
COASTAL VIEWSCAPES OF SOUTH AUSTRALIA

EXECUTIVE SUMMARY

Project Requirements

The Coastal Protection Branch of the Department for Environment and Heritage engaged Dr Andrew Lothian of Scenic Solutions to measure and map the scenic quality of the South Australian coastline.

The Branch recognised that increasing developmental pressures on the coast were threatening the very qualities that the community value. Development pressures included housing and land division, marinas, aquaculture, wind farms and access roads and trails.

The outcomes of the project were intended to assist in the development of planning policy and the assessment of development applications.

The project tasks were to:

- Develop and apply a methodology to measure the scenic value of the South Australia's coast;
- Provide recommendations for the incorporation of the methodology into the Policy, Planning and Development Assessment processes;
- Map scenic value at a scale sufficient for planning and policy development;
- Report on the findings of the project;

The project commenced in mid December 2004 and was completed by the end of June 2005 with the exception of the mapping of scenic quality. This was completed in October 2005.

Approach to the Task

In essence the approach involved classifying the coast into units of similar characteristics, sampling these by the use of photographs, selecting photographs for an Internet-based survey, arranging for the scenic quality of these scenes to be rated by participants, analysing and modelling the results, and using the results as the basis for mapping the scenic quality of the South Australian coastline.

Aesthetics and Coastal Landscapes

The project commenced with a review of previous studies of coastal scenic quality both

in Australia and overseas. Virtually all the studies examined applied various criteria to what was believed to constitute attractive landscapes and then analysed them accordingly. A typical methodology involved the classification of areas of similar landscape character and the application of criteria such as naturalness, pattern, form, line and texture to each area. The scores would then be added and its landscape quality thus derived. This method is heavily dependent on the selection of factors to be scored and this varied widely from study to study. The selection of factors tended to be those which were measurable and were treated as of equal importance. This reductionist approach in which the whole is the sum of the parts is contrary to the holistic way in which landscapes are viewed and judged. The alternative is community rating of scenes which is the method used in this project.

The nature of aesthetics as an affective quality was then reviewed. Aesthetic preferences do not derive from cognitive analysis but rather from affective preferences. The influence of culture and individual differences (e.g. age, gender) on preferences was examined; it being shown that the similarities in preferences across cultures and individuals were greater than the differences. Theories of landscape aesthetics have an evolutionary perspective which argues that people's landscape aesthetics reflect what is survival enhancing. Studies which have examined the influence of water on landscape preferences were summarised.

The use of photographs on which to assess landscape aesthetics was examined, it being shown from a range of studies that providing the photographs meet certain criteria (e.g. colour, common format, not-composed) the preferences would be similar to those derived from field-based studies.

Acquiring the Data

The principles and criteria which guided the taking of coastal photographs were described. The entire accessible coast was travelled, covering over 10,000 km during which nearly 1700 photographs were taken.

At the consultant's request, DEH Environment Information prepared a set of maps showing the land that can be seen from the sea. This

viewshed comprises land with a sea view which is likely to come under greater development pressure than land without this view. Such land with a sea view would also have a higher scenic quality rating. These maps were subsequently used in mapping of scenic quality.

The South Australian coast was classified into five main landscape units: high cliffs, low cliffs & beaches, headlands & bays, beaches & dunes, and the samphire-mangrove formation. Each was described and its length measured. Dunes & beaches comprised 45% of the coast, headlands & bays 28%, high cliffs 12%, low cliffs 3% and mangroves/samphires 10%. The proportion of each landscape unit per region provided the basis for the selection of photographs.

The survey instrument was assembled using 138 coastal scenes plus 28 scenes from wider South Australia to ensure the rating of the coastal scenes reflected a State-wide perspective. The survey instrument commenced with instructions, demographic data, and 10 introductory scenes of the coast and South Australia. The scenes were then shown in random order which was changed for each participant. Ratings were on a 1 – 10 scale (low-high). The ratings were automatically tallied in a data base. An opportunity for comments was provided upon completion of the survey.

The survey commenced on 7 April and *The Advertiser* carried a 2-column article with a photograph on that day with the web address included. By its termination on 30 April, 3324 had participated of whom 2258, 68%, completed all 166 scenes. A further 58 were found to rate most scenes as 10 – a clear case of strategic bias, and were deleted leaving 2200 for analysis. Of these participants, 679 offered comments, particularly about the importance and beauty of the coast. Their comments were included on the CD. A sample of 2200 provided a confidence interval of 2.09; i.e at 95% confidence level, the response will be +/- 2.09% of the true value. This is an exceptionally small figure.

The scenic quality of scenes varied reflecting the presence or absence of certain features. The presence of the following factors were scored on a 1 – 5 scale: indentation of the coast, area of water, awe/ tranquillity scale, diversity, naturalness, quality of beach, and

height of land forms. Each was scored by small groups of participants.

Analysis of Data

The data set comprising the ratings of the 166 scenes by 2200 participants was analysed. The distribution of responses was close to normal.

Compared with the South Australian community, the sample was better educated and more middle aged. However the ratings were similar across the range of participant characteristics (age, gender, education, birthplace), reinforcing the finding earlier that ratings are similar across cultures and groups of individuals. Participant familiarity with different regions of the South Australian coast was strongest nearest to Adelaide and declined with distance. Familiarity with an area increased ratings slightly.

Appendix 10.3 contains all scenes with their ratings. Average ratings of scenes ranged from a low of 3.38 (samphires near Whyalla) to a high of 8.65 (Admiralty Arch, Kangaroo Island). Scenes typical of ratings 3, 4, 5, 6, 7 and 8 were included in the report. The factor scores were also analysed to derive averages.

The highest rating region was Kangaroo Island (7.15) while the lowest were the northern parts of the two Gulfs, St Vincent (4.64) and upper Spencer Gulf (4.57). Averages for other regions were: South East 6.79, Fleurieu Peninsula 6.68, Adelaide coast 5.93, Yorke Peninsula 6.17, Eastern Eyre Peninsula 5.92, Western Eyre Peninsula/Nullarbor 7.02. The ratings by landscape unit were: high cliffs 7.84, low cliffs 6.32, headlands & bays 7.02, dunes & beaches 6.30, samphires & mangroves 4.75.

Content analysis of the scenes in each landscape unit searched for possible influences on the ratings and detected various factors, which contributed to the identification of factors to be scored.

Analysis of the scores of ten landscape factors (e.g. diversity, height of landforms), examined histograms of the distribution of scores, compared the scores with their standard deviations to gauge consensus of opinion, compared the scores with the ratings of scenes and examined the relationship between different scores to identify close relationships. Naturalness was the highest scoring factor. Most scores increased with the

standard deviation, suggesting that consensus lowered as the score rose which was unexpected. The scores for all factors rose with ratings, except for the presence of seaweed on beaches which adversely affected ratings. The strongest influences on ratings were diversity, tranquility-awe inspiring, and the area of water factors. The height and steepness of landforms factors were strongly correlated.

Multiple regression analysis was used to develop predictive models for the scenes. Its purpose was to identify the influence of the various factors that had been scored on the scenic quality rating that had been obtained by the survey. Models were derived for all the scenes, and then for each of the landscape units. The results of each model were tested against the survey ratings to assess their accuracy.

Mapping Scenic Quality

The project required scenic quality to be mapped at a scale sufficient for planning and policy development. This was determined to be 1:40,000, the scale of the Development Plan maps used by Councils. However maps for mapping could only be produced at a scale of 1:50,000 which was considered satisfactory.

The following three zones were defined for mapping:

Zone 1: The water/land interface and land immediately facing the sea, including cliffs, dunes, headlands etc. This was generally a narrow band of land but for mapping purposes was defined as 100 m wide.

Zone 2: The land inland from Zone 1 from which the sea was visible. This may be quite narrow or stretch a considerable distance inland depending on the topography of the area. The extent was defined by the coastal viewshed maps.

Zone 3: Land where the sea was not visible and comprised agricultural land, parks and other uses. Often Zone 3 was inland of Zone 2, however in many areas, low land from where the sea cannot be seen occurred near the coast so in these areas, Zone 3 was located quite close to the sea.

A proforma was developed to guide the mapping of each section of the coast. This covered the following:

1. Defined the section
2. Defined the landscape units present and the length of coast in the section
3. Identified any scenes used in the survey present in the section, plus other photographs from the 1700 taken
4. Identified scenes similar to those found in the section of coast; this is based on the principle of equivalence, that a scene in one area can be applicable to another area with similar characteristics
5. Oblique aerial photographs available on-line from the Atlas of South Australia were inspected covering the entire coast
6. A brief description of the section covered
7. A table setting out the scenic quality ratings of scenes from 3 and 4, together with the ratings derived for them by the predictive models
8. The scenic quality rating for Zone 1 was given as a range of half a unit, e.g. 6.5 – 7.0. The mapping showed the median (6.75).
9. Ratings for Zones 2 and 3 were also provided. These differentiated ratings by location and land cover; land with 1 km considered of higher scenic quality than land more distant, and vegetated land slightly higher than non-vegetated land.

The overall Zone 1 ratings of the entire coast are summarised below.

Rating	Length km	%
3	31.40	0.66
4	402.77	8.47
5	822.97	17.30
6	1404.69	29.53
7	1987.92	41.79
8	107.48	2.26
Total	4757.23	100.00

A summary of these ratings by region and the detailed ratings of each section were included on the CD. The highest rated areas were, in order, Whalers Way – Shoal Point and Cape Catastrophe-Cape Tournefort areas south of Port Lincoln, Cape du Couedic-Kirkpatrick Point area on Kangaroo Island, and Cape Spencer at the toe of Yorke Peninsula. These areas rated 8 – 8.25. Other highly rated areas were in the South East (Cape Northumberland – Finger Point, McIntyre Beach – South End, and Beachport – Robe), the north-west and south-west coasts of Kangaroo Island, western Eyre Peninsula from Farm Beach through to Cape Bauer, and the Nullarbor cliffs. These all rated 7.75.

Coastal Development Survey

Following discussions with the Department a second Internet survey was conducted to ascertain the impact of development on scenic quality. The survey covered mainly housing-type developments of various forms and scales, plus several scenes of marinas and aquaculture. Scenes were prepared digitally with development included and the same scene without the development. The survey comprised 82 scenes. No demographic data was sought but an opportunity to provide comments was included. The comments received were placed on the CD and provide valuable insights into the views of a broad cross-section of the community regarding coastal development.

The survey was placed on the Internet and ran during 11 – 31 May and attracted 2413 participants. Of these, 1659 (69%) completed all scenes and provided the basis for analysis. The data set was checked for strategic bias but little found. The scenes without development averaged 7.09 and with development 5.00, a significant difference of over two units. The reduction due to development ranged from 10% to 50% of the scenic quality with an average of 29%.

Interestingly analysis showed that the impact of development did not correlate with the level of scenic quality; rather the impact was independent of the particular level of scenic quality and applied uniformly across the range of scenic quality. The decrease in scenic value attributable to development was around two units regardless of whether the scenic quality was eight or six. It was expected that the impact would be greater for higher scenic quality and vice versa.

The difference in ratings for scenes with and without development was significant for all categories of development.

Other findings from the analysis of the results were:

- The largest impact was from housing and marina development while aquaculture appeared to have a lesser impact
- The impact was similar whether the development was on headlands or dunes
- While the impact of development was lower for distant scenes, it was similar in the near and middle distance

- The impacts were similar for shack development and high rise development and both were greater than for housing development
- The impact was greater for less familiar scenes than for scenes of high familiarity.

The findings regarding the level of impact being independent of the scenic quality rating and also being greater for unfamiliar scenes were unexpected.

The findings from an earlier study of the impact of wind farms on coastal scenic quality were also summarised. The study used 21 coastal scenes with and without wind farms and had over 300 participants rate the scenic quality. It found that in all cases, the wind farm diminished scenic quality by an average of 1.5, but a larger impact for scenes of higher scenic quality and lesser for scenes of lower scenic quality. The findings enabled the likely impact of wind farm on a coast of known scenic quality to be predicted.

Application of Findings to Policy, Planning and Development Assessment

The project required recommendations for the incorporation of the results in the planning policy and development assessment processes. Scenic quality would be considered along with other relevant considerations in these processes. The assessment of scenic quality that were derived from this project, and the resultant maps were considered sufficiently robust and accurate to provide a basis for the development of planning policy and for the assessment of development applications.

The findings from the Coastal Development Survey were summarised as they were relevant to this chapter.

The issue of access to high quality scenic areas was discussed, with spur roads favoured over coastal roads.

An extensive review was provided of coastal scenic area planning policies from South Australia, other states and overseas together with a synthesis.

Development options for high quality coasts were reviewed and the issue of a veto over development for high quality areas discussed. Options were presented ranging from complete exclusion to providing a high level of

access. This is a policy issue which would require broad community input for its resolution.

The approach proposed to guide planning policy and development assessments classified coastal areas by their relationship to the sea (i.e. Zones 1, 2 or 3) and by the scenic quality rating – also in three zones, proposed as: SQ 1 rating more than 7.25, SQ 2 more than 5.0 and less than 7.25 and SQ 3 more than 3.0 and less than 5.0.

A matrix comprising SQ1, 2 and 3 across and Zones 1, 2, and 3 down was constructed. The strategic approach involved high levels of protection for Zone 1/SQ1 and lesser levels of protection for SQ2 and SQ3 and for Zones 2 and 3, allowing progressively greater levels of access, structures and developments consistent with maintaining the scenic values as well as other environmental values (e.g. wetlands in SQ3). Greater protection was provided within Zones 2 and 3 for areas within 1 km of the coast; it being recognised that there were many Zone 3 areas in proximity to the coast.

The matrix was then applied to the following areas of development: access, visitor facilities, structures & infrastructure, commercial developments, tourist developments and housing developments. Mining and extractive industries, wind farms, aquaculture, marinas and marine Infrastructure were also covered.

Conclusions

The requirements of the Project Brief were fulfilled by the Project.

The conclusions examined the issue of the use of surrogates (photographs and scales) in the Project and that although scenic quality is inherently subjective, the Project has demonstrated that it can be measured objectively.

A whole-of-government policy approach to coastal scenic quality is advocated. This would cover planning and development assessment, Government developments and marine management, National Parks policy, declaration of Landscapes of State Significance, working with the Commonwealth, assigning responsibility for coastal scenic quality, and promoting community appreciation and opportunities for involvement.

Coastal scenic quality is an important community resource of immense social and economic value. South Australia can lead the nation in its recognition of this through its efforts to identify, protect and manage coastal scenic quality.

References

A comprehensive set of references was included.

Appendixes

Appendixes covered the following:

- 10.1 Project Brief
- 10.2 Gantt Chart of Coastal Viewscapes Project Implementation
- 10.3 Scenes in survey by region

CD

The CD accompanying the report contained:

1. Powerpoint summary of Coastal Viewscape project
Locations of all photographs
2. Scenes arranged by landscape unit
3. Coastal development scenes
4. Coastal rating assessments
5. Comments by participants from Coastal Scenic Quality Survey
6. Comments by participants from Coastal Development Survey

NOTE

In December 2009 I substantially extended Section 4.8, Scoring of landscape factors. I also corrected the analysis and graphs in Section 4.11, Development of predictive models, and in Section 6.4, Detailed analysis of the Coastal Development Survey.

These changes do not affect the basic findings of the original report.

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