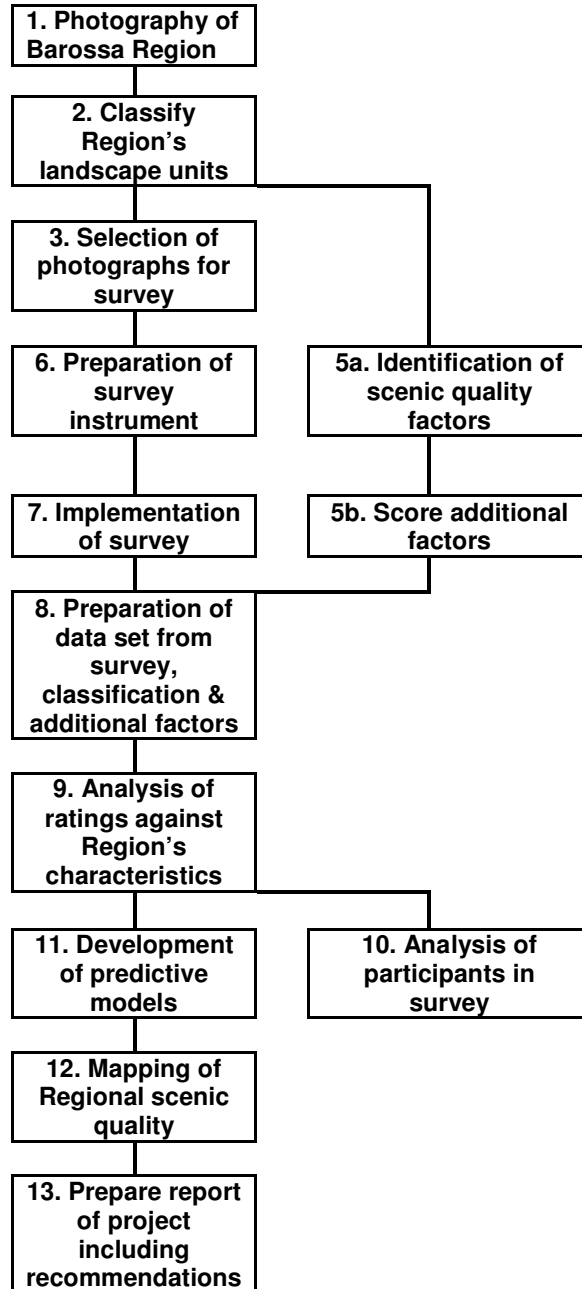
The region covered by the project was broadly based on the Barossa Valley Region identified in the Barossa GI Zone but excluded atypical rural residential areas (e.g. Cockatoo Valley area) and some watershed zones. It included adjacent viticultural areas with emerging development pressures. Tourist roads and scenic regional roads were considered of high priority for inclusion.

### 1.3 PROJECT METHODOLOGY

The project brief required assessment of the scenic quality of the Barossa Valley region rural landscapes. The approach to this task required the region to be classified into units of similar characteristics, for these to be photographed and rated by participants, and for the ratings to be applied to areas of the region with similar characteristics.

Figure 1.1 summarises the overall design and methodology of the project.

The approach to the project was guided by the following specific requirements as defined in the Project Brief.



**Figure 1.1 Project Methodology**

*Be capable of being repeated by others to produce a similar result*

This is standard scientific methodology and the proposed methodology meets this requirement. In contrast with methodologies which rely on design expertise of a professional, the outcomes of the proposed methodology reflect the preferences of the

community. Comparable studies should yield similar results.

*Include standard statistical tests of significance to ensure the statistical validity of the findings*

These tests are required where the survey methodology involves community surveys which this does.

*Ensure that the scenic value can be potentially assessed within the wider context of the South Australian landscape*

All previous surveys by the Consultant have included scenes of the South Australian landscape to provide a context for the assessment of the specific target. These are scenes of known landscape quality rating which can provide benchmarks for the project. Importantly they ensure that the ratings of scenic quality for the Barossa region reflect a State-wide perspective and are therefore credible as representing State-based ratings.

*Be capable of discriminating the scenic value of the regional landscapes to a level of around 0.5 on a 1 – 10 scale*

The previous studies have discriminated scenic value to three significant figures – eg 5.66, 7.48 in the statistical analysis although these may be rounded to 5.7 and 7.5 in reporting.

*Be capable of being applied to other regions of South Australia*

The proposed methodology fulfils this requirement as it has been used in a range of studies (Lothian, 2000, 2003, 2004, 2005).

*Produce a scenic quality valuation capable of being understood without specialist training or education*

Undertaking the ratings is readily understood by participants as evidenced by the several thousand who participated in the coastal viewsapes survey and the Barossa landscape survey.

The Consultant has found ready acceptance and understanding of the ratings obtained through surveys. It does not require, for example, design experience and terminology. The results do not require specialist training or education to understand, but conducting the survey and analysing the results does require considerable expertise and experience. Application of the results to policy and planning however does not require this expertise.

*Define and document methodology assumptions and explain any factors that might distort interpretation.*

The report of the project will provide comprehensive explanation of the methodology and of any difficulties experienced in the conduct of the study that might affect the results.

In addition, there are certain pre-requisites which a study of this nature should fulfil. These are discussed below.

The scenic quality of the Region must be derived in a manner that does not compromise or bias its results. It requires the results provide an objective, rigorous and accurate measure of scenic quality as a basis for development policy and other applications.

The ratings should be derived without reference to their use so that participants can rate scenes disinterested in the use to which they may be put. The principle of disinterest is foundational to social surveys. Informing participants that the results will provide an input for development policy carries with it the risk of strategic bias; that participants will frame their responses in a way that may achieve their objectives and the survey may accordingly be biased.

The methodology proposed would involve participants from the region as well as the wider South Australian community. The ratings derived from each group could be compared and any differences identified. However based on the literature of such studies and the Consultant's previous experience, any differences were not expected to be significant and have a negligible effect on ratings. This means that the scenic quality ratings derived through community involvement could be taken to reflect the preferences of the whole community.

As a qualitative attribute of the environment, the assessment of scenic quality must involve the participation of people to provide the ratings of scenic quality. While there are various theories about why people like the landscapes they like, these are insufficiently prescriptive to determine scenic quality ratings without involving people.

### **Terminology**

Terms which are used in this report are defined as follow.

*Scenic quality* refers to the aesthetic quality of the landscape.

*Quality* refers to the aesthetic worth of a scene, generally on a high – low continuum.

*Landscape* comprises the physical characteristics that are present including land

form, land use, land cover, the presence of water and other attributes.

*Land form* comprises the terrain of the landscape including hills and valleys.

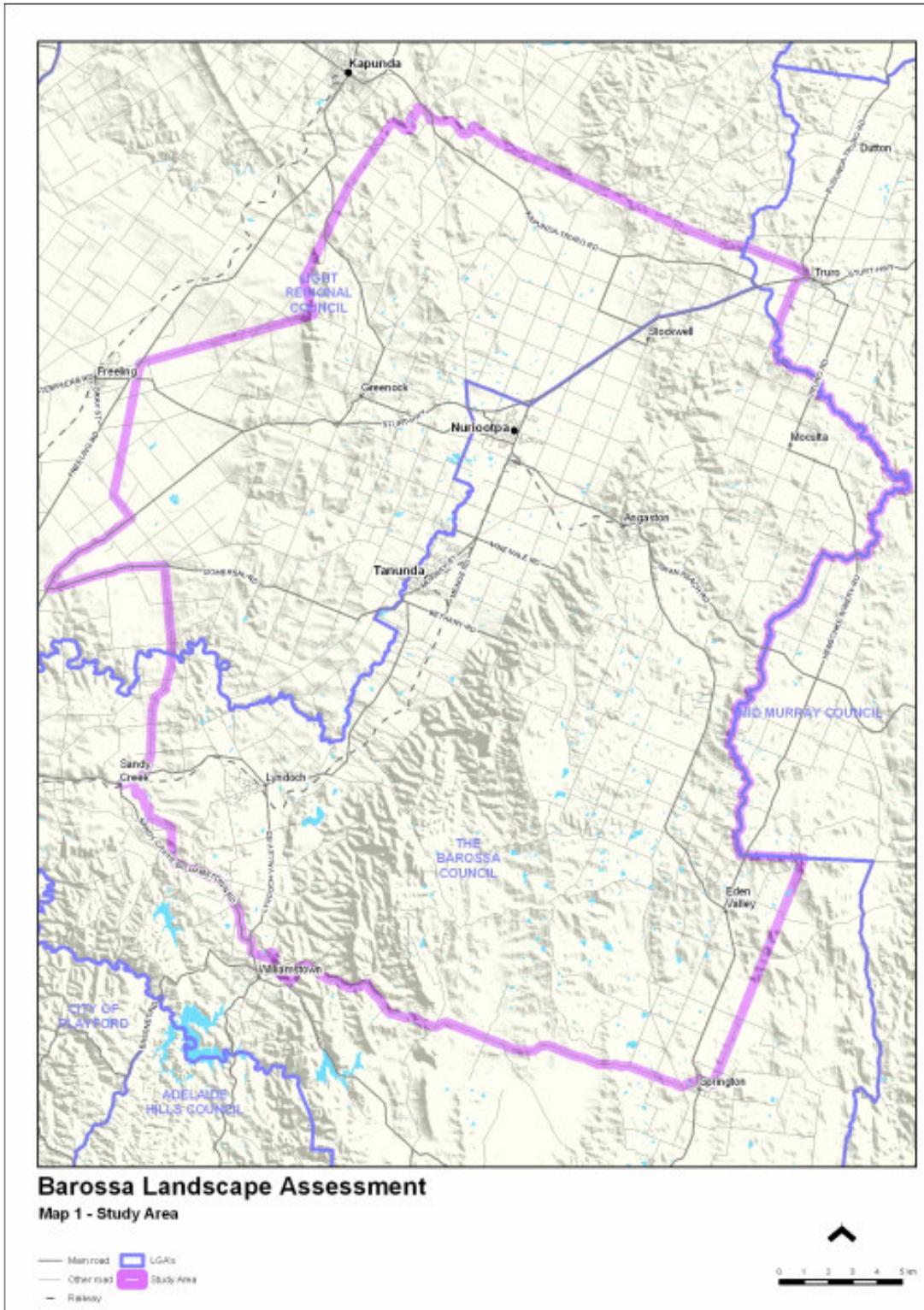
*Land use* covers human use of the land including agriculture and forests, but also non-uses such as national parks and conservation reserves.

*Land cover* refers mainly to the presence of vegetative cover, trees, shrubs, grasses, but can refer also to crops and viticulture.

*Naturalness* : the appearance of the landscape being natural without human impact or presence being apparent. It is not the same as ecological naturalness which refers to the physical extent of human impact or presence, but rather the perception of naturalness.

### Landscape Characteristics and Landscape Factors

<b><i>Landscape characteristics or components are the physical characteristics of the landscape</i></b>	<b><i>Landscape (or scenic) factors refer to the perceived significance of certain physical features and qualities in the landscape including the following.</i></b>
Land form	Barossa Ranges as backdrop
Land cover	Naturalness
Land use	Land use
Presence of water	Trees
	Buildings & structures
	Terrain
	Water



## 2. LANDSCAPE AESTHETICS

In this section the derivation of the methodology used in this study is described. Firstly it examines studies of scenic quality assessment mainly in Australia from the 1970s to the present. It differentiates the affective basis of aesthetics from cognitive analytical approach which was the basis of many of the Australian studies. It briefly reviews theories of landscape aesthetics, theories which seek to explain *why* humans like what they like. It then examines the influence of culture and individual differences on landscape preferences and finally examines the use of photographs in the measurement of scenic quality.

### 2.1 AUSTRALIAN STUDIES OF SCENIC QUALITY

Interest in the identification, protection and management of scenic quality was particularly strong in the 1970s but petered out somewhat by the 1980s, probably because of the lack of credible assessment methods at the time. Interest has grown again over the past decade with the development of new methods. Studies in several states are summarised and the national role examined.

#### (1) Queensland

During the 1990s, Alan Chenoweth, a Queensland planning consultant, developed a comprehensive methodology to assess the scenic resources of the Queensland coast. It comprised the following components:

- Hierarchical assessment of (coastal) scenic resources, cultural themes and heritage values, followed by a regional analysis which provided the framework for smaller units;
- Cultural themes and associations were identified from coastal history, heritage registers, regional focus groups;
- Landscape setting units were defined comprising identifiable places bounded by viewsheds;
- Scenic quality indicators comprised naturalness, pattern, built form & activity, landform, vegetation & wildlife, and water & shoreline. These were based on the US Forest Service Scenic Management System and were assessed by landscape professionals for each landscape setting. The criteria had been validated by

community focus groups but apparently not calibrated across assessment teams.

- Landscape character and identity;
- Land types at a local scale covering foreshore, island, foothills, plains etc.

Chenoweth mapped landscape settings ranked by their scenic significance. Although comprehensive, the ratings did not derive from community preferences but rather from expert assessments.

Based on Chenoweth's work, EDAW (Aust) carried out an assessment of Queensland's scenic resources for the Coastal Management Branch of the Queensland Department of Environment in 1996 (EDAW, 1996). The methodology involved three steps:

1. Identification of the coastal 'viewshed' and coastal landform types; this used physical criteria to identify viewsheds and the basic types of coastal landforms;
2. Identification of 'coastal landscapes'; this classified coastal landscapes of similar characteristics and carried out a field inventory of coastal landscapes;
3. Overall scenic amenity assessment and development of scenic quality criteria; this assessed scenic amenity by categories of visual quality and prepared scenic quality criteria for each landscape character type.

Step 3 adopted Chenoweth's four level classification of scenic qualities:

- Level 1 Highly outstanding and distinctive
- Level 2 Outstanding and distinctive
- Level 3 Somewhat distinctive or outstanding
- Level 4 Tend to be present in other parts of the coast

These grades of relative scenic quality were depicted on a map of the Queensland coast. These comprised blocks of the same level extending for a distance along the coast and inland for varying distances – to the nearest range. Based on this, a further map depicted relative scenic management priority – high, medium and low.

Queensland's EPA, which is responsible for national parks, carries out Biodiversity Planning Assessments for the State's bioregions. These have included scenic amenity assessments (see [www.epa.qld.gov.au/register/p00736ab.pdf](http://www.epa.qld.gov.au/register/p00736ab.pdf)). The methodology

used sets of photographs and random survey groups to establish community preference for landscape types. The community preferences were mapped based on landscape types and ground cover data, producing a scenic preference map. The scenic preference data (what people like to see) was weighted by the visual exposure data (what people can see) to produce a scenic amenity map. Scenic amenity outputs included maps of visual exposure and scenic preference/scenic amenity.

In south east Queensland, a lengthy regional scenic amenity study was completed in 2004. It is probably the most comprehensive study of scenic amenity conducted in Australia to date. The study covered the area from Noosa to the NSW border and inland to Toowoomba, an area of 20,400 km<sup>2</sup>. The SEQ Regional Scenic Amenity Study was initiated by local and State Governments (SEQRESA Steering Committee, 2005) and aimed to:

“identify the most valued scenic areas in SEQ, based on public opinion and to develop context-appropriate guidelines for assessing the influence of development near these scenic areas.”

The methodology was summarised as follows:

The first assessment stage involves a public preference survey to identify the characteristics of views that influence people's preference for scenery. The second assessment stage uses these survey data in the preparation of maps that show the location of areas with highly preferred scenery through to areas of least preferred scenery. Scenic preference maps are then combined with maps showing the most visible parts of the landscape through to the least visible parts of the landscape and to produce maps of scenic amenity on a scale from 1 to 10.

The study involved a large number of participants – the steering committee alone had 30 representatives. Nearly 1,000 people participated in interviews and over 15,000 photographs were used to calculate scenic preference ratings for all photographs. The photographs covered four Visual Domains: bush, rural, urban and coast. Modelling of the results identified 31 variables that influenced scenic preferences; some negatively, others positively. The 31 included six Visual Domain variables and 25 Visual Element variables.

Negative Visual Domain variables included signs, certain buildings, and vehicles while positive Visual Domain variables included trees, water, and certain forms of vegetation. Negative Visual Elements were Rural-Urban, Urban, Bush-urban, and Rural. Positive Visual Elements were coast and bush-coast.

The study developed five site assessment tools comprising photographs, databases, statistical models and guidelines. A Site Assessment Process was proposed to determine the scenic rating of scenes not included in the survey. The process involved field inspection and photography, comparison with extant photographs, conduct of a local public preference survey if required, and compilation of an assessment report. The Study produced four comprehensive reports of its methodology and findings.

## (2) New South Wales

In New South Wales in 1963, the Cumberland Council (covering part of Sydney) considered the declaration of “Areas of special scenic significance” for areas “noteworthy for the quality or uniqueness of its scenery and in which special development control is required to ensure preservation.” (National Trust, 1978) In the early 1970s the designation “Scenic Preserves” was used to cover areas of scenic value in the Sydney 2000 report.

In the mid 1970s, the National Trust was active in the identification and description of Scenic Protection Areas and Scenic Landscapes in the Illawarra region (National Trust, 1975). The Illawarra region covered the area south of Sydney from the coast of Wollongong and Ulladulla south to Batemans Bay and inland to Bowral and Moss Vale.

It defined Scenic Protection Areas as being areas where change could destroy their scenic quality and hence required strict planning controls, while Scenic Landscapes were where sensitive change would be acceptable. The identification and delineation of such areas was entirely subjective, relying on a consensus of the survey team. Six Scenic Protection Areas and eight Scenic Landscapes were identified.

In 1978 Roland Breckwoldt on behalf of the NSW Branch of the National Trust developed guidelines for the protection of scenic landscapes. After a review of options, Breckwoldt adopted the term Scenic Protection Area which he defined as follows:

Scenic protection areas can contain both public and privately owned lands where the natural attributes and the land-use pattern have contributed to a landscape of such high scenic quality that it warrants conservation as part of Australia's heritage.

Breckwoldt recommended the inclusion of scenic protection areas in state environmental plans. Subsequently, in 1977, the NSW Planning & Environment Commission adopted a new zoning plan for non-urban areas and this included a Rural Environmental Protection Zone. Ten such zones were defined for such features as wetlands, wildlife refuges, archaeological sites. A scenic zone was one of the zones.

Breckwoldt called for the establishment of an "administrative structure that manages scenic protection on a statewide basis. Eventually, there should develop Australia-wide agreement of scenery preservation as with national parks." (National Trust, 1978).

Over the period 2001 – 04, Planning NSW carried out the Comprehensive Coastal Assessment (CCA). It aimed to identify, analyse and assess data and information on the physical, biological, social and economic values of the State's coastline. It included a visual assessment which mapped areas of high scenic quality that are important for preservation.

The Assessment described scenic quality as a resource:

Coastal visual resources not only make a major contribution to tourism and recreation but strongly influence the amenity of those who live, work and recreate within the coastal zone. Visual resources are particularly significant as most people are immediately responsive to them. (Visual Project Summary)

The coastal visual assessment defined the extent and character of the coastal landscape, the extent of the visual catchment, identified management opportunities, and established a framework for local detailed visual assessment, planning and design.

The Visual Resource Management System for the NSW Coastal Landscapes had the following components:

Landscape Management Structures described at state and local levels

Landscape Assessment to determine what parts of the coastal landscape contribute to coastal landscape settings and classification of landscape systems and units on the basis of land form and land cover (vegetation)

Landscape Analysis which examined their visual features and qualities and visibility of the coastal landscape from significant locations. It defined Viewing Situations and Landscape Features which included landform, land cover and water features as well as ephemeral features such as light and atmospheric conditions. Visual Elements were the formalist features of form, shape, pattern, line, colour and texture. Visual Values assessed the landscape in terms of visual integrity, diversity/contrast, balance/harmony, distinctiveness, adjacent scenery, rarity, ability to accept change and visual quality. The landscape analysis was thus based on explicit descriptive information and qualitative judgements.

Landscape Management defined the level at which the visual resource of the landscape should be managed based on considerations of uniqueness, integrity and the visibility from regionally significant locations. Four management levels were defined:

1. Preservation – High visual quality + visible from viewing situation + high ecological or natural values
2. Conservation – High visual quality + visible from viewing situation
3. Modification – Low visual quality and low visibility from viewing situation
4. Restoration – Very low visual quality.

### (3) Victoria

In the 1970s, visual landscape assessment was applied by the Town and Country Planning Board to the Bellarine Peninsula based on the assessment of the Scottish landscape by Linton (1968). Assessments were also undertaken by the Forests Commission at Lake Mountain, the National Trust in the Mornington Peninsula-Westernport Bay region, and the University of Melbourne in the southern Mornington Peninsula (Calder, 1981). Generally they described the landscape character and assessed scenic quality subjectively. Being subjective they were difficult to substantiate (Calder, 1981).



The National Trust in Victoria took a leading interest in identifying and protecting scenically attractive areas. In 1972 it identified a "Classified list" and a "Recorded list", the former being areas for which it "would be prepared to fight hard". By 1975 the Trust had a listed 23 Classified and 26 Recorded Landscapes and had exercised considerable influence on planning developments affecting these places (Lennon & Forge, ACF, 1975). The Trust's criteria for inclusion of areas were that the areas have outstanding aesthetic, scientific or cultural values.

In 1975 the Australian Council of National Trusts decided that all landscape classification by State branches should be on a standard basis. The Classified and Recorded categories were adopted. Classified meant areas that the Trust regarded as essential to the heritage of Australia and which must be preserved. Recorded meant those areas which the Trust considered contributed to the heritage of Australia, preservation of which should be encouraged.

A study of the Upper Yarra Valley and Dandenong Ranges by the landscape architects, Gerner, Sanderson, Fagetter and Cheeseman developed landscape management policies based on visual characteristics of the region. They identified its value as a scenic resource, its sensitivity to change from land use impacts, and its value to the regional community for its historic, scientific, educational and other cultural attributes (Calder, 1981). These three attributes were quantified and mapped, the three overlaid to define landscape management units, each with a landscape management objective. The approach appears to have derived from a realisation that while the assessment of scenic quality might be too difficult, progress could be made in respect of its protection and management.

A study of landscape and townscape for Bright in NE Victoria assessed the view potential and land use compatibility (Fabos, *et al*, 1979). View potential comprised the quality of the view which derived from view resources (the areas being viewed), view corridors (the areas viewed from), critical view areas, and high points (potential views). These were mapped from a combination of aerial photographs and windscreen/walking surveys.

In 1980 a Landscape Planning and Management Workshop was held in Melbourne to review the state of the art in

landscape quality assessment (Itami & Williamson, 1981). In her review of the then current situation, Ann McGregor said that "standardized concepts, theories and definitions of landscape and landscape planning are ... lacking in Australia but have ... somewhat improved in the last few years."

In the early 1980s, Williamson and Chalmers (1982) applied the US Forest Service's system of visual assessment to the Victoria's State Forests. The method was based on landscape character types, identifying areas of visual homogeneity through analysis of land form, land cover and vegetation types, the presence of water, and any artificial structures and uses. Scenic quality classes based on landscape character types were divided into three levels: high, moderate and low quality.

In 1984, Leonard and Hammond identified nine regional landscape character types in Victoria and documented them. These provided a useful basis for subsequent landscape assessment projects.

In 1988, Victoria's Land Conservation Council undertook a special investigation of Victoria's rivers and streams including a scenic assessment. It identified 21 rivers with high natural scenic value. The assessment was undertaken from aerial photographs.

In 1994 a study of the national estate values of the Central Highlands of Victoria (AHC, 1994a) examined places of aesthetic value. Community input via workshops, along with art and literature, tourist information, forest and professional reports and other sources were used as input. The process identified forest landscapes, routes such as walking tracks and vehicle tracks, lookouts, waterfalls, rivers, creeks & gorges, mountains and unusual natural features such as geological formations. A similar exercise was undertaken for the East Gippsland (AHR, 1994b).

In Victoria in 1998, Tract Consultants defined landscape setting types for the Victorian coast. Criteria used in their selection included:

- The landscape as viewed from a number of points, including the sea
- Natural systems (landforms/geomorphology/land cover)
- Cultural systems (settlements/structures)
- Stability or energy level of the landscape – exposure to winds and the sea

- Capacity of the landscape to absorb change without creating visual impacts from prominent viewpoints
- Landscape character - climatic, experiential, visual, spiritual aspects of the coastal environment

More recently, in 2003, Planisphere carried out *The Great Ocean Road Region Landscape Assessment Study*. The study assessed the landscape character of the region and the way in which various types of development can be managed in different landscape types. The study included an assessment of “distinctive landscape elements, features, characteristics, character, quality and extent of the landscape within the region, and their value or importance.”

The study confirmed landscape character types defined earlier and identified additional landscape types, undertaking a “visual and sensory analysis from a professional outsiders’ point of view”.

#### (4) Tasmania

The Tasmanian Forests Commission applied the US derived Visual Management System in the 1980s. It divided the island into “landscape character types”, with common visual characteristics including landforms, water forms and vegetation. It defined ‘frames of reference’ for each character type, which described the landscape features present. It assigned them into three levels of scenic quality: high, moderate or low scenic quality.

In an unusual inclusion, the Tasmanian State of Environment Report, 2003 contained a section on “Scenic Landscape Condition.” (RPDC, 2003). The report stated:

“Landscape is fundamental to Tasmanians’ self image and sense of place. While it is difficult to quantify its monetary contribution, landscape character is important to the State and to local communities for economic and social benefits. Landscape character has a critical role in attracting the visitor to Tasmania and contributes to the sense of place experienced by visitors and locals alike. Social and economic impacts of landscape change are scale and context dependent and relate to factors, including:

- the scale of the land use change;
- the capacity of the particular landscapes to absorb change;

- the application of visual management systems to manage that change;
- the cumulative impacts of change on visitor preferences (e.g. that might cause them to stay away); and
- the cumulative impacts of change on the ‘sense of place’ of locals.”

The report stated:

SoE 1997 noted that despite its importance to the State’s tourist economy and to a range of other values, no comprehensive survey of the State’s landscape has been undertaken. This remains the case in 2003.

The SoE report examined local government planning schemes for their coverage of landscape values as a gauge to the level of protection. It found 78% of planning schemes included such provisions including: Landscape Protection or Landscape Values Protection Areas, Landscape and Skyline Protection Areas and Scenic Corridor or Scenic Protection Areas. Some schemes went further with comprehensive provisions related to landscape management. Others provided for landscape zoning: Landscape and Skyline Conservation, Landscape Protection and Conservation Zones.

#### (5) South Australia

During the 1970s, South Australia was active in landscape assessment, largely through the work of the National Trust’s Nature Preservation Committee led by Maud McBriar of the University of Adelaide. Studies included the following (summarised in Lothian, 1984).

Dr Phillip Kane worked with the Nature Preservation Committee in the early 1970s and developed four assessment methods: bipolar semantic differential scale, component checklist, marker scenes, and an equation to “objectively” appraise landscape components (Kane, 1976). His bipolar list comprised 21 adjectives of which 14 were significant to South Australians as descriptive of their landscapes. These included wet/dry, cold/warm, private/public, unstimulating/stimulating and disordered/ordered. Responses were transformed into a landscape rating score through application of a weighting factor derived from an earlier evaluation of 40 adjective pairs and a selection of those which related most to beautiful/ugly and like/dislike.

The scoring of adjective pairs was undertaken by ten participants and applied to 46 scenes throughout South Australia.

In 1976 the Committee assessed four regions in the State using his methods which could only appraise views from a set point and could not apply the results to a regional assessment of landscape values" (McBriar, 1977). Nevertheless the Committee assessed 41 views and based on this, proposed 26 as suitable for the Trust's Classified category and 13 for its Recorded category. The derivation of so many areas from so few views defies credulity.

John Dallwitz, an artist and photographer, applied a method he devised to the Flinders Ranges in 1976. He evaluated landscape elements (landform, composition, transitory elements etc) and scored them on a rating scale. It was entirely subjective. Composition and transitory elements are aspects that should be avoided as they can artificially enhance the scenic quality of a scene.

Richard Dare in 1978 assessed Fleurieu Peninsula for the Committee to produce maps of regional landscape quality. He classified the Peninsula into nine landscape tracts of similar landform and land cover. He used 1 km grid squares and the landscape character was the composite of the values for landform and vegetation for each square. He commenced mapping landscape quality but concluded that further research was necessary.

Geoff Sanderson in 1979 carried out landscape assessment of the Adelaide Hills. He mapped landform and land cover, and landscape sensitivity to visual change. He defined 12 landscape management units of areas of similar characteristics and sensitivity to change. He developed planning principles and policies for landscape management. The work grew out of similar work his firm had undertaken in the Upper Yarra Valley and Dandenong Ranges.

Grant Revell in 1981 followed up on Dare's work, taking colour photographs of components close up and from a distance. He included land forms, water, vegetation and man-made forms. Ten photographs of each tract were viewed and rated by ten people. He then applied these ratings to the remaining photographs using a group of five people to make the comparison. As a pilot study the small sample may suffice, however as a basis for the selection of significant scenes it is quite inadequate. Scenes over 70 points were

deemed of outstanding scenic attractiveness and qualified to the Classified category of the National Trust. 198 views were of outstanding value. Though he had come further than others, he did not produce a map of landscape quality. In her forward to Revell's report, McBriar wrote:

Grant Revell has made interesting advances on earlier work; additionally, he has explored further the production of a landscape map, but the ideal still eludes us.

Geoff Edwards in 1987, carried out an assessment of coastal landscape of Kangaroo Island. Edwards used the model (Table 2.1) by Brown, Itami and King (1979) which had derived from the model by Stephen Kaplan (see section 2.3).

**Table 2.1 Model relating scenic resource values to landscape preference components**

	Making sense	Involvement
Land form	Slope	Spatial diversity
	Relative relief	Relief contrast
Land cover	Naturalism	Height contrast
	Compatibility	Internal variety

Edwards identified and mapped five "coast-scape" character types for Kangaroo Island and then assessed landscape quality on the basis of land form and land cover. He scored each, added these and applied a weighting to each factor in recognition that the contribution of each factor is not of equal value. He produced a map of scenic quality which indicated only three categories, Excellent, Average and Poor.

## (6) National

In 1976, the House of Representatives Standing Committee on Environment and Conservation enquired into land use pressures on areas of scenic amenity (H. of R., 1976). It recognised the need for surveys to identify regions most under threat. Based on a Victorian proposal for a management authority over the Dandenongs and Yarra Valley, it proposed:

Regional amenity parks be established in areas defined by comprehensive survey, and consideration be given to establishing a planning and management authority in each park

along the lines of (the Victorian proposal).

Such parks were to be similar to the English national park model with conventional residential, farming and other uses continuing within a conservation and amenity framework. Generally the land would remain in private ownership except for some environmentally sensitive areas which would include “areas of critical landscape value and areas of outstanding natural beauty.” Such areas would be acquired. The Committee suggested that the Australian Heritage Commission be a source of “scenic area funding.”

In 1975 the Australian Heritage Commission was established and its mandate included protection of components of the national estate of aesthetic significance. The criteria for inclusion on the National Estate Register included:

Criterion E: Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.  
E.1 Importance for a community for aesthetic characteristics held in high esteem or otherwise valued by the community.

It received nominations and assessed these and considered any objections to the listing. During the late 1970s the Commission received many nominations of areas of high landscape significance, particularly from State branches of the National Trust. Although 1217 listed sites include Criterion E by mid 2005, most of these include this criterion along with others (see [www.deh.gov.au/cgi-bin/ahdb/search.pl](http://www.deh.gov.au/cgi-bin/ahdb/search.pl)). Most sites referred to buildings, ruins, lighthouses, schools, churches, early settlements, hotels, parks and gardens. A few referred to areas such as national parks and reserves. From a cursory inspection, none appeared to derive uniquely from Criterion E or to have derived from an assessment of landscape quality.

In 1979 the Commission engaged Professor Julius Gy Fabos from the US to review the state of the art, to examine the studies undertaken and to provide directions for future landscape assessment. Fabos worked with Anne McGregor of the Centre for Environmental Studies, University of Melbourne. Their report (1979) was critical of the National Trust’s nominations, stating that they had been assessed on an incremental basis, site by site, with no comparison with

significant landscapes within Australia, or cross-comparison with different categories. The data base was non-existent and processes were “either vague or only suggestive; the steps taken by the assessors were not clearly specified...”

The Fabos/McGregor report was the subject of considerable discussion by the Australian Council of National Trusts and the Australian Heritage Commission including a 2 day conference in Adelaide in May 1979. This conference concluded:

There was not a single method suitable for all States to adopt, but several positions had emerged from which they could work towards a greater use of parametric systems.

Fabos and McGregor had advocated the parametric quantitative approach (i.e. psychophysical). According to Maud McBriar who spearheaded South Australian nominations through the National Trust, the conclusion influenced the Australian Heritage Commission not to accept landscapes nominated for the Registrar of the National Estate until “a basis of assessment by professionals is found by which evaluations can be defensible in a court of law.” (Lothian, 1984).

The Commission released a paper in 1991 (O’Brien and Ramsay, 1991) which sought to overcome the difficulties with landscape nominations involving aesthetic values and their assessment. It proposed an expert approach which took into account broader interpretations of aesthetic value than purely visual quality (Ramsay, 1994). It also proposed mapping of landscape units based on GIS. The Commission then turned its attention to regional heritage assessments in East Gippsland and Central Highlands of Victoria.

Following a review of policy (AHC, 1996, 1997), the Australian Heritage Commission defined ten Australian Heritage Places Principles. The third principle was:

Each natural and cultural heritage place has its own cultural meaning to the community or a group. The cultural meaning and natural or cultural heritage significance is derived from the place’s social, spiritual, scientific, *aesthetic*, historic or other values. (emphasis added)

The Commission clarified the respective roles of the three levels of government in heritage identification and protection. It established principles for the National Protection List which emphasized the national significance of any inclusions.

The Australian Council of National Trusts in conjunction with the Australian Wind Energy Association have commenced a project to advise on the best methodology to assess the landscape values and the potential landscape impacts of wind farm developments. The first report of the project was released in March 2005 (ACNT/AWEA, 2000).

Part of this report reviewed methodologies for landscape assessment. It referred to the classification by the Macaulay Institute in Scotland of formal aesthetic models or ecological classification, quantitative and qualitative public perceptions, and visual management systems. It defines the work of the National Trust in NSW and Victoria as deriving from the formal aesthetics approach.

The report then proposed that broader definitions of landscape were emerging, paralleling the approach of the Australian Heritage Commission, including the cultural landscape concept.

Subsequent stages of the project are intended to further develop the methodologies.

### **(7) United Kingdom**

The United Kingdom has a long tradition, extending back to after World War 2, of recognising and protecting its outstanding landscapes. Many of its Areas of Outstanding Natural Beauty (AONB) were defined by the 1949 National Parks Act and others have been designated in more recent years. More recently, the Countryside Agency has conducted landscape assessments of some 30 AONBs and other significant areas.

These landscape assessments covered the following:

- Description of physical and human influences that have shaped the landscape
- Review of the features contributed to special character of the area
- Classification of landscape into a number of distinct and recognizable landscape types including a description of the characteristics of each

- A review of the forces of change influencing the landscape now and in the future
- Information on the perception of the landscape over time
- A summary of the special character and quality of the area that makes it of national significance

These landscape assessments were largely descriptive as evidenced from their scope. Their purpose has been to raise awareness of the importance of the area and to guide planning policies. Their focus has been the characteristics of the landscape rather than its quality.

### **(8) Conclusion**

During the 1980s relatively few studies of scenic quality were undertaken in Australia. It appeared that the activity of the previous decade had not yielded a method which could be regarded as credible and reliable and enthusiasm waned. During this period, many studies were carried out in the United States, mainly by university researchers, to better understand the factors in humans and in the landscape which influenced preferences, to better measure preferences, and to provide support for theories of landscape quality (Lothian, 2000). However the studies undertaken largely ignored measuring scenic quality for the purpose of mapping, rather they were restricted to very small areas, or to particular attributes of the landscape under investigation.

With few exceptions such as Williamson and Chalmers work in the early 1980s and the recent SEQ study, most scenic quality assessments in Australia have been judgement based, relying on the expertise or interest of those rating the landscape. These include professional landscape architects but more commonly interested lay people such in as the National Trust's various committees in the studies in NSW, Victoria and South Australia.

A common characteristic in the methodologies adopted was the measurement and classification of whatever could be measured and classified in the landscape – the landscape character units, the land forms, land cover, etc. While this analysis assisted in understanding the landscape, it is a giant leap from there to the derivation of scenic quality ratings. Most of the studies faltered at this point. It is akin to measuring the enjoyment

that one may derive from a piece of music by numbering the notes it contains, the types of instruments used, the pitch and rhythm used – anything but the aesthetic pleasure that one derives from the music.

The focus on the measurable may derive from a belief that objective measurement is a pre-requisite for qualitative assessment – that the knowledge of what the landscape contains and its characteristics will somehow provide a sound basis for the judgement of its quality. Again, using the music analogy, knowledge of the workings of instruments and of music form, though these may contribute to one's appreciation of the piece, definitely are not pre-requisites for the enjoyment of music.

The choice of characteristics included in expert assessments varied from study to study, from expert to expert. Thus replicability of the results by other persons is not possible.

Underlying the approach which used measurements was the belief that anything that was measured was objective and defensible while aspects which required judgements were inherently subjective and lacked credibility. Certainly this is so where the judgement was based by one person, however if it was based on a sample of the community, then while still subjective, it can be defensible and credible.

A further criticism of these studies is that they were based on a reductionist approach to the landscape, segmenting it into its component parts which were measured and added together in some unique way to provide its overall quality rating. However when a scene is viewed, one's appreciation of it is made holistically, based on its entirety, not by forensically dissecting it into its parts. It is a judgement that is reached instantly and without analysis.

The alternative is to use the community rate their preferences. This is based on the premise that as landscape quality is a subjective quality, it is the community who derive satisfaction from it and they should be involved in its assessment. The community view and rate scenes holistically, not by reductionism or analysis of its components. Issues of the relative importance of their characteristics do not enter into the assessment. Surveys which aggregate the opinions of the community in a structured way amenable to statistical analysis can provide the basis for an objective assessment of this

subjective quality. It is this approach which is applied in this study.

## 2.2 AFFECTIVE BASIS OF AESTHETIC PREFERENCES

The nature of aesthetics is described to assist in understanding the approach used in this study.

At its core, aesthetics is not an attribute that can be measured in the way that physical characteristics of the landscape can be measured. This is because aesthetics is an affective quality. Dictionaries reinforce this in their definition of aesthetics: "things perceptible by the senses as opposed to things thinkable or immaterial (Shorter Oxford, 1973), and "pertaining to the sense of the beautiful or the science of aesthetics" (Macquarie, 1981).

Aesthetics derives from the affects or preferences of individuals. Preferences do not derive from cognitive analysis. An individual's preference for a composer derives from their liking for his or her music, not from an analysis of his or her competency as a composer, his or her use of instruments, his or her scoring for the orchestra etc. The individual knows immediately whether or not they like a piece of music, although sometimes a piece may grow on the individual and he or her may come to like it. But it still derives from the individual's preferences, not from cognitive analysis. Similarly a person's liking of another person derives from intuitive preferences, not from cognitive reasoning.

The failure of the efforts in the 1970s to develop a credible method for assessing scenic quality derived fundamentally from approaching scenic quality from a cognitive analytical framework rather than from an preferences approach. The identification, description and classification of the components of the landscape do not produce a measure of scenic quality.

Preferences for landscape can change over time but are remarkably stable. The shift that occurred at the start of the 17<sup>th</sup> century<sup>1</sup> transformed the Western view of mountainous landscapes, from features regarded as the

<sup>1</sup>. A typical description of the European Alps, by John Evelyn who cross them in 1644: "which now rise as it were suddainly ... as if nature had here swept up the rubbish of the Earth in the Alps, to forme and cleare the Plainses of Lombardy." (Nicolson, 1959)

haunts of devils, uncouth areas fit for the scrap heap to features in which we delight. In *Mountain Gloom and Mountain Glory*, Margaret Nicolson (1959) traced the revolutionary change that occurred in the space of a generation in Western attitudes to mountainous areas which lead to the contemporary love of mountainous landscapes, largely to recognition of feelings of the sublime and awe associated with mountains.

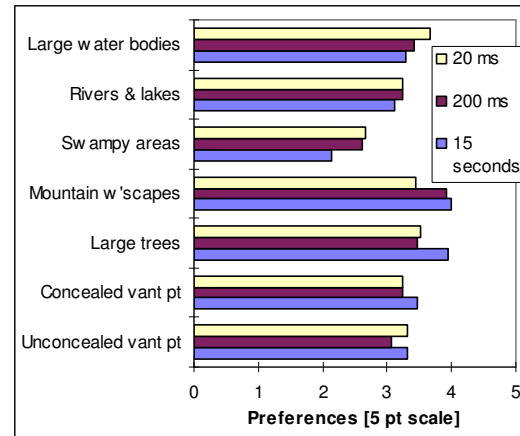
More recently the wilderness and environmental movements have influenced landscape preferences by heightening an appreciation of natural areas compared with areas where human influence is evident. In the author's study of South Australian landscape preferences, naturalness was second only to diversity as a predictor of landscape preferences (Lothian, 2000).

The preferences model is based on the premise that emotional (i.e. affective) responses to landscapes occurred before cognitive information processing. With the development of cognitive psychology in the 1960s, affects were regarded as products of cognition, i.e. they were post-cognitive.

In a widely quoted paper, *Feeling and thinking, preferences need no inferences*, R.B. Zajonc (1980) argued against affect being post-cognitive and provided experimental evidence that discriminations [like-dislike] could be made in the complete absence of recognition memory. He argued that preferences preceded cognition. He concluded that affect and cognition were:

“under the control of separate and partially independent systems that can influence each other in a variety of ways, and that both constitute independent sources of effects in information processing.”

Preferences are registered extremely quickly which supports them being pre-cognitive. Herzog (1984, 1985) used scenes which respondents viewed for 20 milliseconds [i.e. 1/50 sec] or 200 milliseconds [i.e. 1/5 second] and compared the responses with 15 seconds. As Figure 2.1 indicates that the ratings, though not identical, were very similar. The instantaneous assessment of what we like and dislike is obviously a skill that everyone possesses.



Source: Herzog, 1984 & 1985

**Figure 2.1 Effect of Viewing Times on Preferences**

### 2.3 THEORIES OF LANDSCAPE AESTHETICS

Theories of landscape quality, which seek to explain *why* we like what we like rather than simply describing *what* we like, all derive from an evolutionary perspective. These theories argue essentially that landscape preferences are survival enhancing: human preferences have been moulded by what enhances our capacity to survive as a species. These theories are summarised briefly below.

G.H. Orians, an evolutionary biologist, proposed the *habitat theory* with the biological imperative for humans to “explore and settle in environments likely to afford the necessities of life ...” (Orians & Heerwagen, 1992). He focused on the African savanna which contains scattered trees amongst extensive grassland and is believed to be the environment in which humans evolved. He argued that there would be a strong preference for this type of environment. Using the characteristic shape of the Acacia trees present he found strong human preferences for these trees. Similar environments are found in our public parks comprising extensive lawns and isolated trees and even our own backyards and gardens. The ubiquity of this form reinforces Orians' case.

Jay Appleton proposed the *prospect-refuge theory* in which he proposed that landscapes are preferred which enable one to see without being seen; they provided places (prospects) where one could spy out game, the enemy or other objects, while also providing places (refuges) in which to hide. However when these ideas were tested empirically, the proof

was not compelling. While prospects tend to correspond with the appeal of mountains and trees, refuges (e.g. caves) tend to be regarded negatively.

Roger Ulrich proposed the *affective theory* in which natural settings and landscapes produce in their viewers, emotional states of well-being. Measured on a like-dislike dichotomy, it correlated closely with scales such as beautiful – ugly or scenic quality scales. A disciple of Zajonc’s view that preference is pre-cognitive, Ulrich provided supporting evidence from preference studies. He proposed that:

“immediate, unconsciously triggered and initiated emotional responses - not ‘controlled’ cognitive responses - play a central role in the initial level of responding to nature, and have major influences on attention, subsequent conscious processing, physiological responding and behavior” (Ulrich, *et al*, 1991)

Using various physiological measures of brain activity and of feelings, Ulrich found that urban scenes without trees or natural objects produced negative feelings while scenes of nature provided positive feelings, and that these produced

physiological benefits. In a study of hospital patients, for example, he found that those patients with a view of trees recovered more quickly and required fewer analgesics than those without this view (Ulrich, 1984).

The overarching theory of environmental perception is information processing theory which has been applied in the field of landscape aesthetics by Stephen and Rachel Kaplan. They suggested that in extracting information from the environment, humans sought to *make sense* of the environment and to *be involved* in it. They have identified four predictor variables: *coherence* and *legibility* help one understand the environment, while *complexity* and *mystery* encouraged its exploration (Figure 2.2).

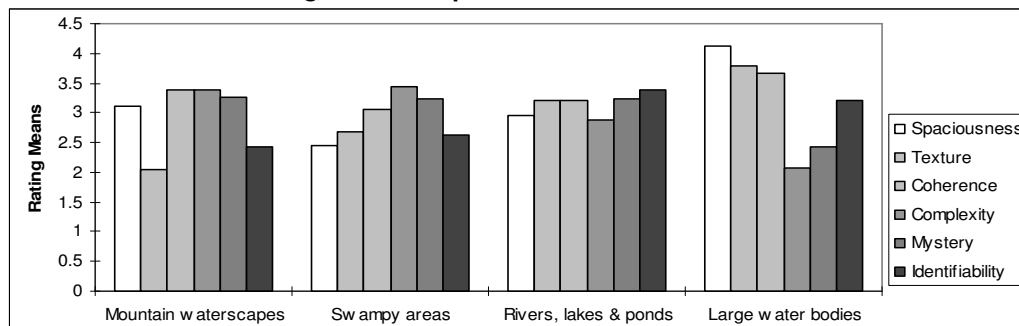
Coherence and complexity involve minimal analysis and are registered immediately while legibility and mystery require more time and thought. Research of these has found that coherence is the strongest predictor and mystery is the most consistent.

Among the many studies of the Kaplan model, Herzog carried out several. In a study of

	<u>Understanding</u> Making sense	<u>Exploration</u> Being involved
<u>Immediate</u> The visual array	<b>Coherence</b> Making sense now Orderly, “hangs together” Repeated elements, regions	<b>Complexity</b> Being involved immediately Richness, intricate Many different elements
<u>Inferred</u> Future, promised Three-dimensional space	<b>Legibility</b> Expectation of making sense in future Finding one’s way there & back Distinctiveness	<b>Mystery</b> Expectation of future involvement Promise of new but related information

Source: Kaplan, Kaplan and Brown, 1989; Kaplan, 1979.

**Figure 2.2 Kaplans’ Predictor Variables**



Source: Herzog, 1985

**Figure 2.3 Rating of Waterscapes by Kaplans’ Predictor Variables**



waterscapes, he used Kaplans' predictor variables and found (Figure 2.3):

- spaciousness was, not unexpectedly, best shown in large water bodies; these also showed highest texture and coherence but lowest complexity and mystery - they are water bodies which lack interest and are easy to make sense of;
- by contrast the other water bodies are more interesting, being high in mystery and complexity yet being reasonably coherent; they thus reward immediate involvement yet hold out promise of more
- the distinguishing features of (1) mountain waterscapes are their low textures which suggest that they are difficult to navigate; (2) low spaciousness of swampy areas; (3) identifiability of rivers, lakes & ponds; (4) while large bodies of water have the most distinguishing features.

The studies of the Kaplans' information processing model that have been conducted provide support for its elements. There would appear however to be a considerable degree of interpretation required of the application of these four predictor variables in the landscapes studied. The nebulousness of the concepts involved suggests that they are still evolving and this is likely to continue for some time.

Stephen Kaplan describes the theory as an evolutionary view based on habitat theory, with human preferences deriving from the adaptive value offered by particular settings (Kaplan, 1987). He regarded preferences as:

“An intuitive guide to behavior, an inclination to make choices that would lead the individual away from inappropriate environments and towards desirable ones”

An evolutionary perspective, in which preference aids the survival of the individual, led Stephen Kaplan to conclude:

“Aesthetic reactions reflect neither a casual nor a trivial aspect of the human makeup. Aesthetics is not the reflection of a whim that people exercise when they are not otherwise occupied. Rather, (they are) a guide to human behavior that has far-reaching consequences.” (Kaplan, S., 1987)

Brown & Itami (1982) proposed a model which related scenic resource values to landscape

preference components as defined by the Kaplan model.

Kaplan model:

	Making sense	Involvement
Visual array	Coherence	Complexity
3-D space	Legibility	Mystery

Brown & Itami model:

	Making sense	Involvement
Visual array	Slope	Spatial diversity
3-D space	Relative relief	Relief contrast
	Naturalism	Height contrast
	Compatibility	Internal variety

The Brown & Itami framework comprised two interrelated systems - the natural (land form) & cultural (land use). These described the physical components. Landform reflected the permanent “immutable” components and the cultural system was reflected by the land use and land cover pattern.

Clearly a robust theory of landscape which provides an all encompassing framework with which to understand and to predict landscape preferences does not currently exist. What we have at present are a range of theories which offer explanations of aspects of landscape preferences but which fall well short of a definitive explanation.

## 2.4 INFLUENCE OF CULTURE ON LANDSCAPE PREFERENCES

Cross-cultural studies of landscape have established that cultural differences play a minor role in influencing landscape preferences. Studies of the influence of culture on landscape preferences included the following.

Buhyoff, *et al*, (1983) examined the preferences of participants from the US, the Netherlands, Sweden and Denmark for slides of the Rockies and Appalachians. Correlations were highest between the Danish and Dutch and between the American and Swedish (Table 2.2).

**Table 2. 2 Correlation (Pearson) matrix**

	Netherlands	Sweden	United States
Denmark	0.84*	0.755*	0.727*
Netherlands		0.586***	0.550**
Sweden			0.890*

\* p > 0.01; \*\* p > 0.05; \*\*\* p > 0.10

Buhyoff *et al* noted the:

“Danes and Dutch prefer flat and open landscapes, whereas Americans and Swedes show a higher appreciation of forested and mountainous scenes.”

This is a finding which may reflect familiarity.

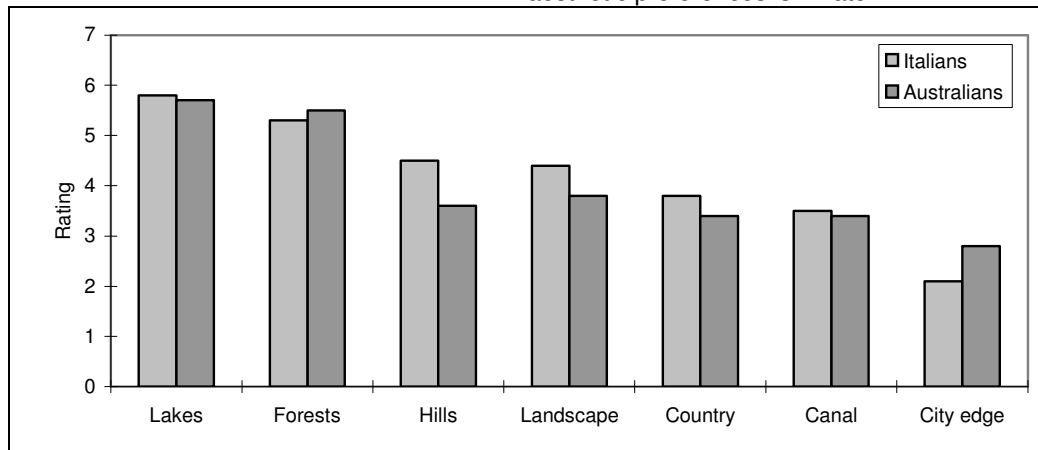
Hull and Revell (1989) found that the level of agreement regarding the scenic beauty of Bali among the Western tourists was significantly higher (0.86) than among the Balinese (0.79) which was surprising given that the tourists came from many countries. They considered that the Balinese who had been exposed to Western culture for decades might have adopted western values. Overall they concluded that despite the “enormous differences which exist between the Balinese and western culture” that “the results suggest that there was perhaps more similarity than differences between the two groups in their scenic evaluations” of the Balinese landscape.

Purcell *et al* (1994) compared the responses by Italian and Australian students to photographs of landscapes from both countries. Preferences by the Italian participants were generally higher than by the Australian participants but the differences were only slight (Figure 2.4).

Figure 2.5 indicates the preference values obtained by Tips & Savasdisara (1986) from people from a range of national backgrounds. They found, with some exceptions, a reasonable degree of similarity across different nationalities.

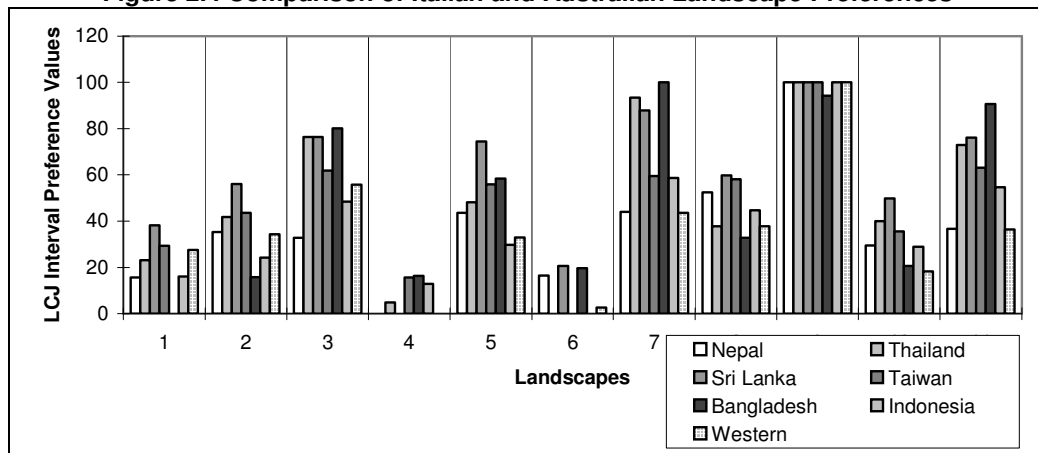
Kaplan, R. and Herbert (1987) assessed the preferences of students in Western Australia and Michigan for WA jarrah forests. Figure 2.6 summarises the findings for these students (5 point scale) and indicates a close agreement.

These and similar studies suggest that human preferences for landscape are deep seated, deriving from past human development. While culture has some influence, the core of our aesthetic preferences is innate.



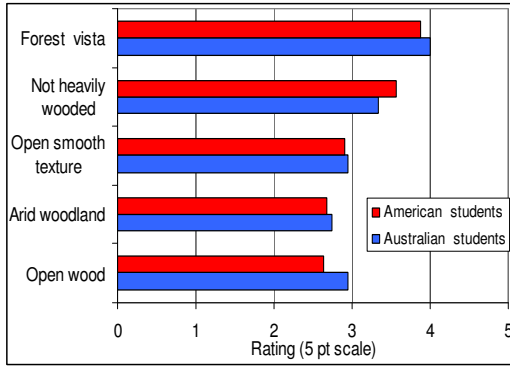
Source: Purcell *et al*, 1994.

**Figure 2.4 Comparison of Italian and Australian Landscape Preferences**



Source: Tips & Savasdisara, 1986

**Figure 2.5 Preference Values for 11 Landscapes**



Source: Kaplan.R. & Herbert, 1987

**Figure 2.6 Preferences of Australian & American students for Jarrah Forests**

**2.5 INDIVIDUAL DIFFERENCES IN LANDSCAPE PREFERENCES**

Many studies have examined the influence of respondent characteristics such as age and gender on landscape preferences and have generally found there to be little difference. Among the findings:

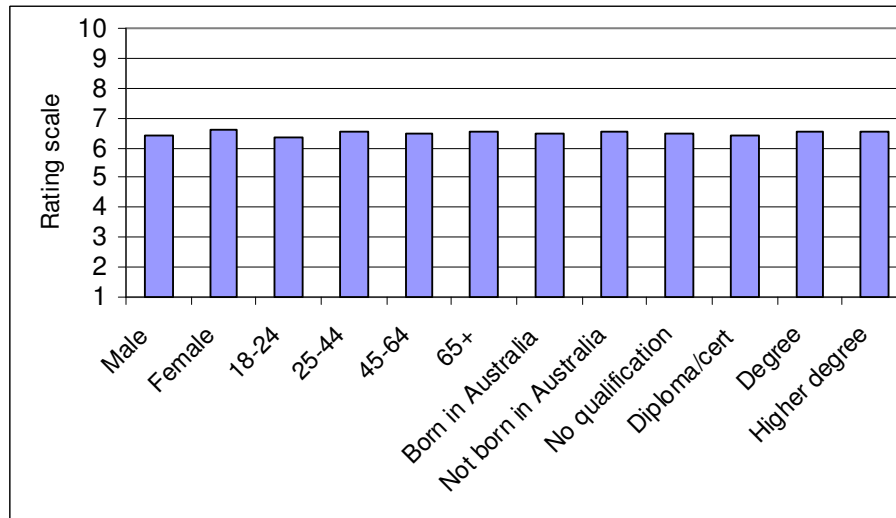
- Age generally had little effect, the exception being young children whose preferences differed markedly from adults
- There were slight differences between genders in the types of landscapes preferred

- Education, employment and socio-economic status appeared to have nil or negligible influence on preferences

Four studies that the author has undertaken (Lothian, 2000; 2003; 2004; 2005) support these conclusions; overall the similarities in preferences across respondents were much greater than the differences. This is illustrated by Figure 2.7 which indicates the similarity of average preferences across the differing age, gender, education and birthplace (i.e. inside or outside of Australia). The range of differences was +/- 0.1.

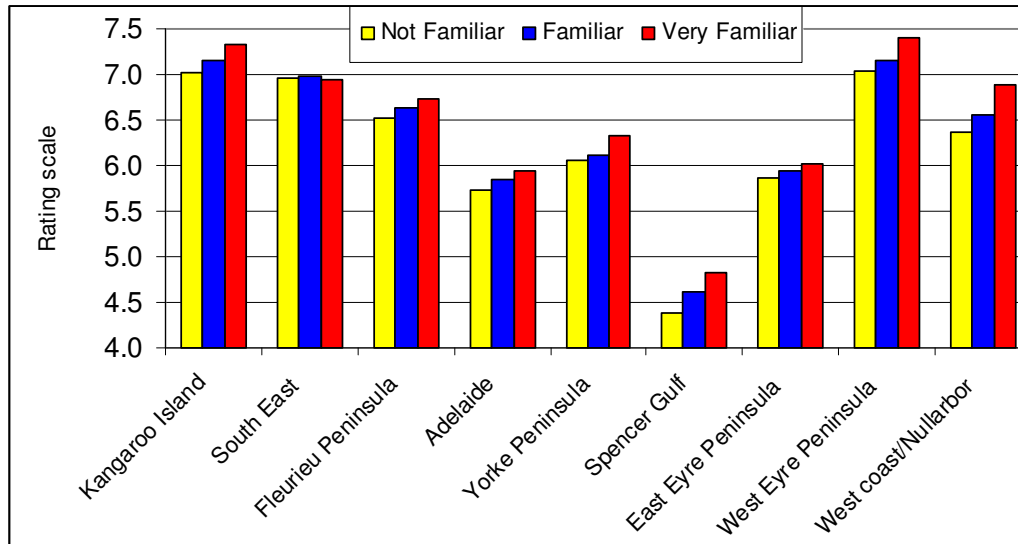
Familiarity is one component of observer characteristics which does appear to influence their preferences. Some studies have found a direct correlation between familiarity and preferences (e.g. Hammitt, 1979). Nieman (1980) examined the landscape preferences of residents near the Long Island coast and the Great Lakes shore and found they strongly preferred the environment with which they were most familiar (Figure 2.8). Similar results were found when respondents were asked which coastal area they would most prefer to live - in both cases, 82% preferred to live where they were rather than in the other location.

In the coastal scenic quality study (Lothian 2005), familiarity had a small but discernible effect on ratings (Figure 2.9). Being familiar with a region increased ratings by an average of nearly 2% while being very familiar increased ratings by 4.4%.



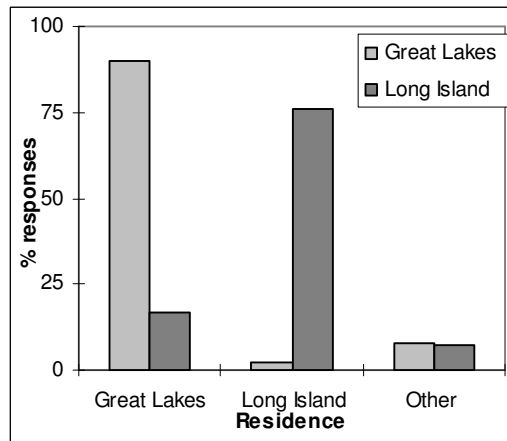
Source: Lothian, 2005

**Figure 2.7 Average Ratings by Participant Characteristics**



Source: Lothian, 2005

**Figure 2.9 Influence on Ratings of Familiarity with Regions**



Source: Neiman, 1980

**Figure 2.8 Preferences vs familiarity**

## 2.6 USE OF PHOTOGRAPHS TO MEASURE SCENIC QUALITY

Photographs of scenes are generally used in ascertaining the preferences of participants. These have obvious advantages over transporting large numbers of people into the field to visit widely dispersed locations. It would be clearly impractical to take 300+ people around the Barossa Region for the purposes of rating scenic quality. Photographs also enabled ratings of scenes separated temporally (e.g. different seasons). However the issue is whether photographs can be relied upon as substitutes for field assessments.

There have been many studies of this issue and their overall finding is that providing the

photographs meet certain criteria then the ratings gained from them will not differ significantly from ratings gained in a field situation. Some of these studies are summarized below.

Zube, *et al* (1975) reported on a series of studies including the responses from field vs surrogate assessments. Using a range of techniques (semantic scales, rank order and Q-sort) and groups of field and non-field populations, they found high correlations between field and non-field assessments. Comparing the field and non-field evaluations for eight views, the average  $R^2$  was 0.92.

Daniel and Boster (1976) used their Scenic Beauty Estimation (SBE) method to compare results produced by on-site vs slide judgements of forest landscapes. The SBEs derived from on-site judgements were generally slightly lower (i.e. based on the scale used, the scenes were judged to be of higher quality) than those derived from slide judgements. The correlation coefficients were highly significant statistically.

Kellomaki and Savolainen [1984] used a variation of the semantic differential method to assess the scenic values of selected tree stands in Finland. Three groups of participants evaluated the scenic values:

- Basic Group of forestry students assessed the scenic values in the field and laboratory

- Comparison Group, also students, assessed the values only in the laboratory
- Two groups of City Dwellers only assessed the values in the laboratory

**Table 2.3 Comparison of Field and Laboratory Assessments**

Group	Mean value	Mean deviation	Range of variation
Basic group - field	56.9	6.8	44 - 63
Basic group - laboratory	56.1	7.8	42 - 65
Comparison group - lab	55.1	8.2	43 - 63
City dwellers - lab	55.9	10.2	40 - 66
City dwellers - lab	54.0	9.4	40 - 65

Source: Kellomaki and Savolainen, 1984

The results indicated very close agreement between the three groups ( $p < .01$ ) (Table 2.3). While only one group rated the scenes in the field, the mean value of their assessment was only marginally higher than the laboratory assessments but their range of variation was slightly less.

A definitive study on the use of photographs as a surrogate of field observations was undertaken by Shuttleworth (1980). Being concerned that many of the studies that had examined this issue used different populations to assess the sites and the photographs, Shuttleworth used the same group in both situations.

His study used landscapes in rural areas and on the urban fringe (East Anglia, England). Colour and black and white prints were used as surrogates. Semantic differential (SD) and bipolar scaling techniques were used. The sample population of students ( $n = 93$ ) was divided into two groups all of whom visited all the field sites and half viewed the colour and half the b/w photographs. Various techniques were used to ensure randomness (e.g. changing the sequence of field vs photograph assessments) and to enable within-group and between-group analysis.

Shuttleworth found no differences between groups in responses to landscapes in the field and found little difference in responses to the photographs. However he did detect distinctly more differences between responses to b/w photographs and field views than between colour photographs and field views. He found

that with b/w photographs, participants tended to “make much more definite and differential responses by reinforcing likes and dislikes; responses to them thus tended far more to extremes of opinion than did responses to colour photographs”.

Shuttleworth concluded that the results “indicated that there were very few differences of significance between the reactions to and perceptions of the landscapes either when viewed in the field or as photographs” with any differences being explainable by content. He proposed that photographs can be used providing they are in colour and that they are wide-angled to provide a lateral and foreground context.

In conclusion, with few exceptions, surveys have established that photographs can provide a viable surrogate of landscape, however there are slight differences in responses and certain rules should guide their use. Photographs tend to provide more objective, more dispassionate responses, while site assessments can yield a more subjective response influenced by a range of site factors unrelated to landscape quality. Black and white photographs can reinforce likes and dislikes and produce more extreme responses than colour photographs. Generally, photographs should be in colour and provide a wide view to provide sufficient context.

## 2.7 POST SCRIPT

The outburst of activity in the 1970s to assess and map scenic quality failed to reach fruition and eventually withered and died through the lack of a credible methodology. An immense amount of work was expended and while much experience and understanding of scenic quality was gained, the period was characterised by frustration at not being able to translate this into assessment of scenic quality.

What was lacking was a method which met the criteria of scientific method, the first being that it was replicable, i.e. another person(s) using the same methodology would reach essentially the same results. Other requirements were objectivity, statistical reliability, and care to avoid strategic bias or other biases and influences. Each step of the methodology needed to be defensible from the acquisition of data, generally by photographs, through the analysis, to the mapping of the resultant

scenic quality. A method was required which would be defensible in court.

The methodology that is employed in this study fulfils these requirements. It aims to provide a defensible method that can measure and map scenic quality. In essence the methodology is a seven-step process involving the following:

1. Photography of the subject area
2. Delineation of landscape units in the area and the selection of photographs to sample these and other key attributes
3. Preparation and implementation of an Internet-based survey to gain the community preferences from a minimum of 400 participants who rate the scenes on a scale of 1 to 10
4. Identification of factors which may contribute to scenic quality of the area and the scoring of these factors on a 1 – 5 scale
5. Analysis of the ratings for the area as a whole, by the landscape factors, and by landscape units
6. Derivation of models which quantify the contribution of the factors to the ratings thus enabling the rating of a scene to be predicted from these factors
7. Mapping the scenic quality for the area based on the knowledge gained from the ratings and models

The Barossa Landscape Quality project is the fifth such project undertaken by the author during which this method has evolved and refined. The following summarises the previous studies.

#### **PhD: Landscape Quality Assessment of South Australia, 2000**

Dr Lothian's PhD dissertation was on the subject: *Landscape Quality Assessment of South Australia*, which involved:

- A thorough review of the literature underlying human landscape preferences and of studies throughout the world involving the assessment of landscape quality;
- Development and application of a methodology to assess South Australia's landscape quality which involved photographing South Australia's landscapes, mapping landscape character, selecting representative photographs, conducting sessions with the

community to rate the scenes, analysing the results, and mapping landscape quality for South Australia.

The dissertation's research and mapping was at a regional and state level, and provides a valuable context for proposed regional project. A brief summary of the study was reported in the *Australian Geographic* (75, July – Sept 2004).

#### **Visual impact of wind farms in South Australia, 2003**

Dr Lothian conducted private research of the visual impact of wind farms in South Australia to determine whether they have a negative or positive impact on landscape quality.

The project involved photographing proposed and potential wind farm sites near the coast and in the agricultural regions, inserting photomontages of wind farms into each scene, showing participants the scenes (in random order) of the sites with and without the wind farms and having the participants rate the scenic quality of each scene on a 1 (low) to 10 (high) scale. The results were based on 311 participants who completed all or nearly all 160 scenes.

Analysis of the results showed that wind farms had a significantly negative effect on landscapes perceived as highly scenic, particularly the coast, and progressively less effect on landscapes rated as lower in scenic quality (inland areas) where wind farms can actually enhance scenic quality.

#### **Amenity value of scattered and isolated trees, 2004**

The Native Vegetation Council of South Australia awarded a research grant to Dr Lothian to conduct research on the development of a method to assess the amenity value of scattered and isolated trees. These are subject to clearance applications for pivot irrigation and vineyard development.

The study involved the photography of scattered and isolated trees in many areas of South Australia, the selection of scenes for use in the survey, the development of an Internet based survey and the conduct of the survey. A total of 438 participants completed all 112 scenes.

Analysis of the results examined the influence of the various characteristics of trees (e.g.

height, canopy form and density, health) on the ratings of the scenes. Based on this, multiple regression analysis was used to derive a predictive model which would enable the scenic value of trees to be assessed in a field situation. A workbook was prepared to guide the field assessment of the scenic value of trees.

### **South Australian Coastal Viewscapes Project, 2005**

Dr Lothian measured and mapped the scenic quality of South Australia's coast for the Coast Protection Branch of DEH. The project involved:

- Extensive travel to photograph the coast
- Classifying the coast into six landscape units based on its characteristics
- Identifying photographs to represent these landscape units and compilation of a survey instrument
- Arranging the placement of the survey on the Internet. The Internet survey gained 2200 participants who completed the survey of 166 scenes
- A complementary survey on coastal development pressures was also undertaken using scenes with and without development. A total of 1659 participants completed the 82 scenes
- Analysis of the results provided a thorough understanding of coastal scenic quality and of the factors which contribute to it. Predictive models were derived covering each of the landscape units as well as the coast as a whole
- Mapping of scenic quality was then undertaken based on the results
- Recommendations were made regarding coastal policy and development assessment.

In summary, the methodology of these studies derives from community preferences, it does not rely on individual judgement and is thus inherently defensible providing the ratings are derived soundly, analysed objectively, and the mapping undertaken is based on these in a documented, transparent manner.