3. ACQUIRING THE DATA

The collection of the data on which this study is based is described in this section, commencing with the photography of the coast, the selection of scenes for the survey, and finally the development and implementation of the survey instrument.

3.1 PHOTOGRAPHY OF THE COAST

Principles

South Australia’s coast is approximately 3,700 km in length and it would be clearly impractical to photograph every kilometre of it. Neither is it necessary. Rather a sampling of coastal landscapes was undertaken which aimed to ensure that each type of coastal landscape was represented.

Photography was based on certain principles:

- **Principle of representativeness** – the photographs needed to cover the diversity of coastal landscapes and the variations within each type;
- **Principle of equivalence** – two similar scenes of a given type of coastal landscape, e.g. sand dunes, should gain similar ratings; thus location is not critical, rather it is the characteristics that are present;
- **Principle of complexity** – the photographs should reflect the complexity of the coastal landscapes;
- **Principle of typicality** – scenes were selected which typified a particular landscape;
- **Principle of simplicity** – landscapes were photographed to contain the minimum of components, and complicating and distracting elements were avoided as far as possible.

The method used was that all accessible and navigable roads available in a region were traversed to the coast and photographs taken. Table 3.1 summarises the trips made to each region.

Photographs

Photographs were taken at 50 mm focal length which is equivalent to the human eye.

Composing each photograph sought to minimise extraneous factors such as people, sheep or cattle, wildlife and seagulls, fences, electricity poles and wires, dead trees, and excavations or other eyesores. Any of these can influence preferences either positively or negatively and as many were of an ephemeral nature and not part of the scene they were excluded. Photographs were taken using the landscape view, not portrait view and extended to the horizon, not a close-up confined view. Photographs were taken in full daylight without strong side lighting or early morning or late evening which can dramatise scenes.

Table 3.1 Summary of Coastal Trips

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance (km)</th>
<th>Photographs</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East</td>
<td>1911</td>
<td>159</td>
</tr>
<tr>
<td>Fleurieu Peninsula</td>
<td>912</td>
<td>272</td>
</tr>
<tr>
<td>Kangaroo Island</td>
<td>964</td>
<td>196</td>
</tr>
<tr>
<td>Adelaide</td>
<td>235</td>
<td>30</td>
</tr>
<tr>
<td>St Vincents Gulf</td>
<td>297</td>
<td>268</td>
</tr>
<tr>
<td>Yorke Peninsula</td>
<td>1529</td>
<td>171</td>
</tr>
<tr>
<td>Upper Spencer Gulf</td>
<td>1186</td>
<td>62</td>
</tr>
<tr>
<td>Eyre Peninsula/Nullarbi</td>
<td>3099</td>
<td>578</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10133</strong></td>
<td><strong>1676</strong></td>
</tr>
</tbody>
</table>

The photographs should be regarded as providing a benchmark for scenic ratings. The photographs deliberately did not include the transitory effects of special atmospheric lighting such as sunsets or particularly vivid side lighting. Nor did they reflect the influence that clouds can have on a scene – heavy cloud dampens colour saturation while spectacular cloud formations may enhance the scene. In some locations, seasonal colour such as autumn leaves or ripe cereals may also enhance the appearance of a scene.

In its effort to standardise scenes, the project sought sunny cloud-free conditions throughout to standardise scenes against a blue sky. This proved difficult as the 2005 summer was particularly cool and cloudy days persisted. As a result the photography took somewhat longer than intended. Photography was undertaken mainly in January and the first half of February 2005.

Photographs were taken so that the rating reflected the quality of the scene, not the quality of the photograph. Photographic composition of a scene to frame a view or to lead the viewer into a scene may enhance its appearance and was avoided as far as possible.
In the early trips (400 photographs), a Nikon F60 SLR camera was used and conventional photographs produced which were subsequently scanned. A Nikon D70 SLR digital camera was then acquired and used for the remainder of trips. Its advantage over lesser digital cameras was that it could be set at the correct focal length (50 mm). In digital cameras, the focal length needs to be multiplied by 1.5 to equate to conventional cameras. Thus a focal length of 35 mm in the Nikon D70 equated approximately to 50 mm in the Nikon F60. Digital photographs were recorded at the normal image quality and the medium image size, producing images of 2,240 X 1,488 pixels (3.3 megapixels) which were recorded by 8 – 900 kilobytes. Only a UV filter was used on both cameras.

Overall over 10,000 km was traveled and nearly 1700 photographs taken. This is an average of one photograph every six kilometres.

A Toyota HiAce campervan was used for all trips. This proved a reliable vehicle but as it lacked 4WD capability was limited to reasonable roads and tracks. Sandy areas were avoided and required walking some distances in many instances.

Photography at each of the thousand plus sites considered suitable involved the following five steps:

1. Stop the vehicle.
2. Switch on and place the GPS on front dash, collect camera. A Magellan 310 geographical positioning system (GPS) was used throughout.
3. Walk to suitable location for the photograph. At the least this required walking to the fenceline along the road but often it involved walking across dunes to the beach or along cliffs.
4. Compose and take the photograph(s) and walk back to the vehicle.
5. Record the location and the latitude and longitude coordinates from the GPS. Note that these were generally of the vehicle’s location so they could be some distance from the actual photograph located near the coast. The location of the photographs was also recorded on maps.

Later the details of each site were transferred to an Excel file to compile a permanent record of the photograph locations and for use in mapping the photograph locations. A file of their locations is included on the CD. Figure 3.1 indicates the location of the photographs around the South Australian coast. At the majority of sites shown more than one photograph was obtained.

Each stop took a minimum of five minutes to cover these steps but were often far longer where they involved walking a distance.

Maps of 1:50,000 scale were used for much of the coast, with the exception of Eyre Peninsula and the far west coast into the Nullarbor where such maps do not exist. For Eyre Peninsula, maps of 1:100,000 scale were used and for areas further west, the 1:250,000 maps were used.

**Covering the coast (Figure 3.1)**

There were sections of the coast which, due to the absence of access tracks, terrain, or prohibition of entry, were not possible to visit and photograph. The oblique aerial photographs of these areas in the Atlas of South Australia \(^3\) were examined in detail and assessments made from these of the categories of the coast. Examples of these inaccessible sections of the coast were:

- The extensive national parks and reserves on Kangaroo Island, some of which are designated Wilderness Protection Areas, in which tracks to the coast were non-existent. The Canunda National Park in the South East similarly limited access.
- The rugged terrain on Fleurieu Peninsula and the north coast of Kangaroo Island limited availability of access. On Fleurieu Peninsula the Heysen Trail which traverses part of the coast was closed for summer and access through private land was prohibited.
- The El Alamein Army Training Area, which includes approximately 18 km of the western coast of upper Spencer Gulf, is a prohibited area with signs warning of unexploded ordnance lying about.
- Areas of extensive mangroves and samphires, including upper St Vincent’s Gulf and upper Spencer Gulf.
- An extensive inaccessible area south of Whyalla with mangroves in the northern part and coastal dunes towards Cowell.
Note: in most locations, several photographs were taken.

Figure 3.1 Locations of All Photographs
• Much of the west coast, west of Ceduna, comprised high dunes rendering access impossible even for 4WD vehicles.

Many roads near the coast, marked on maps, were followed only to find them impassable. Many tracks were marked on maps but turned out to be private farm tracks and access was prevented generally by locked gates.

Observations

Based on the extensive travel in coastal regions, the following comments are offered.

1. Many rubbish dumps (waste depots) have been located near the coast. This is probably because it is Crown land and under the care and management of the local council. But it has resulted in dozens of rubbish dumps located within short distances of the coast, in often ecologically sensitive and environmentally significant land including dunes and wetlands. Efforts should be made to locate these out of the coastal zone inland to less sensitive environments.

2. Signs advertising coastal subdivisions were found in quite remote locations, particularly on Eyre Peninsula. These were generally of large allotments often with water frontage but sometimes lacking water and other services. Several large subdivisions were visited, including Fisherman’s Paradise south of Streaky Bay and Perlubie beach north of Streaky Bay. Each had houses, caravans and various sheds scattered across extensive areas overlooking the coast.

3. A significant improvement to tourism in regional areas would be achieved by non-corrugated roads which currently do much to mar the enjoyment of an area. Tourism information of all areas failed to mention the condition of the roads that must be endured to reach the destinations sought. It was amusing to see speed limit signs of say 60 kph on the roadside when the condition of the road made it impossible to approach this speed. It was also apparent that while some councils had striven to provide good roads (e.g. Streaky Bay Council), in other areas, sections of the roads were atrocious. Kangaroo Island with its ironstone roads is an example, though efforts have been made to sheet some of these with limestone which appeared successful until potholes took over.
Sign at Baird Bay, western Eyre Peninsula

Sign near Lipson Cove, eastern Eyre Peninsula

Sign near Pt Neil, eastern Eyre Peninsula

Sign and developments at Fisherman’s Paradise, south of Streaky Bay
3.2 VIEWSHED ANALYSIS

At the consultant’s request, DEH Environment Information carried out an analysis of the viewshe visible from the sea. The objective was to determine the boundary on the land at which the sea is visible.

It was known from the literature that the presence of water in a scene almost invariably enhances the scenic quality of the landscape (see Section 2.5 (5)). For South Australian scenes and using a 1 to 10 rating scale, I found that coastal scenes averaged 7.7 compared with inland scenes which lacked a view of any water of 5.3, a difference of 2.4 which is a very substantial difference (Lothian, 2000). It was considered therefore that land between the coast and this viewshe boundary could potentially be subject to development pressure. In crude real estate terms, a view of the sea adds thousands of dollars to the value of a property – particularly residential or holiday properties. The land lying beyond sight of the sea is likely to have a lower scenic quality rating. The viewshe boundary therefore provided the basis for demarking the coastal ratings where the sea is visible, and the land where the sea is not visible.

The viewshe boundary was derived by the Environmental Information Branch of DEH using a detailed topographic data set. Positions approximating the horizon at 6.2 km distance from the shore were selected at 5 km intervals around the coast. The figure of 6.2 km represents the distance visible at sea from eye level to a point 1.5 m above sea level (Figure 3.2)

From these positions, the land within a 20 km radius was plotted. This was plotted for successive 5km positions parallel to the coast so that a location not visible from one position may be visible from one or more other positions.

The data did not consider the blocking effect of trees or buildings on the viewshe – these do not comprise permanent features on the landscape and could be removed. There are locations, e.g. western coast of Yorke Peninsula, where coastal dunes thickly vegetated by dense trees block the view of the sea from inland.

The viewshe maps provide a detailed assessment of the land visible from the sea. For the purposes of scenic quality ratings, it may be necessary to generalise the viewshe boundary to omit isolated hilltops and ridges so that a contiguous viewshe boundary can be derived.

The viewshe maps showing the detailed viewshe for the South Australian coast will be lodged with the Coast Protection Branch of DEH. These may be consulted for more detailed appraisal of the viewshe boundary, particularly in hilly coastal areas (e.g. Fleurieu Peninsula, northern Kangaroo Island) where isolated hills and ridges may be visible from the sea but are non-contiguous due to intervening vallies and gullies.

3.3 CLASSIFICATION OF SOUTH AUSTRALIA’S COASTAL LANDSCAPE

The landscape characteristics of the South Australia’s coast are the product of its geology, climate, past and present sea levels, wave energy, and, more recently, human influence such as the removal of sand dunes on the Metropolitan coast.

Davies (1977) grouped the State’s coastline in a “warm temperate arid coasts” classification of Australia’s coasts. It included rock coasts, mainland beach coasts, and small barrier...
Table 3.2 Areas of different coastal surface types (km$^2$) – South Australia

<table>
<thead>
<tr>
<th>Section</th>
<th>Total area</th>
<th>Bare mud flats</th>
<th>Mangrove mud flats</th>
<th>Holocene sand total area</th>
<th>Holocene sand bare</th>
<th>Holocene parabolic dunes</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East, Coorong, Fleurieu Peninsula</td>
<td>3903</td>
<td>150</td>
<td>0</td>
<td>666</td>
<td>225</td>
<td>180</td>
</tr>
<tr>
<td>Gulf St Vincent, Yorke Peninsula</td>
<td>1767</td>
<td>81</td>
<td>63</td>
<td>243</td>
<td>45</td>
<td>57</td>
</tr>
<tr>
<td>Upper Spencer Gulf, E. Eyre Peninsula</td>
<td>2022</td>
<td>108</td>
<td>99</td>
<td>132</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>W. Eyre Peninsula</td>
<td>1860</td>
<td>63</td>
<td>0</td>
<td>435</td>
<td>168</td>
<td>135</td>
</tr>
<tr>
<td>West coast</td>
<td>1887</td>
<td>84</td>
<td>42</td>
<td>384</td>
<td>183</td>
<td>78</td>
</tr>
<tr>
<td>Nullarbor</td>
<td>903</td>
<td>0</td>
<td>0</td>
<td>147</td>
<td>54</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>12342</td>
<td>486</td>
<td>204</td>
<td>2007</td>
<td>696</td>
<td>483</td>
</tr>
</tbody>
</table>


Note: the columns do not comprise the total area.


Figure 3.4 The South Australian coast showing structural base and major coastal types

coasts (i.e. the coastal dunes protecting the Coorong).

Gill (1982) classed the Nullarbor and far west coast as part of the Great Australian Bight Arid. Table 3.2 summarises the coastal surfaces of the South Australian coast. Holocene refers to the most recent geological period of 10,000 years. Riverless Coast, and the remainder of the South Australian coast as part of the Aeolianite Coast which extends into western Victoria.

Galloway and colleagues of the CSIRO Division of Water and Land Resources classified the entire Australian coastline using LANDSAT satellite imagery, aerial photographs and maps. They classified a 3 km wide strip.
South Australia has a greater proportion of sandy coasts and eolianite coasts compared with Australia, which occurs mainly in the tropics. Sand dominates the South Australian coast, covering over 60% of the coast. The sandy areas have formed following the return of sea levels around 6000 years ago.

Twidale, a prominent South Australian geomorphologist, classified South Australia’s coast into five landscape units:

- Cliffs
- Cliffs with bayhead beaches
- Low cliffs and beaches
- Beaches and backing dunes
- Mangroves

Figure 3.4 indicates the distribution of these landscape units. This classification matches closely with a classification prepared by the consultant from traveling the South Australian coast. Based on Twidale’s classification:

- The Nullarbor, west coast and Western Eyre Peninsula comprises mainly cliffs
- Eastern Eyre Peninsula comprises mainly low cliffs, interspersed with some mangroves

The following classification of South Australia’s coast builds on the previous work, particularly the five-part classification by Twidale. It comprises the following six landscape units:

1. High steep cliffs
2. Low cliffs and beaches
3. Headlands and bays
4. Beaches backed by dunes
5. Samphire – mangrove formation
6. Township foreshores

(1) HIGH STEEP CLIFFS

High land which terminates as sheer cliffs at the sea occurs in several localities. Cliffs are steep, generally sheer and inaccessible. Their height, steepness and sheer ruggedness differentiates them from other landscape units. These generally occur on high energy coasts which formed the cliffs through erosion.

The coast is defined by the larger morphological context extending well inland from the sea. High steep cliffs often present spectacular coasts with considerable diversity, indentation and unpredictability. They are of medium to high landscape quality. They are generally not developed except where valleys bottom out near the sea and settlements occur – e.g. Second Valley on Fleurieu Peninsula and Stokes Bay on Kangaroo Island.

These may be formed by high land and plateau extending to the coast via ridges and valleys or a high flat plain extending to the coast. High steep cliffs are found on the Nullarbor, western and southern Eyre Peninsula, the toe of Yorke Peninsula, north-western and south-western Kangaroo Island.

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5. Eolianite (or aeolianite, also known as calcrete) comprises wind blown shell sand consolidated into limestone by solution and redeposition of calcium carbonate. It originated in the Pleistocene age as massive dunes (Galloway, 1984).
southern Fleurieu Peninsula and Newland Head.

(2) LOW CLIFFS AND BEACHES

Low cliffs occur on several essentially straight sections of the coast and are generally on low energy coasts. Their low height is the main point of differentiation from the high steep cliffs landscape unit although they can be sheer and quite rugged. In some locations, beaches and dunes occur between the cliff and the sea and this is rare for the high steep cliffs. On the eastern coast of Yorke Peninsula these coasts are popular for shack development and holiday housing townships.

The main locations in which these coasts occur are the Redbanks – Pt Gibbon section of eastern Eyre Peninsula, much of the eastern coast of Yorke Peninsula, and a short section at Redbanks on north eastern Kangaroo Island. The name Redbanks indicates the ironstone character of these low cliffs.
This group is similar to Twidale’s *Cliffs with bayhead beaches*, and comprises headlands of resistant strata with beaches between them where the hard strata has been eroded and the softer rock underneath disappears through subsequent erosion.

The hard stratum is often of calcrete (aeolianite) but in some locations (e.g. western Eyre Peninsula) harder granite or other more resistant rock may underlie the cliffs at sea level. Although this base has been eroded it provides a firm base for the headlands. Headlands and bays generally occur on high energy coasts.

Many cliffs have wave cut platforms at their base and considerable rock debris strewn about. Some coasts comprise highly fractured headlands with rock debris and wave cut platforms (e.g. Cape Buffon area near South End).

The headlands may be low, medium or high in height, and the land may slope back into the bay. The bays may be backed by dunes or agricultural land. These are highly diverse landscapes, with considerable indentation of the coast and are unpredictable in their formations. These formations are generally of medium to high landscape quality.

With plentiful limestone, South Australia’s coast has many examples of this formation. They are found in the South East, southern and western Yorke Peninsula, and particularly the west coast of Eyre Peninsula.

In several localities of protected bays and inlets, the hills slide into the sea with virtually no erosion from the low energy sea. The lack of apparent erosion distinguishes these from areas in which the hills have been eroded into cliffs. In some locations the land slopes gently or is nearly flat but because of the low energy coast erosion is minimal.

Examples include the upper Spencer Gulf between Pt Lowly and Port Augusta, Lincoln National Park, Port Lincoln, parts of Coffin Bay, Baird Bay and Smoky Bay at Streaky Bay. It also occurs on the protected side of some headlands – e.g. on the Encounter Bay side of the Bluff and in protected areas on Kangaroo Island.
Beaches are backed by dunes which may be low, medium or high in height, vegetated or barren, and the beaches may be wide and extensive or narrow or intermittent. This type is found in both high and low energy coasts. The coast is usually fairly uniform, lacking indentation and other diversifying features. Landscape quality tends to be medium. These coasts are often used for shack development and holiday housing – e.g. in the South East and Yorke Peninsula.

Parts of the far west coast (e.g. near Fowlers Bay) comprise extensive stretches of coastal high dunes, some vegetated, others barren. On the western side of Yorke Peninsula the coast is lined by dunes of medium height, generally vegetated. In the South East, the Coorong is separated from the sea by medium height dunes, mostly vegetated. Further south, there are low vegetated dunes.

Dunes occur backing large bays forming attractive curved arches of which there are many examples (e.g. Anxious Bay, Peake Bay, Berry Beach). In other localities, the coast is straight – Younghusband Peninsula is an example although it curves slightly over its very long length. Examples of very high dunes include the head of the Bight, Fowlers Bay, Talia Beach, and Formby Bay.

Parsons Beach and Waitpinga Beach on Fleurieu Peninsula are rare examples of dunes which have formed between high headlands not consisting of calcrete as is common on Yorke and Eyre Peninsulas.
Western Cove, north Kangaroo Island

Anxious Bay, western Eyre Peninsula

West Lakes Shore, Adelaide coast

Davenport Creek, west coast

Formby Bay, Yorke Peninsula

Head of Bight, Twin Rocks

Arno Bay, eastern Eyre Peninsula

(5) SAMPHIRE – MANGROVE FORMATION

Samphires and mangroves always occur on low energy coasts and often comprise extensive areas. While the other coastal landscape units refer to the land, mangroves exist in the sea. They can be considered as part of the seaward component of the coast. Mangroves require warm conditions in which to thrive so are not found in the South East, Fleurieu Peninsula or on Kangaroo Island.

There is little diversity and these formations have a high degree of predictability. Landscape quality tends to be low. Examples include south of Pt Pirie and Pt Augusta, eastern St Vincents Gulf, and inlets on Eyre Peninsula (e.g. Cowell, Tourville Bay, Murat...
Bay). In some areas the mangroves are scattered (e.g. on the western side of upper Spencer Gulf and adjacent to the Port Wakefield Proof Range) and the samphire component may not exist or be highly dissected.

Development is rare in these formations although access tracks to boat launching facilities and crabbing localities often occur. An exception is the west coast of the upper Spencer Gulf where scattered littoral mangroves lie adjacent to extensive linear shack development.

In some localities, extensive sand flats occur with patches of mangroves or other coastal vegetation – Pelican Lagoon on Kangaroo Island is an example. These may comprise internal bays and lagoons. There may also be extensive flats with seagrasses and other marine vegetation – St Kilda, Fisherman’s Bay and Weerona Bay north of Port Pirie are examples.
(6) TOWNSHIP FORESHORES

Often the foreshore of townships has been considerably modified from the original. Dunes, if they existed, have long disappeared, and the area is often grassed with non-indigenous trees planted. Norfolk Island pines are particularly popular.
3.4 LENGTH OF COASTAL LANDSCAPE UNITS AND REGIONS

The approximate length of the seven landscape units of coastal landscapes in South Australia was assessed by measuring each off maps of the State. Maps of 1:50,000 (1 cm = 0.5 km) and 1:100,000 (1 cm = 1 km) scale were mainly used, the exception being the Nullarbor where 1:250,000 (1 cm = 2.5 km) scale maps were used. Oblique photographs on the Atlas of South Australia were also viewed extensively.

Distances were scaled off the maps using a ruler. A measuring wheel was considered but decided against as it would offer little gain in accuracy. Reference was made to the photographs throughout the length of the coastline as well as to other sources of information.

The length measured from the maps totaled 3685 km, which compares well with the 3,700 km length of the South Australian coast – only 0.4% difference which is considered acceptable. Table 3.3 summarises the length of the seven landscape units and these are illustrated by Figure 3.5.

These figures indicate that the South Australian coast is dominated by two formations, dunes/beaches and the headlands/bays formation. Together these account for 73% of the total length.

Table 3.3 Length of Coastal Landscape Units

<table>
<thead>
<tr>
<th>Landscape Unit</th>
<th>Total (km)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High cliffs</td>
<td>433</td>
<td>11.8</td>
</tr>
<tr>
<td>Low cliffs</td>
<td>126.5</td>
<td>3.4</td>
</tr>
<tr>
<td>Headlands</td>
<td>1015.5</td>
<td>27.6</td>
</tr>
<tr>
<td>Dunes</td>
<td>1676</td>
<td>45.5</td>
</tr>
<tr>
<td>Mangroves</td>
<td>353</td>
<td>9.6</td>
</tr>
<tr>
<td>Towns</td>
<td>81</td>
<td>2.2</td>
</tr>
<tr>
<td>Total</td>
<td>3685</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Interestingly towns accounted for over 80 km or 2% of the total length, and this excluded Adelaide coast which was designated as dunes. This indicates the linear nature of much coastal development where the town stretches along the coast. Only the larger towns and settlements were recorded on the basis that these had produced major changes in the coastal formation and formed their own distinct formation.

Figure 3.6 summarises the length of coast in each of the nine regions and indicates the dominance of the Eyre Peninsula and areas to the west. Together with eastern coast of Eyre Peninsula, these two sections total more than half the State.

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6. The coast is a fractal entity as its degree of irregularity is the same at any scale. As the measuring scale becomes smaller the measured length of coast rises without limit. Thus any given length of the coast is an approximation.
Finally, Table 3.4 and Figure 3.7 summarise the length of each coastal landscape unit present in each of the regions. These indicate the region where the majority of a landscape unit is present:

- Most of the high cliffs are found on western Eyre Peninsula and particularly the Nullarbor, and on Kangaroo Island.
- Headlands are found equally on Western Eyre Peninsula and Kangaroo Island.
- Dunes are scattered across all regions but are best represented on western Eyre Peninsula, the South East (the Coorong), and western Yorke Peninsula.

This analysis can inform the selection of scenes for the survey. Ideally it may be desirable that the numbers of scenes of each landscape unit reflect their prominence in the South Australian landscape. Thus the survey would show many scenes of dunes and headlands and fewer scenes of other landscape units. However, other factors are important determinants, particularly the relative complexity of a landscape unit and how many scenes are required for it to be adequately represented. Also, it is necessary to ensure adequate representation of a landscape unit for statistical analysis. Thus, the analysis can inform but not determine the allocation of scenes for the survey.

Note: Gulf St Vincent covers St Kilda and Pt Wakefield. Eastern Spencer Gulf covers Tickera to Port Augusta. Adelaide covers Outer Harbor to Sellicks Beach.

Figure 3.6 Length of Coast by Region

Table 3.4 Length of Coastal Landscape unit by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>High cliffs</th>
<th>Low cliffs</th>
<th>Headlands &amp; bays</th>
<th>Dunes</th>
<th>Samphires &amp; mangroves</th>
<th>Towns</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East</td>
<td>0</td>
<td>0</td>
<td>51</td>
<td>332</td>
<td>0</td>
<td>5</td>
<td>388</td>
</tr>
<tr>
<td>Kangaroo Island</td>
<td>48</td>
<td>13</td>
<td>276</td>
<td>87</td>
<td>12</td>
<td>3</td>
<td>439</td>
</tr>
<tr>
<td>Fleurieu Peninsula</td>
<td>8</td>
<td>0</td>
<td>72</td>
<td>46</td>
<td>0</td>
<td>5</td>
<td>131</td>
</tr>
<tr>
<td>Adelaide</td>
<td>0</td>
<td>10</td>
<td>13</td>
<td>39</td>
<td>0</td>
<td>0</td>
<td>62</td>
</tr>
<tr>
<td>Gulf St Vincent</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>45</td>
<td>48</td>
<td>2</td>
<td>95</td>
</tr>
<tr>
<td>Yorke Peninsula</td>
<td>11</td>
<td>36</td>
<td>91</td>
<td>298</td>
<td>28</td>
<td>22</td>
<td>486</td>
</tr>
<tr>
<td>Eastern Spencer Gulf</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>88</td>
<td>90</td>
<td>14</td>
<td>197</td>
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<td>0</td>
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<td>135</td>
<td>216</td>
<td>103</td>
<td>22</td>
<td>500</td>
</tr>
<tr>
<td>Eyre/West coast/Nullarbor</td>
<td>366</td>
<td>43.5</td>
<td>372.5</td>
<td>525</td>
<td>72</td>
<td>8</td>
<td>1387</td>
</tr>
<tr>
<td>Total</td>
<td>433</td>
<td>126.5</td>
<td>1015.5</td>
<td>1676</td>
<td>353</td>
<td>81</td>
<td>3685</td>
</tr>
<tr>
<td>%</td>
<td>11.7</td>
<td>3.4</td>
<td>27.6</td>
<td>45.5</td>
<td>9.6</td>
<td>2.2</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 3.5 Number of Photographs by Landscape Unit and Region

<table>
<thead>
<tr>
<th>Region</th>
<th>High cliffs</th>
<th>Low cliffs</th>
<th>Headlands &amp; bays</th>
<th>Dunes</th>
<th>Samphires &amp; mangroves</th>
<th>Towns</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East</td>
<td>55</td>
<td>82</td>
<td>0</td>
<td>5</td>
<td>17</td>
<td>159</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kangaroo Island</td>
<td>16</td>
<td>2</td>
<td>93</td>
<td>31</td>
<td>14</td>
<td>7</td>
<td>30</td>
<td>272</td>
</tr>
<tr>
<td>Fleurieu Peninsula</td>
<td>8</td>
<td>145</td>
<td>84</td>
<td>21</td>
<td>14</td>
<td>136</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adelaide</td>
<td>98</td>
<td></td>
<td>23</td>
<td>15</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St Vincent's Gulf</td>
<td>5</td>
<td></td>
<td>25</td>
<td>0</td>
<td>268</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yorke Peninsula</td>
<td>2</td>
<td>35</td>
<td>94</td>
<td>79</td>
<td>6</td>
<td>3</td>
<td>49</td>
<td>171</td>
</tr>
<tr>
<td>Upper Spencer Gulf</td>
<td>31</td>
<td>31</td>
<td>44</td>
<td>6</td>
<td>59</td>
<td>62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Eyre Peninsula</td>
<td>9</td>
<td>22</td>
<td>15</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>314</td>
<td></td>
</tr>
<tr>
<td>West Eyre Peninsula</td>
<td>49</td>
<td>175</td>
<td>54</td>
<td>14</td>
<td>22</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Coast</td>
<td>7</td>
<td>21</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nullarbor</td>
<td>21</td>
<td>6</td>
<td>6</td>
<td>193</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td>46</td>
<td>622</td>
<td>506</td>
<td>90</td>
<td>99</td>
<td>217</td>
<td>1676</td>
</tr>
</tbody>
</table>

Note: Other includes shacks (100), jetties, marinas, aquaculture and lighthouses

3.5 DISTRIBUTION OF PHOTOGRAPHS

The photographs were distributed by region and by landscape unit. These are summarised by Table 3.5 and Figures 3.8 and 3.9.

Photographs of headlands and bays, and dunes landscape units together account for two thirds of all photographs. The large proportion of Other landscape unit is due to the large number of photographs of shacks and other forms of development. These included jetties (23), marinas (15), aquaculture (11) and lighthouses (14).

The representation by region reflects their size and their accessibility, a small but highly accessible region such as Adelaide has many photographs while a large region with extensive areas inaccessible such as eastern Eyre Peninsula has fewer photographs.

To gain a better appreciation of their representativeness, the linear distance of the coast contained in each landscape unit and each region is used as the basis for comparison (Table 3.6, Figure 3.10).

Comparing the proportion of photographs taken in each landscape unit with the distance covered by each landscape unit (Table 3.6, Figure 3.10) indicates that the overall proportions are in similar levels of magnitude. Headlands and bays are slightly over-represented while dunes are somewhat under-represented.
Figure 3.8 Proportions of Photographs by Landscape Unit

Figure 3.9 Proportions of Photographs by Region

Table 3.6 Comparison of Proportion of Photographs with Distance

<table>
<thead>
<tr>
<th>Distance Km</th>
<th>High cliffs</th>
<th>Low cliffs</th>
<th>Headlands &amp; bays</th>
<th>Dunes</th>
<th>Samphires &amp; mangroves</th>
<th>Towns</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>433</td>
<td>11.8</td>
<td>3.4</td>
<td>27.6</td>
<td>45.5</td>
<td>9.6</td>
<td>2.2</td>
<td>100.0</td>
</tr>
<tr>
<td>%</td>
<td>11.8</td>
<td>3.4</td>
<td>27.6</td>
<td>45.5</td>
<td>9.6</td>
<td>2.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Photographs</td>
<td>96</td>
<td>46</td>
<td>622</td>
<td>506</td>
<td>90</td>
<td>99</td>
<td>1459*</td>
</tr>
<tr>
<td>%</td>
<td>6.6</td>
<td>3.2</td>
<td>42.6</td>
<td>34.7</td>
<td>6.2</td>
<td>6.8</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* Total excludes 217 other scenes

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Figure 3.10 Comparison of Proportion of Photographs with Distance

Figure 3.11 Comparison of Proportion of Photographs with Regions

samphires landscape unit could be better represented.

Figure 3.11 compares the proportion of photographs in each region with the distance represented by that region. As expected, the more accessible regions such as Adelaide, Yorke and Fleurieu Peninsulas are over-represented while the less accessible regions, particular the Eyre Peninsula and West Coast are less well represented.

These findings are presented to provide an objective assessment of the adequacy of the photography in terms of its representativeness. Using distance as the basis of comparison, it is apparent that some landscape units, particularly dunes, are under-represented (while headlands & bays are over-represented), and some regions, particularly Eyre Peninsula are under-represented (while Fleurieu and Yorke Peninsulas are over-represented).

Overall these differences are not considered significant; all of the landscape units are adequately represented and the large number of photographs available should ensure that the diversity inherent in each landscape unit is able to be represented in the survey instrument.

3.6 SELECTION OF PHOTOGRAPHS

Overall the survey should comprise no more than 200 scenes as fatigue is likely to set in
with longer surveys and affect the concentration of participants. If 160 scenes were selected to represent the coastal landscapes, a further 20% (i.e. 32 scenes) of South Australia would be added making a total of 192 scenes. A lesser number would reduce the overall survey size.

Applying the coastline lengths of the seven landscape units to 160 coastal photographs yields the number of photographs per landscape unit as shown in Table 3.7.

Table 3.7 Number of Photographs based on Coastline Lengths per Landscape unit

<table>
<thead>
<tr>
<th>Landscape unit</th>
<th>Distance %</th>
<th>Photos</th>
<th>Without towns</th>
</tr>
</thead>
<tbody>
<tr>
<td>High cliffs</td>
<td>10.7</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Low cliffs</td>
<td>3.2</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mangroves</td>
<td>9.3</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Dunes</td>
<td>47.4</td>
<td>76</td>
<td>78</td>
</tr>
<tr>
<td>Headlands</td>
<td>27.1</td>
<td>39</td>
<td>44</td>
</tr>
<tr>
<td>Towns</td>
<td>2.3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>160</td>
<td>160</td>
</tr>
</tbody>
</table>

These figures indicate the distribution to represent the landscape units by their abundance in the South Australian landscape. However for statistical analysis it is desirable that no landscape unit be represented by fewer than 12 scenes. It is also essential that the photographs in the survey adequately cover the diversity present in each landscape unit. This is likely to be the major determinant of the number of photographs in each landscape unit. If the landscape units were represented equally, then there would be around 27 scenes per landscape unit (excluding towns).

The diversity differs considerably across the landscape units. The most complex visually are the headlands and bays followed by the scenes with cliffs – particularly the high cliffs. Mangroves are less complex and can be represented by fewer scenes.

The 1676 photographs were distributed across the landscape units. The photographs in each were then examined critically and selection made on the basis of representing the variety present and also representing the different regions around the South Australian coast. Photographs which were too dark or too light, viewed into the sun or were too distant were rejected. Photographs without the imprint of people evident or present were sought although in the scenes of the Adelaide beaches this was not entirely possible.

In the landscape units with relatively few scenes – e.g. low cliffs, and mangroves and samphires, the selection was relatively straightforward. For the larger landscape units – dunes, and headlands and bays, where the number of photographs was 5 – 600, several sieves were needed. In the case of headlands and bays, this initially selected around 160 scenes from the 622 total, and from this the final selection of 45 was made.

The end result was the selection of 138 scenes for the survey. Their representativeness was reviewed by region and by landscape unit. Table 3.8 and Figure 3.12 indicate their representativeness by region and Table 3.9 and Figure 3.13 by landscape unit.

On a regional basis, the selection of photographs was very close for six of the nine regions, and in the remaining four regions ranged from 4.2% to 10.4%. The largest difference was eastern Eyre Peninsula where large areas south and north of Whyalla were inaccessible or where entry was prohibited (i.e. El Alamein). These coasts however were well represented elsewhere. For both Fleurieu Peninsula and Yorke Peninsula, there were somewhat more photographs than their distance would suggest. As both areas are close to Adelaide and under heavy pressure their higher representation was not considered undesirable.

The remaining region where the representation was 3.6% below the quota covers western Eyre Peninsula, the west coast and the Nullarbor which accounted for 37% of the State’s coast. It was considered that the landscapes of this vast region were adequately represented by the selection made.

Table 3.8 Comparison of Survey Photographs with Regions

<table>
<thead>
<tr>
<th>Region</th>
<th>Photos</th>
<th>Photo %</th>
<th>Region Dist. %</th>
<th>Diff. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE</td>
<td>15</td>
<td>10.9</td>
<td>11</td>
<td>-0.1</td>
</tr>
<tr>
<td>KI</td>
<td>15</td>
<td>10.9</td>
<td>12.3</td>
<td>-1.4</td>
</tr>
<tr>
<td>FP</td>
<td>15</td>
<td>10.9</td>
<td>3.7</td>
<td>7.2</td>
</tr>
<tr>
<td>Ad</td>
<td>5</td>
<td>3.6</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>St V G</td>
<td>7</td>
<td>5.1</td>
<td>2.7</td>
<td>2.4</td>
</tr>
<tr>
<td>YP</td>
<td>23</td>
<td>16.7</td>
<td>12.5</td>
<td>4.2</td>
</tr>
<tr>
<td>USG</td>
<td>7</td>
<td>5.1</td>
<td>5.1</td>
<td>0</td>
</tr>
<tr>
<td>EEP</td>
<td>5</td>
<td>3.6</td>
<td>14</td>
<td>-10.4</td>
</tr>
<tr>
<td>WEP/Null</td>
<td>46</td>
<td>33.3</td>
<td>36.9</td>
<td>-3.6</td>
</tr>
<tr>
<td>Total</td>
<td>138</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
3.7 ASSEMBLY OF SURVEY INSTRUMENT

The survey instrument comprises the scenes of coastal landscapes together with additional scenes of the South Australian landscape. These were included to meet the requirements of the project specifications:

*Ensure that the coastal scenic value is assessed within the wider context of the South Australian landscape*

Scenes of the South Australian landscape would provide a context for the assessment of the specific target. Their inclusion better ensures that the ratings of the coastal scenes reflect a state-wide perspective and would be benchmarked at the State level. Scenes of known landscape quality rating would be used which can also provide a test of the adequacy of the sample of participants used to rate them.

With 138 coastal scenes and 28 South Australian landscape scenes, the total survey comprised 166 scenes. This is towards the upper limit for concentration for many participants but is considered acceptable as the Internet basis of the survey would enable the participants to take a break at any time.

The survey was preceded by a set of ten scenes, five being coastal scenes and five scenes of the South Australian landscape, to prepare participants for what will follow. These also help cue their minds to the rating scale.

3.8 CONDUCT OF THE SURVEY

An 18 page listing of regional and local groups had been compiled containing names, addresses and emails (where available) covering the following 284 groups:

- Regional groups – 145 groups
- Statewide organisations – 20 groups
- Councils – 26 local councils
- Economic Development Boards – 7 regional boards
- Regional Tourism Associations – 4
- Catchment Water management Boards – 5
- National Trust – 22 local branches
- TAFEs – 12
- National Parks Regional offices – 4
- Friends of Parks groups – 30 groups
- National Parks Consultative Committees - 9
Figure 3.14 Locations of Survey Photographs
• Plus State departments

Invitations were forwarded to many of these groups via email.

The respondent characteristics used the categories of the Australian Bureau of Statistics and were included to compare the respondents with the community.

Design of the Internet survey

Previous experience had shown the efficiency of using the Internet to conduct surveys. To achieve rapid and cost effective results the Internet was relied upon solely for this survey. In 2003, 53% of Australian households had access to the Internet (up from 16% in 1998) & 58% of adults had access to Internet through work and libraries as well as home (ABS, 2005). By extrapolation, by 2005, around 70% of households were likely to have Internet access with a higher percentage having access through work and libraries. This suggests that reliance on the Internet should not strongly bias participation.

A sub-consultant, David Whiterod, prepared the survey instrument using the Internet. Mr Whiterod had undertaken similar work previously for Dr Lothian (Lothian, 2003; 2004).

The use of the Internet to deliver the survey introduced a number of challenges and required certain assumptions to be made about respondents, their web browsers, screen configurations and Internet connection speeds. The survey website was developed to cater for as large an audience as possible (slightly erring on the conservative side when making assumptions about respondents' Internet speed and screen size).

The site and survey application was developed using Macromedia's ColdFusion™ Application Server.

The landscape assessment survey was an image-intensive process; the cumulative file sizes of the scene images were quite large. This was not generally a problem for respondents with broadband (or faster) connections.

To cater for people with slower Internet connection speeds (such as those with dial-up Internet connections), two sets of scene images were created. Both sets of images were identical in all respects except the level of JPEG compression used. A set (with a compression level of 80) was developed for use by broadband users while another set (compression level 60) was developed for dial-up users. The total file size of the dial-up images was around 60% of that of the broadband images.

The image compression settings were a trade-off between compression and image detail. As the level of JPEG compression increased the general quality of an image decreased. If images were compressed too much this would affect the ability for respondents to see fine details in an image and would result in "blockier" images. The trade-off was that high quality scenes were slower to download.

Each image set was resized to 585x390 pixels. This size fitted well into a screen size near 800 pixels by 600 pixels. The page layout also performed well at larger screen resolutions.

A Microsoft SQL Server was used to record both the demographic details as well as the ratings of each scene.

The survey website was designed to be as self-contained as possible. The front page included details of the survey process, background and contact information. If the respondent chose to proceed to the survey they were prompted to enter some general demographic information. This information was recorded in the database and a unique survey identifier generated for each respondent. This initiated the survey session. The respondent's session identifier was used to record scene ratings with the correct demographic details. As the participant rated each scene, their rating was automatically recorded in the database.

As part of the demographic collection stage, respondents were asked to indicate their Internet connection speed: either dial-up or broadband. This information was used to reduce the download requirements for dial-up users as they are shown a more compressed set of scene images during the survey.

Following the introductory ten sample scenes, the 166 scenes were then shown, each for as long as the respondent required. The order of these scenes changed for each participant, a new random order being generated automatically as the participant moved to the next scene. Each time a new scene was to be
shown the survey application chose a random scene from the list of scenes that the participant had yet to rate. Randomising the order of scenes overcame the issue of the order of the scenes affecting the results – with attention waning towards the end, or one scene being affected by the previous scene.

Following selection of the rating on the 1 to 10 scale at the top of the screen, the next scene automatically appeared. This allowed respondents to move through them at their own pace and not be anxious about completing their rating before it moved to the next scene, or alternatively, being frustrated for waiting the scene to change after they had completed their rating. The design of the rating instrument ensured that scenes loaded rapidly, even on dial up connections although delays can and did occur when many hundreds logged in concurrently.

Respondents could temporarily leave the session if interrupted and return to continue it. However there was a cut off time of 30 minutes at which point the survey terminated.

A respondent could exit the survey at any point. They could also leave comments, either at the end of the survey or, if they chose to leave the survey before completion, before rating all scenes.

On completion of the survey the participant was thanked and provided with an opportunity of commenting on the survey. They could then either exit or go back to the first page. The Internet survey is shown on the following pages.

The survey was launched publicly on Thursday 7 April, 2005 and The Advertiser covered it with a lengthy article. The Minister for Environment and Heritage was interviewed by the electronic media. By 2 pm on that day, 130 people had completed the survey. Over the following week, responses climbed steadily (Figure 3.16). Late on Wednesday 13 April a notice was posted on the State Government Intranet advising of the survey and inviting employees to participate (Figure 3.15).

The notice was posted at 4.28 pm and within an hour or so, nearly 700 had participated in the survey. Because so many logged onto the site concurrently, the scenes took far longer to download and this resulted in considerable frustration, premature terminations, and comments on the surveys. The following 24 hours saw the number of responses climb from 500 to nearly 2500. The following day saw a further 320 participate. As the notice went out across the State Government it included many regional centres.

The survey was terminated late Friday 29 April by which time 3324 had participated in it. It is believe that this level of participation may be a record for a survey of this nature and vindicates the use of the Internet as the vehicle for the survey instrument.

![Figure 3.16 Total Responses to Survey during April, 2005](image)

### 3.9 DATA MANAGEMENT

The survey results were transferred to Excel spreadsheet and the following steps taken:

- The ratings of South Australian scenes were removed to another file
- The comments of many participants were compiled and placed in a Word document. This was subsequently replaced by the verbatim record from the Internet survey which has been included on the CD.
- The data was re-arranged with participant data followed by ratings in numerical order
- Data from participants who rated less than the full 166 scenes were deleted. This reduced the total participants from 3324 to 2258, a 32.1% reduction. It was
Coastal Viewshed Survey

Purpose of this survey

South Australia has spectacular and diverse coastal scenery. The Department for Environment and Heritage (DEH) has commissioned a study to measure and map the scenic values of our coast. This survey is intended to help determine the scenic attractiveness of South Australia's coast. The outcome of this project will assist State and Local government in better planning and management of the coast. The Coastal Viewshed Survey closes on Saturday 30 April 2005.

How it works

You will be shown a photograph of a scene and asked to rate its scenic attractiveness. The ratings are on a scale of 1 to 10 - 1 being very low and 10 being very high. The rating scale is located at the top of each scene's page - just click the appropriate number to register your rating for each scene. Once a rating has been recorded you will be automatically shown the next scene.

How long will it take?

- The survey has a total of 166 scenes. How long it takes will depend on how much time you spend rating each scene: it can be completed in less than 15 minutes.
- There is no time limit to rate each scene, however, your rating session will end after 30 minutes of inactivity.
- Please rate all 166 scenes as this will provide a greater statistical weight to the survey.
- None of the scenes for rating are repeated.
- At the end of the survey, or if you leave before the end, you will be able to provide comments.

Hints

- Use the entire rating scale, don't just sit in the middle around 5.
- Judge each scene on its merits.
- Trust your initial instinct - don't try and analyse your response.
- Try to ensure you have no distractions (phone, callers etc) before you start the survey.
- If you feel tired or get interrupted during the survey, take a break, the survey will wait until you return (for a maximum of 30 minutes).

Contact

The project coordinator, Damian Moroney, is available on (61 8) 8124 4896 if you have any questions about the project.

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Coastal Viewshed Survey

Before the survey starts please fill in the following form (please answer all questions)

<table>
<thead>
<tr>
<th>Please indicate your age</th>
</tr>
</thead>
</table>

**Gender**
- [ ] Male
- [ ] Female

**Birthplace**
- [ ] Born in Australia
- [ ] Not born in Australia

**Postcode**

<table>
<thead>
<tr>
<th>Postcode (if in Australia)</th>
</tr>
</thead>
</table>

**Country**

<table>
<thead>
<tr>
<th>Australia</th>
</tr>
</thead>
</table>

**Education**

<table>
<thead>
<tr>
<th>Please indicate your highest level attained</th>
</tr>
</thead>
</table>

**Please indicate how familiar you are with different parts of the South Australian coast**

<table>
<thead>
<tr>
<th>Region</th>
<th>Very Familiar</th>
<th>Slightly Familiar</th>
<th>Not familiar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adelaide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fleurieu Peninsula</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South East</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yorke Peninsula</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastern Eyre Peninsula</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Eyre Peninsula</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Spencer Gulf</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Coast and Nullarbor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kangaroo Island</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Internet Connection Speed**

- [ ] Broadband (I have a fast Internet connection)
- [ ] Dial-up (I have a slow Internet connection)

*This will be used to reduce your download requirements*
Coastal Viewshed Survey

You are about to start the survey

How do I rate each landscape?

- You will be shown a photograph of a landscape. Please rate the landscape’s scenic attractiveness using the ratings scale on the top of the page.
- Rate the scenic attractiveness of each scene on a rating scale of 1 to 10 (1 being very low and 10 being very high).
- There are a total of 166 landscapes in this survey.
- There are some scenes of general South Australia to balance the coastal scenes.

Example Landscapes

- The survey will start with a series of 10 example landscapes. This will give you an example of the types of landscapes you will be asked to rate during the survey.
- During the example landscapes phase you can continue to the next landscape by either clicking the photograph or the rating buttons at the top of the page (these ratings are not recorded), otherwise the page will automatically progress to the next example landscape after a few seconds.
- If you get interrupted, the survey will wait until you return (for a maximum of 30 minutes).
Example Scene 9
Continue to the next example landscape by clicking the photograph or the rating buttons (above) otherwise this page will automatically progress to the next example landscape.

Scene for Rating
Rating scale above scene: 1  2  3  4  5  6  7  8  9  10

Counter 1 Scene 22

End of Survey
Coastal Viewshed Survey

Thank you for completing the survey

Please feel free to submit any comments you may have about the survey.

No Comments

[Image]

Back to front page...

Coastal Viewshed Survey

Thank you for completing the survey

Thank you for adding your comments.

If you want to find out more about the survey and its results please contact:

Dr Andrew Lothian
Scenic Solutions
Tel: 0439 872 226
Email: alothian@aapt.net.au

Back to front page...
Want to save our beautiful coast? Play your part

The beauty of South Australia's coastline is being put under public scrutiny to determine how it should be protected from development.

The Department for Environment and Heritage will use people's views on the "scenic attractiveness" of the coast in creating a policy to protect it from housing and land divisions to windfarms and aquaculture.

People are being urged to take part in an Internet survey to comment on the looks of the state's diverse coastline – from the rugged cliffs of the Great Australian Bight to the South-East's sandy beaches.

"This is the first time in Australia that community preferences will be used to place a value on a landscape," Environment Minister John Hill said yesterday.

"The scenic quality of South Australia's coast is a significant social, economic and environmental resource so it is important that we protect it.

"The views will help the department in developing policy for protecting our coasts and for assessing developments such as windfarms and aquaculture."

Mr Hill said respondents would be asked to rate, on a scale from 1 to 10, the "scenic attractiveness" of 168 images which include white sandy beaches at Fowlers Bay on the far West Coast, mangroves at Port Gawler, north of Adelaide, the cliffs of Whalers Way on Fleurieu Peninsula and the bay of South Port beach, south of Adelaide.

"The community's views will help state and local government in developing policy for protecting our coasts and for assessing new developments," Mr Hill said.

Conservation Council of SA spokeswoman Catherine Way said it was important visual attractiveness was not the only criteria used when determining a site's value.

"It is important to the Conservation Council that a sound policy is developed to assist state and local governments in assessing the biodiversity and environmental value of an area," she said.

Courtney Romanowicz, 21, of Valley View, took part in the survey yesterday. "I think it's a great way of finding out what the public think," she said.

"And what better way to do it than survey the people who know the areas. I think particular beaches should be better protected."

Responses will be anonymous and no qualifications or experience will be required to participate. Respondents must be aged 18 or more. The survey can be taken until Saturday, April 30.

www.coastalsurvey.net

The Advertiser, Thursday 7 April 2005
COASTAL SURVEY

The Department for Environment and Heritage (DEH) has commissioned a study to measure and map the scenic values of our coast. The outcome of this project will assist State and Local government in better planning and management of the coast.

A selection of photographs, which are representative of the diversity of coastal sceneries, have been placed in a survey on the Internet. This will give the opportunity for as many South Australians as possible to rate their scenic values.

The Internet address www.coastalsurvey.net I am seeking your support for this project by completing the survey.

No qualifications or experience are required to participate and the responses will be anonymous. Participants need to be a minimum of 18 years of age.

The project co-ordinator, Damian Moroney (telephone number: 8124-4896 ormailto:moroney.damian@saugov.sa.gov.au) is available if you have any questions about the project.

Groups from across SA are being approached to participate in this significant project. It is important that people with an interest in South Australia's coast participate in assessing our coastal scenic resources.

Figure 3.15 Notice publicising Coastal Survey on State Government Intranet

• recognised that many participants spent considerable time viewing and rating the scenes, and it was with reluctance that their contribution was deleted. With the large number of completed surveys they were not required and their inclusion could distort the results.

Examination of the resulting data sheet revealed that some participants had rated all or virtually all scenes as 10. This is likely to comprise strategic bias, where the participant uses the survey to fulfil their own objectives, in this case, to achieve high ratings of all South Australian scenes. While the motive may be applauded, this actually diminishes the credibility of the data. Means of all participants’ ratings were derived and those over were deleted along with those where mainly 10s were used. A total of 56 data items were deleted. In addition two participants entered mainly 1’s and these were also deleted. The total participants were thus reduced to 2200.

A sample of this size provides a confidence interval of 2.09, in other words, at a 95% confidence level, the responses will be +/- 2.09% of the true value9. This is an exceptionally small confidence interval, for a sample of 300 the figure would be +/- 5.7%. Had the data from all 3324 participants been used, the confidence interval would have been 1.7%.

Analysis of postcodes indicated that 80.5% of the participants were from the Adelaide Metropolitan Area, 18.2% from elsewhere in South Australia, and 1.3% from elsewhere in Australia. Efforts to maximise participation in the survey from regional areas saw nearly 400 participate which was excellent. The high proportion of the survey from Adelaide reflected the high proportion of the State’s population, 73%, who live in Adelaide.

3.10 IDENTIFICATION AND SCORING OF FACTORS

Analysis of the survey photographs identified a range of factors which could help to explain their scenic quality.

In the study of South Australian landscape quality, the following four factors were identified (Lothian, 2000):

- Significance of the area of the water
- Length of the water edge: short to long
- Movement of water: still to considerable movement
- Rating of the psychological impact of the scene: serene/placid to high level of arousing/awe

Each of these was scored on 5 grade scale. An additional factor, colour, was dropped as the sea was blue in all scenes. The significance of the area of water was based on the extent of the sea as a proportion of the non-sky portion of the scene. The length of water edge was based on the length of the interface of land and water in bays and beaches, cliffs and rocks - scenes with a heavily indented coast have longer edges than a uniform curving beach. The presence of waves and white foam were considered in scoring water movement.

The rating of psychological attributes was based on the entire scene - the land component and thus covered the perceived relationship between sea and land. High cliffs with rough sea and breakers for example may invoke a sense of high arousal and awe compared with a gently sloping beach and calm bay without any waves which may be rated as serene or placid. The selection of this scale was based on Gobster & Chenoweth, 1989; Herzog & Bosley, 1992; and Schroeder, 1991.

Analysis of the ratings of scenes against these factors indicated that water/land edge and the area of water were the most important, followed by the scoring of awe-peaceful, and lastly water movement.

In addition to these factors, however, the study found that over the State as a whole, the factors of diversity and naturalness to provide the strongest causes of high scenic quality. Diversity may be defined simply as the busyness of the scene as generated by the combination of changes in land form, land cover, land use, the presence of water, textures, colour, forms and so on. Scoring of diversity is based on the whole scene, not one of its elements such as land form. It is thus an holistic quality which is the sum of all its elements. Diversity was based on a judgement of the busyness of the scene. A scene lacking diversity was monotonous; a highly diverse scene was full of interest. Scoring was again on a five grade scale. Coastal diversity varied across the scale with some beach scenes scoring low and scenes with cliffs, rock debris, wave action and other features scoring high.

Naturalness is how natural the scene appears to be, not necessarily the same as its ecological naturalness. An agricultural scene for example may be heavily grazed, lack understorey vegetation and hence be ecologically depauperate but the presence of scattered large trees may create a pleasing scene aesthetically and appear natural. Several studies have examined the influence of naturalness (or naturalism) on scenic quality including Anderson et al (1976), Kane (1981), Kaplan et al, 1989, Lamb and Purcell (1990) and Palmer and Zube (1976).

Scoring of naturalness required close inspection of scenes. The presence of tracts, fences, structures and even the footprints of humans or of stock diminish the appearance of naturalness. Coastal scenes tended to score high in naturalness so there is unlikely to be wide range of values – most will score 4 or 5.

Based on earlier work, the following factors were selected:

- Water land edge – or indentation
- Area of water
- Awe-tranquil scale
- Diversity
- Naturalness

Naturalness was included as although most scenes would score high, where development was present, it would be lower and this might
correlate with lower scenic value. Movement of water was omitted as it had less influence on scenic quality than the other factors.

In addition to these factors, the scenes were inspected to identify any additional factors which could be assessed. The following possible factors were identified:

- Quality of beach
- Height of land forms on a flat – high scale
- Familiarity with the location of the scene
- Pleasing forms – e.g. the curve of a beach

The quality of the beach is probably a function of its width, the characteristics of adjacent sea (e.g. smooth, surf), the presence of rocks, dunes and other features, and even of its accessibility (e.g. Adelaide’s beaches). It would thus be an holistic gauge, based on a range of factors. Alternatively the quality may be judged by what the individual finds important at a beach – surfers will look for the quality of the surf, families with young children would look for the safety of the water, others might like the interest of rocks for beach combing. Clearly much additional information would be needed to understand why individuals judged its quality. However as an overall factor it would be worth exploring as the beach is such an important component of the coast.

Height will indicate the flatness or steepness of the land forms in the scene. In some locations such as cliffs, this factor may duplicate, or at least correspond with the awe-tranquil scale. However this would be a relatively simple factor to assess in the field and if it was found to correlate closely with scenic quality its inclusion could be useful.

Familiarity is known to influence ratings generally positively. Familiarity with the various coastal regions of South Australia will be assessed as part of the information gathered on participant characteristics. Therefore although data on the familiarity with a particular location may be interesting, it is repetitive. Also it is likely that while a few scenes will gain high levels of familiarity, e.g. the Bluff at Encounter Bay, and the Adelaide beaches, many other locations will be unfamiliar to most participants. The information gathered will therefore be of doubtful value.

The main pleasing form is likely to be the curve of the beach, very common particularly in the headlands and bays landscape unit and the dunes and beaches landscape unit. It may occur in respect of cliffs, for example, the repetitive occurrence of high headlands as occurs on Whalers Way on Eyre Peninsula. However assessing the attractiveness of the form in the scene is likely to be influenced largely by the instructions. If an example of a curved beach is included then it is probable that all curved beaches will be scored accordingly. This factor would probably be the opposite of the degree of indentation of the coast which introduces irregularity and lack of pleasing forms. A long curved beach may correlate closely with the sense of tranquility. Overall it was considered that this factor would not be useful to include as it is likely to result in obviously curved beaches scoring high and other scenes scoring low – not a useful differentiation.

The final list of factors to be scored comprised:

- Water land edge – or indentation
- Area of water
- Awe-tranquil scale
- Diversity
- Naturalness
- Quality of beach
- Flat – height of landform

Sessions were held at the Department for Environment and Heritage and also with members of the Marine Life Society and volunteers at the Marine Discovery Centre to score the various factors. Participants were provided with scoring sheets and briefed about the factor they were asked to score. An opportunity was provided for any questions and clarification. The coastal scenes, without the South Australian scenes, were shown including the introductory scenes, at 6 or 7 second intervals. A Digital projector and Powerpoint™ presentation were used to project the scenes. The resulting scores were subsequently entered into the data set.