

7. APPLICATION TO POLICY AND PLANNING

The project brief included the development of recommendations to assist DWLBC in its strategic planning. These would be directed towards the protection, enhancement and management of the River Murray's scenic quality. In particular they would contribute to a Landscape & Amenity Policy, to assist in achieving the *Objects* and *Objectives for a Healthy River Murray* as contained in the Act.

The recommendations were to be derived from the results of the two surveys – the scenic quality survey and the development survey.

It is emphasised that the recommendations are based on scenic preferences and the attitudes to development as expressed in the surveys. There are other dimensions of landscape which are also important such as place identity (including symbolic meanings) and place dependence (including economic dependence on the area) which were not necessarily captured by the surveys.

7.1 OVERVIEW OF THE DEVELOPMENT OF THE RIVER MURRAY, LAKES AND COORONG

Viewed historically, the River has undergone a series of development stages.

The major river trade was established in the late 19th century during which South Australian paddle steamers transported wool, wheat and other produce from the eastern states out through Goolwa and later Adelaide. While now regarded nostalgically, the hundreds of paddle steamers consumed enormous quantities of timber to feed their boilers, timber which was felled along the river

Construction of the weirs and barrages in the 1920-30s provided the stable pool level for navigation and for irrigation. By the time they were constructed however, the river trade was in terminal decline due to the extension of railways to the River. The stable pool level provided by the weirs drastically altered the normal cyclical flood/dry regime of the River.

Establishment of extensive irrigation areas in the Riverland started at Renmark under the Chaffey brothers in the late 19th century. Following each of the two world wars further irrigation areas were established to provide for

soldier resettlement. Drainage of the lower Murray swamps to provide for flood irrigated dairy flats commenced in the 1880s and was completed by 1930.

The growth of the irrigation industry saw the establishment and expansion of towns and communities along the River, including Renmark, Berri, Barmera, Loxton and Waikerie, Cadell, Mannum, Murray Bridge and Tailem Bend.

In the post WW2 period the River became increasingly important for recreation and tourism. Annual licences were issued by the Crown and long term leases sold on private land for shack development along sections of the River, mainly between Mannum and Morgan. By the mid 1970s, over 2600 shacks had been built, around half on Crown Land and the remainder on private land. Nearly 70% of these were built on the floodplain. During the 1990s, many of the Crown Lands shacks were freehold and this resulted in an upgrading of formerly small houses into substantial houses.

Over recent decades, the houseboat industry has grown along the entire length of the River in South Australia as well as interstate. There are now over 1200 houseboats on the River in South Australia. In addition, watersports including skiing, speedboating, parasailing, water boarding, fishing and kayaking have grown in popularity.

Improved road access to the River from Adelaide has put most of it within one to three hours drive a population of over one million. Gradually the urban shadow, the pressures from the nearby Adelaide population, has extended further into the region.

Much of the lower Murray, particularly near Murray Bridge as well as Goolwa, lies within commuting distance of Adelaide and many people have established permanent homes on the River and Lakes. In addition, many people have retired to former holiday houses. Canal subdivisions have been constructed on Hindmarsh Island, at Wellington and Renmark and the potential exists for similar major urban developments along the River.

The reduction in flow of the River Murray to 27% of its natural flow due mainly to the abstraction of water for irrigation, coupled with

the current record low inflows together with rising salinity have created the conditions for a very significant decline of the River environment including the Lakes and the Coorong.

Much of the South Australian population and industry is dependent on the reliability of water supply from the River and the growing crisis poses considerable risks for the State. At no time during its long history has the River system been under such threat to its very survival.

7.2 POLICY FRAMEWORK

The key policy instruments affecting the River Murray are found in the River Murray Act 2003 and in the planning and development control system established under the Development Act 1993. These are examined below.

(1) River Murray Act 2003

The Objects of the River Murray Act 2003 include (S 6) (emphasis added):

- b) to provide mechanisms to ensure that any **development or activities that may affect the River Murray** are undertaken in a way that provides the greatest benefit to, or protection of, the River Murray while at the same time providing for the economic, social and physical well being of the community; and
- c) to provide mechanisms so that **development and activities that are unacceptable** in view of their adverse effects on the River Murray are prevented from proceeding, regulated or brought to an end; and
- d) to promote the **principles of ecologically sustainable development** in relation to the use and management of the River Murray; and
- e) to ensure that proper weight is given to the significance and well being of the River Murray when **legislative plans and strategies** are being developed or implemented;

There are four Objectives under the River Murray Act 2003 (S 7):

- (a) River health objectives
- (b) Environmental flow objectives
- (c) Water quality objectives

- (d) Human dimension objectives.

River health objectives

- (a) The key habitat features in the River Murray system are to be maintained, protected and restored in order to enhance ecological processes;
- (b) The environments constituted by the River Murray system, with particular reference to high-value floodplains and wetlands of national and international importance, are to be protected and restored;
- (c) The extinction of native species of animal and vegetation associated with the River Murray system is to be prevented;
- (d) Barriers to the migration of native species of animal within the River Murray system are to be avoided or overcome.

Environmental flow objectives

- (a) Ecologically significant elements of the natural flow regime of the River Murray system are to be reinstated and maintained;
- (b) The Murray mouth should be kept open in order to maintain navigation and the passage of fish in the area, and to enhance the health of the River Murray system and estuarine conditions in the Coorong;
- (c) Significant improvements are to be made in the connectivity between and within the environments constituted by the River Murray system.

Water quality objectives

- (a) Water quality within the River Murray system should be improved to a level that sustains the ecological processes, environmental values and productive capacity of the system;
- (b) The impact of salinity on the ecological processes and productive capacity of the River Murray system is to be minimised;
- (c) Nutrient levels within the River Murray system are to be managed so as to prevent or reduce the occurrence of algal blooms, and to minimise other impacts from nutrients on the ecological processes, environmental values and productive capacity of the system;

- (d) The impact of potential pollutants, such as sediment and pesticides, on the environments constituted by the River Murray system is to be minimised.

Human dimension objectives

- (a) A responsive and adaptable approach to the management of the River Murray system is to be implemented taking into account ecological outcomes, community interests and new information that may become available from time to time;
- (b) The community's knowledge and understanding of the River Murray system is to be gathered, considered and disseminated in order to promote the health and proper management of the system;
- (c) The interests of the community are to be taken into account by recognising indigenous and other cultural, and historical, relationships with the River Murray and its surrounding areas, and by ensuring appropriate participation in processes associated with the management of the River Murray system;
- (d) The importance of a healthy river to the economic, social and cultural prosperity of communities along the length of the river, and the community more generally, is to be recognised.

The objectives will be collectively known as the *Objectives for a Healthy River Murray* (or *ORMs*).

These ORM's cover many of the features that are of significance for scenic quality including trees and tree health, wetlands, algae blooms, anabranches, water flow, the Coorong, and salt scalds as well as the community's knowledge and understanding of the River system.

The Act establishes a general duty of care (S 23):

A person must take all reasonable measures to prevent or minimise any harm to the River Murray through his or her activities.

The Minister may prepare related policies (S 22). A policy published by the Minister may specify:

- (a) Matters that the Minister may take into account in assessing applications for specified classes of statutory authorisations;
- (b) Conditions that the Minister may impose with respect to specified classes of statutory authorisations;
- (c) Cases or circumstances where the Minister may oppose the granting of specified classes of statutory authorisations;
- (d) Such other matters as the Minister thinks fit.

The Minister may undertake works to further the Act's Objects or ORM's (S 17). The Minister may enter into a Management Agreement with a land owner to conserve or manage water or the resources of the River Murray or anything that will further the Act's Objects or ORM's (S 18).

The Minister must prepare a plan called the River Murray Act Implementation Strategy to define priorities and strategies to achieve the Act's Objects and implement the ORM's (S 21).

The Minister may issue a Protection Order to ensure compliance with the general duty of care, a condition to an approval, a management agreement, or any other requirement under the Act (S 24).

(2) Planning Strategy

Under the Development Act 1993, the planning system has established extensive measures covering the control of development across South Australia. In rural South Australia it is based on the Planning Strategy for Regional South Australia and the Development Plans for individual councils (see (3) below).

The Planning Strategy for Regional South Australia includes the Riverland, Murraylands and the Southern Fleurieu regions, the latter including the Goolwa – Hindmarsh Island area. The Planning Strategy provides a description of each area in respect of economic activity, environment and resources, people, towns and housing, and infrastructure. It identifies strategies under each of these. Many of these are generic across all regions.

The Planning Strategy addresses major resource issues such as water resources. It

identifies the following strategies for the Murray-Darling Basin.

Contribute to improving the health of the Murray Darling Basin to achieve a sustainable future for the Basin, its natural systems and communities.

- a. Protect the health of the Basin and its catchments by setting measurable targets linked to specific outcomes and management actions.
- b. Develop integrated catchment plans and commence major on-ground works to address land and water degradation.
- e. Improve the health of river systems by reviewing irrigation practices in areas of rising water tables and high ground water salinity, and where appropriate encourage the transfer of water allocations to more suitable irrigation areas.
- f. Restore riparian land systems, wetlands and flood plains and allow for environmental flows capable of sustaining natural processes and improving water quality.

Under the heading, *Environment and Resources* of the Planning Strategy, the Riverland and Murraylands Areas include the following description.

Environmental Protection

The area contains many areas of outstanding scenery and wildlife significance. The river banks and wetlands of the river valley (including the Ramsar wetlands), the Bookmark Biosphere, the characteristic mallee vegetation of the area and the woodlands to the north are all important areas requiring protection.

The ability to preserve the landscapes and the natural character of an area is linked to the construction of buildings and other structures and the visibility of development from the river, roads and other viewing points. Planning policies need to ensure residential buildings and other urban development in particular are appropriately designed and sited to ensure they do not impinge upon significant landscapes and natural areas.

Strategies relevant to this study include the following.

Riverland

Plan tourism facilities and attractions based on the area's natural features and character.

- a. Promote nature-based developments that address the river or other parts of the local environment (as has Banrock Station).
- b. Plan visitor facilities including small-to-medium scale accommodation, signage, interpretive/information centres for walking trails, wildlife and bird watching.
- c. Improve the area's interface with the river through the upgrading and development of riverside infrastructure and amenities.

Murraylands

Further develop and market the areas tourist attractions including:

- a. Coorong National Park
- b. the mid and lower River Murray and lakes
- e. recreation and boating opportunities
- f. scenic drives.

Develop new tourism ventures and products.

- a. Promote riverbank development around Murray Bridge and Mannum in keeping with the character of the area.
- b. Develop one or more sustainable nature retreats and visitor facilities within the Coorong area.
- d. Promote nature-based developments that address the river, wetlands or conservation parks.
- e. Improve visitor facilities, interpretation, signage within conservation parks and the Coorong
- f. Improve facilities for houseboats and leisure boats along the river including, mooring and refuelling facilities.

Riverland and Murraylands Areas

Conserve and manage biodiversity and essential ecological processes.

- c. Protect areas of native vegetation and associated native fauna on both public and private lands.
- d. Retain, re-establish and manage native vegetation and threatened plant communities including those areas that provide links and buffers between existing habitats.
- e. Restore native vegetation in key areas such as watercourses and erosion gullies through fencing, destocking and weed control.

Recognise the importance of a healthy River Murray to the economic, social and cultural prosperity of the communities along the length of the River.

Protect and restore key habitat features in the river, riparian zone, floodplain and estuary to enhance ecological processes.

Protect and restore healthy riverine and estuarine environments and high value floodplain and wetlands of national and international importance.

Promote sustainable development and rehabilitate degraded areas on the River Murray floodplain.

Remove evaporation basins from the flood plain.

Reinstate ecologically significant elements of the natural flow regime.

Significantly improve connectivity between and within riverine, wetland, floodplain and estuarine environments.

Develop flow management strategies to maintain the health of the River Murray.

Substantially improve water quality in the Murray system to a level that sustains ecological processes, environmental values and productive capacity.

Manage salinity to minimise impacts on ecological processes and productivity levels

Manage nutrient levels to reduce the occurrence of blue-green algal blooms.

Optimise environmentally sustainable recreational use of the River.

Protect and enhance natural areas, scenic routes and landscapes from unsightly development by minimising its visual impact.

- a. Develop urban areas adjoining the river in a manner that protects its natural character while accommodating sensitively designed and located urban activities and tourist and recreation facilities.
- b. Investigate opportunities to redesign and redevelop inappropriately located housing areas that do not satisfy environmental, health or public access standards.
- c. Protect and enhance the river environments and ecosystems and ensure development does not change the natural dynamics of these areas.

Southern Fleurieu

This area includes the following strategies:

Recognise the Coorong and lower lakes as a wetland of international significance through consistent and supportive land management and development policies. Link parks, reserves, coast, watercourses and areas of significant vegetation through a regional open space network. Ensure expansion of the town of Goolwa is linked to the upgrading of infrastructure and services.

- b. Develop the land to the north of Goolwa following detailed planning to address issues of flooding, infrastructure and protection of areas of conservation significance.
- c. Investigate the development potential of the western end of Hindmarsh Island for limited residential expansion in the long term.

In summary, key provisions contained in the Planning Strategy include:

- Preservation of landscape and natural character in respect of housing, development and roads
- Provision of scenic drives
- Improved mooring facilities for houseboats and leisure boats
- Protection, restoration and re-establishment of native vegetation, riverine and estuarine habitats and the floodplain
- Development of flow management strategies for the health of the Murray system and manage salinity and blue-green algal blooms

(3) Council Development Plans

Each of the seven councils in the region have Development Plans under the Development Act which provide the detailed objectives and principles of development control and provisions covering each zone in the council area²¹.

The Development Plans contain generic objectives and principles of development control. They define specific zones in which particular provisions apply, for example:

21. Development Plans are at: www.planning.sa.gov.au

- Alexandrina Council's Plan includes a range of zones covering Hindmarsh Island with additional key objectives and principles.
- The Rural City of Murray Bridge has a Tourist Development Zone
- The DC of Renmark – Paringa has a Marina Commercial Zone.
- The Coorong DC which extends to Taillem Bend includes a River Murray and Lakes Zone covering the River and the shores of Lakes Alexandrina and Albert.

Common to most Council Development Plans are a Flood Zone and a Fringe Zone. These Zones have also been included in the land outside Councils in the Riverland.

The Flood Zone is the area subject to flooding, and the Fringe Zone is the valley slope bordering the River. The Flood Zone includes objectives covering the improvement of existing housing and development principles which require buildings and structures to be located unobtrusively and to be of a scale and design that harmonises with their surroundings. Developments are to minimise their effects on scenic routes or scenically attractive areas. Developments are to be landscaped with locally indigenous species to enhance the amenity of the area and to screen buildings from public view.

Objectives in the Fringe Zone require development to not mar the visual character of the Zone and to retain the rural and scenic character. Development control principles prohibit development not in keeping with the rural character of the Zone or which detract from its scenic and environmental significance.

The Mid Murray Council covers the Morgan – Mannum section of the River valley (except for part of its eastern bank), a section with extensive holiday housing. Its Development Plan includes a River Murray Zone which establishes objectives and development control principles covering much of the Murray. This approach appears very comprehensive and is described below.

The River Murray Zone comprises overall objectives and development control principles. Its objectives include the following:

- Objective 1:** Ecologically sustainable development.
Recreation and tourism
- (a) restrictions on waterfront development for a distance of 50 metres from the

water's edge to prevent erosion, maintain native vegetation, retain the river's visual characteristics and the character of the historic public waterfront;

- (b) retaining floodplain shacks on a permanent basis notwithstanding their location on the flood plain, subject to adherence to service pre-conditions, notably relative to acceptable methods for effluent disposal;
- (c) designation of specific locations for marina developments and pre-conditions for their development.

Objective 4: Protection and improvement of the riverine landscape.

Measures should be taken to protect and enhance the riverine landscape by maintaining riparian vegetation communities along the river bank and adjacent land, rehabilitating degraded sites and stabilising and revegetating riverbank with appropriate species.

Objective 7: Minimum disturbance to the shape of the bank and riparian native vegetation in any development of river front land.

Objective 15: The waterway and parts of the foreshore of the River Murray maintained as a public resource.

Objective 16: Development along the main channel of the River Murray for public purposes except where designated.

Objective 17: Riverfront land kept free from development.

Objective 18: Moorings for vessels with overnight accommodation only in designated locations.

Objective 19: Flood prone land kept free from development to avoid:

- (a) damage to development;
- (b) compounding flood impacts by interference with natural flows.

Objective 20: Limited residential development.
Residential use limited to: Shack Settlements and River Settlements, where required to support tourism and recreation

ventures in designated areas; and on a restricted basis in Primary Production

Objective 22: River structures restricted and adequately designed.

River Structures restricted in number and constructed to design standards to withstand floodwater and not detract from the aesthetic quality of the riverine environment.

Structures for recreation use, boat ramps, jetties and mooring boats, should only be constructed where the depth of water is inadequate to access the River. Where practical, structures should be shared amongst a number of users to maintain equity in access to the River and minimise obstruction to the River channel.

The principles of development control include a section dealing with river structures with illustrations of alternative fixed and floating landings and jetties.

The River Murray Zone comprises the following Policy Areas each with their own objectives and measures:

- Conservation Policy Area
- Floodplain Policy Area
- Primary Production Policy Area
- Recreation and Tourism Policy Area
- Shack Settlement Policy Area
- River Settlement Policy Area

The Primary Production Policy Area includes the following landscape provision:

Development should be designed and sited to respect and maintain the landscape character of an area which is of:

- (a) historical (including archaeological) significance;
- (b) scientific interest;
- (c) scenic value or natural beauty; or
- (d) other heritage significance.

The Shack Settlement Policy Area includes as principles of development control:

Development (including land division where relevant) should:

- (a) be visually compatible with the area in which it is located;
- (b) not cause erosion of the riverbank or adversely impact upon the ability to maintain the river frontage in a stable condition;

- (c) avoid adverse impact on the environment by the appropriate location of vehicle access to the river;
- (d) maintain existing public access routes to waterfront reserves and provide new waterfront reserves for land division;
- (f) be landscaped with locally indigenous species in order to enhance the amenity of the area and to screen buildings from public view;
- (i) not detract from the value or significance within the locality of items, land, buildings and structure or exceptional beauty or aesthetic, architectural, scientific use;
- (j) where second-hand or re-used materials for external cladding for any buildings is proposed, use materials of sound condition, good quality and painted an appropriate colour to harmonise with the surrounding environment;

The number of residential outbuildings should be limited to:

- (a) one garage or one shed;
- (b) rainwater tank(s) and tank stand(s); and
- (c) open sided garden structures, eg pergola, gazebo.

Dwellings should not exceed one storey in height (3.0 metres), excluding the elevation to minimise the potential for personal or property damage as a result of a flood.

Replacement of an existing dwelling or, construction of a dwelling on an allotment where no dwelling currently exists requires:

- (a) siting not occur closer to the waterfront than any part of the existing dwelling on either side and in any event the set-back distance from the waterfront is not less than 30 metres;

Alteration of, or addition to an existing dwelling should:

- (a) minimise obstruction to, or loss of views from, other dwellings;
- (b) not occur closer to the waterfront than any part of the existing dwelling other than a verandah, pergola, deck or balcony which is a maximum depth of 2.5 metres;

Development should display a built form consistent with the Desired Future Character so to provide visual interest through building elements which include wide verandahs,

balconies, integrated roof designs and pitches and building materials and finishes which complement each other and the riverine character of the locality.

In summary, the Council Development Plans established principles of development control requiring:

- Unobtrusive location of housing and structures
- Landscaping and screening using indigenous local species
- Protection of scenically attractive areas and their landscape character
- Restrictions on development for 30 – 50 metres from the River
- Permission for existing shacks on the floodplain subject to satisfying effluent disposal requirements
- Protection and restoration of the river bank and riparian vegetation
- Maintenance of foreshore as a public resource and such land to be kept free of development
- Flood prone land kept free of further development
- River structures including boat ramps, jetties and moorings restricted in number and shared.

7.3 MANAGEMENT OF SCENIC RESOURCES

Arising from the findings of the scenic quality survey and the development survey, the following proposals were developed directed to the protection and management of the region's scenic quality and landscape character. These proposals have also been developed in light of the provisions of the River Murray Act's Objects and ORMs, the Planning Strategy and Council Development Plans summarised in the previous sections. The proposals are summarised below in Tables 7.1 and 7.2.

The ratings derived in the scenic quality survey and the development survey reflected the values of the participants. Participants valued the anabranches, lagoons and lakes of the River valley, the extensive stands of native vegetation, the natural appearance of the cliffs and the ubiquitous wildlife. The qualities of naturalness and visual diversity along the

River valley and particularly along the Coorong were highly valued.

Some holiday housing and waterfront treatments along with extensive moorings of houseboats were seen to have degraded the region's scenic quality. Irrigation pumps resulted in cutting of cliffs for pipes have similarly created eyesores.

The absence of trees around Lakes Alexandrina and Albert and the barrenness of the dairy flats between Mannum and Wellington lower the scenic quality of these areas.

The following discussion and proposals are predicated on the basis that scenic quality matters; that it is an environmental quality which the community value. Measures are required to protect scenic quality, to enhance it, and to better manage it. These proposals are directed towards these ends.

High quality landscapes

High quality landscapes represent a significant community environmental resource which are deserving of protection and careful management to retain their quality and the benefits which derive.

Some of these high quality landscapes are located within the National Parks system, for example Chowilla Regional Reserve, the Murray River National Park which includes Katarapko, and the Coorong National Park.

The objectives of management of the National Parks and Wildlife Act 1972 include:

the preservation of features of geographical, natural or scenic interest (S 37)

The results of the scenic quality survey, in particular the identification of areas of high quality landscapes, should be brought to the attention of the Parks authorities and considered in their plans of management.

It is of concern that there is only one national park (Maize Island Lagoon) along the trench section of the River Murray. The scenic quality provided by the River, trees and particularly the cliffs is unique to South Australia and significant areas should be considered for reserves. Combined with wetland areas and other features, these would be attractive reserves under the national parks system.

Table 7.1 Management of scenic resources

Feature	Attributes	Pressures	Solutions
High quality landscapes	River, trees, cliffs, wetlands	Environmental degradation Developments and uses	Environmental management Planning & development control Protect within park system five areas as Regional Reserves Protect scenic quality within national parks system
Panoramas	Views over the River valley	Developments, roads, infrastructure (e.g. powerlines)	Careful planning, siting and design to minimise landscape impacts
Water	Presence of water enhances scenic quality	Prevention of flow through anabranches & lagoons	Ensure tracks & roads on floodplain have culverts where they cross anabranches. Initiate works and measures to enable water flows of floodplains. Flood backwaters through environmental flows.
	Water quality	Salinity & algal blooms reduce scenic quality	
Trees	Presence of any trees enhanced scenic quality Height, density & health enhanced scenic quality Trees along river banks framed the River Lack of trees around lakes & some lagoons Lack of tree cover adjacent to Lakes Alexandrina/Albert	Salinity, aridity, developments Salinity, aridity, developments Salinity, aridity, developments Salinity, aridity, developments Salinity? Wind exposure?	Environmental flows of floodplains Environmental flows – watering of floodplain Environmental flows – watering of riverine trees Planting locally indigenous species Planting locally indigenous species
	Dead, dying & drowned trees reduced scenic quality Willows – moderate scenic quality	Environmental stress – aridity and salinity. Trees drowned by high river created by river structures Environmental and community pressure for their removal	Artificially flood the floodplain. Increase environmental flows. Increase river flows. Retain drowned trees for habitats. Remove willows and revegetate with locally indigenous species.
Cliffs	Scenic quality enhanced by their height, steepness, & barrenness Cliff tops	Road cuttings, pipe routes from pumps, powerlines, excavations, seepage Housing and other developments sited close to cliff edge	Careful planning, siting and design to minimise landscape impacts. Site developments well back from cliff so not visible from floor of River valley. High & moderately high sheer cliffs – development & infrastructure prohibited.
Floodplain	Bald and scalded floodplain areas	Salinity, aridity	Planting locally indigenous species.
Wildlife	Birdlife on the River, Lakes and Coorong enhance scenic quality	Salinity of Coorong, environmental degradation, loss of habitat, predators	Environmental flows. Protect habitats. Keep Murray Mouth open.
Naturalness & diversity	Natural character & diversity enhanced scenic quality	Inappropriately located and designed developments; Sameness of developments	Careful planning, siting and design to protect natural character

Table 7.2 Management of development

Feature	Attribute	Impacts	Solutions
Housing	Cliff top	Reduces scenic quality of cliffs	Site developments well back from cliff so not visible from floor of River valley
	Above floodplain	Can be visually intrusive	Require screening of housing by locally indigenous vegetation & trees.
	Floodplain	Flood risk pollution of River. Public access. Environmental impact	Prevent further development on floodplain. Limit conversion or replacement of small dwellings with large houses. Require replacement houses to be set back a minimum of 30 metres from waterfront to maximise the area in front of structure.
	House forms	Intrusive colours. Dominant size. Inappropriate design.	Ensure blending of housing with environment re colour, size and design. Avoid primary colours.
	Tree cover	Clearing of indigenous trees and vegetation on house blocks	Protect existing indigenous trees and vegetation. Avoid planting of introduced vegetation. Require screening of houses by planting of locally indigenous trees in their vicinity.
Waterfront	Wharves & retaining walls associated with housing	Reduce natural appearance of River bank. Environmental impact – loss of trees & habitats	Retain natural bank and protect where it remains. Restore the natural bank. Remove existing retaining walls and/or wharves except where of heritage value. Prevent construction of further retaining walls & wharves except where absolutely necessary. Ban use of large rocks in retaining walls. Ban use of imported sand, associated flattening of banks and creation of beaches.
	Jetties associated with housing	Limits public access to River bank. Environmental impact. Visual impact.	Ban use of tyres on jetties and remove existing tyres. Promote and establish common jetties for groups of houses and the public. Ensure jetties conform to a design standard and are subject to approval and inspection.
	Rushes and reeds	Removal exposes banks to erosion from boat wash and reduces wildlife habitat	Protect remaining rushes and reeds along River bank. Initiate action to re-establish reeds & rushes along River bank.
Houseboats	Moored in group along bank when not hired	Visual impact Reduced public access to River bank	Require future houseboats to be located in off-river marinas when not touring.
	Marina development	Visual impact Environmental impact of construction	Screen marinas from River using locally indigenous species. Locate off-river marinas in areas that minimise loss of landscape quality.
Houseboats	Permanently occupied	Visual impact Inappropriate use of River space and River bank Environmental impacts Reduced public access	Prohibit permanent occupation of houseboats on river.

Feature	Attribute	Impacts	Solutions
Caravan & recreation parks	Informal areas	Pollution Environmental degradation Semi-permanent sites	Prohibit camping within 30 metres of River. Prohibit permanently occupied sites. Provide environmentally sound toilets. Ensure periodic supervision of informal parks during peak times.
Pumps		Visual impact Cutting of cliffs for pipes & tracks	Tidy up, paint, cover and screen pumps with trees to blend with the environment. Require the location & establishment of new pumps or replacements to be subject to approval to ensure that they blend with the environment.
Dairy flats		Bare treeless areas	Encourage planting programs around dairy flats using indigenous local species to enhance landscape quality.

Suitable sections of the trench for reserves include the following five areas.

- Devlin Pound to Great Yarra Reach: extensive flats, backwaters and lagoons, cliffs
- Cadell to Morgan: sheer cliffs, historic North West Bend Station, extensive flats and lagoons
- Murkbo to Roonka: sheer cliffs, extensive flats, backwaters and lagoons, archaeological site (Roonka Conservation Park)
- Swan Reach pumping station to Swan Reach: sheer cliffs, extensive flats, backwaters and lagoons; dense red gum forests
- Big Bend to Ngautgnaut: spectacular high sheer cliffs, lake and backwaters (Shannon Landing Conservation Park), archaeological site (Ngautgnaut Conservation Park)

It would be appropriate for these to be included in the reserve system as Regional Reserves which are multiple use reserves.

Infrastructure and development impacts

Cliffs are a unique feature of the River Murray in South Australia, they do not occur to such an extent upstream. They thus differentiate the South Australian section of the River from interstate and this is important for tourism.

The sheer size and steepness of the cliffs, the colours they produce at different times of the day, and the strong visual boundary they provide the River and the River valley all contribute to their visual significance.

In some locations, irrigation pumps have been placed at the base of cliffs and the cliffs cut to accommodate the pipes. Near Waikerie in particular, seepage from irrigation has flowed out through the cliffs resulting in algae growth which has produced unsightly blackening of the cliffs.

Roads and tracks have been cut down across cliffs in many localities (e.g. Griffen Marina north of Blanchetown), resulting in scaring and erosion. Powerlines from the high land in some locations (e.g. north of Swan Reach) have been draped across the River to serve shacks and other developments on the flood plain. Approval has been given for some houses to be erected at the top of cliffs overlooking the River.

Each of these pressures *writ large* have the potential of diminishing the scenic value of the cliffs and need to be carefully managed. Cliffs, particularly the high and moderately high sheer cliffs should be afforded protection as no-go areas in which no developments or infrastructure should be located. Prohibition of further development and associated impacts is essential for the protection of the cliffs.

Flooding the floodplain

Trees play a vital role in creating the River's character, in framing the River and contribute significantly to its high quality landscapes. Due to the lack of River flow and particularly of flood inundation of the floodplain which is vital for their survival, well being and regeneration, trees in many areas are suffering. Only additional flows and measures to flood irrigate the trees for periods are likely to result in their recovery.

The floodplain and associated anabranches and lagoons are critical to the River's ecology

as they comprise the main breeding areas for its wildlife, fish and birdlife.

In some locations, WetlandCare Australia has undertaken micro works to facilitate movement of river water into anabranches and lagoons to assist the floodplain environment. Although this organisation no longer appears to operate in South Australia, their initiative would appear to be worth extending to other localities along the River.

Scenic enhancement through trees

Some of the lagoons and particularly the lakes lack trees around them and programs to encourage the regeneration of trees through fencing of areas to protect them from grazing pressure (particularly rabbits) could be initiated. Planting programs using locally sourced indigenous species should also be encouraged.

The tree planting undertaken in recent years on Sturt Peninsula and Hindmarsh Island will enhance the scenic quality of these otherwise rather barren areas. Further plantings of these and other similar bare areas near the Lakes should be encouraged.

The drowned trees in sections of the River above the weirs and locks provide an interesting feature in the landscape. Having been there since the weirs and locks were constructed prior to WW2, they have long lost their leaves and thinner branches and their main trunk and branches remain polished by the wind and the sun and weathered into sculptural forms which have intrinsic appeal. The hollows and roosting sites they provide, away from predators are also significant. It is not proposed that they should be removed on landscape grounds.

Past attempts to clear willows from the River banks failed due to a variety of reasons including lack of community understanding and support. A program of willow removal would require careful research of its benefits and the current problems they cause. Their annual leaf fall results in a significant organic load on the River, affecting water quality (similar to urban creeks where deciduous trees have been removed to protect the marine environment). The removal of willows would need to be accompanied by planting of indigenous trees, particularly by red gums.

Areas of the floodplain have been reduced through salinity to barren scalded areas which are unattractive and diminish scenic quality.

Such areas which have resulted from salinity or aridity need to be distinguished from dried-up lagoons which flood during high rivers, a natural feature of the landscape. Regeneration and planting of vegetation around the scalded bald areas could be encouraged.

Wildlife

Birdlife is such an essential feature of the riverine environment that their absence would greatly diminish the attractiveness of the landscape. No-where is this more under threat than along the Coorong due to its high salinity resulting in major changes to its ecology. Along the River also, human pressures associated with watersports must affect the distribution and abundance of birdlife.

Naturalness and diversity

Naturalness and diversity are important along the River's length in underlying much of its scenic quality. It was apparent from the comments of many participants in both the scenic quality survey and the development survey that naturalness is a prized quality which is diminished by any form of development including infrastructure such as pumps, jetties and powerlines. Screening of houses and pumps with trees was suggested as a means of maintaining the sense of naturalness.

Naturalness is the Coorong's key attribute and its protection should be the principal objective of the management of the National Park.

Naturalness should be protected and developments should aim to minimise their visual impact. The choice of colours, forms, materials and textures in buildings can both blend with the environment and contribute to the visual diversity.

Holiday housing

Knowledge of the extent of housing development along the River is clearly lacking in the general community and it was apparent from the development survey comments that many participants were appalled by the extent of development. While the origins of much of this development is historical, it is apparent that significant upgrading and upsizing of housing has occurred following the reversal of Government policy to remove the shacks on Crown Land to that of permitting their stay and freeholding them subject to satisfactory effluent disposal.

While the number of houses on the floodplain is unlikely to increase, their impact on the environment will continue to grow due to the human pressures they bring to the area. This includes the removal of trees and indigenous vegetation near the houses, the clearing of protective reeds and rushes from the waterfront, and the construction of retaining walls, wharves, and jetties. Strict controls over these need to be exercised to prevent their impact from increasing.

Existing housing should be screened from the River by trees and their colours should blend with the environment.

Where new houses are replacing existing dwellings they should be located no closer than 30 metres from the River. This will reduce their visual impact on the River and their effects on the waterfront. It is desirable that public accessibility be improved to the waterfront between houses and the River.

Waterfront treatment

Many parts of the waterfront adjacent to housing have suffered gross change and degradation. The removal and flattening of the natural bank and associated vegetation, reeds and rushes, and the building of retaining walls, wharves and jetties has occurred progressively over many decades. Each addition and refinement has tended to further reduce the natural appearance of waterfront.

Where the waterfront has not been changed, it should be afforded protection and any change requires stringent assessment and justification. Measures to restore the natural bank through planting of indigenous vegetation, reeds and rushes should be encouraged.

Further construction of walls, wharves and jetties should be opposed. Any proposed change should not alienate or change any more waterfront and desirably should lead to a net reduction in structures.

The use of large rocks for retaining walls should be banned. Constructing beaches through flattening of banks and import of sand should be prohibited. The use of tyres on jetties should be banned and existing tyres removed.

While the convenience of individual jetties and facilities for each shack is appreciated, it has

come at the cost of alienation of considerable lengths of the waterfront with its associated environmental impact and this has created an image of a private river for River users. These structures generated considerable adverse comment from survey participants.

Measures should be taken to reduce the number of retaining walls, wharves and jetties on the waterfront and to return it to a natural condition. Desirably there should be a sharing of common facilities, say a jetty/wharf per six dwellings. The establishment of common facilities and of making these available to the public should be promoted.

Houseboats

Houseboats have the potential of overtaking shacks as the major dwelling on the River. The current number of 1200 houseboats is expanding annually and could reach several thousand within a few years.

While most new houseboats are made available for hire, there is a growing market for older houseboats and in places such as near Renmark, these have been turned into permanent residences. Policy needs to be developed covering the development of off-river marinas, the mooring of houseboats along the River banks, the permanent occupation of houseboats, as well as the requirements for waste disposal.

In future it should be accepted practice for houseboats to be moored off river while not hired. This policy should apply to any new houseboats and, after a reasonable phase-in period, to existing houseboats as well. This obviously will place considerable pressure on the selection of sites for off-river moorings and such work should be accelerated.

Caravan and recreation areas

Camping and caravanning along the River comprises one of the least impacting forms of activity. There is a place for both formally developed sites with facilities as well as informal sites with minimal facilities. Informal sites should not have permanent residents and should be provided with basic toilet facilities.

Irrigation pumps

Irrigation pumps, vital to the horticulture industry, are located along the River and the incredible variety of structures built to support

them and enable them to cope with floods bear testimony to the innovativeness of the farmers. While the pumps and structures may be functionally sound, many have a significant visual impact as they can present a strong industrial feature in an otherwise natural landscape. A voluntary program with the irrigation industry should be initiated involving covering the pumps, painting them and the pipes appropriately, and planting trees for screening.

Dairy flats

The dairy flats comprise a very extensive area of low scenic quality adjacent to the lower River, the area closest to Adelaide and of obvious tourist significance. They lie adjacent to the main Adelaide - Melbourne highway. The flats are essentially barren of trees apart from the thick wall of willows along their banks. The planting of trees on the flats should be encouraged to break up their monotony, add interest and enhance their scenic quality. Trees would also provide shade for stock.

7.4 RECOMMENDATIONS

The following recommendations were developed from the findings of the scenic quality survey and the development survey.

Landscape quality

1. Protect within the National Parks system the following five areas of high quality landscapes:
 - Devlin Pound to Great Yarra Reach:
 - Cadell to Morgan
 - Murkbo to Roonka
 - Swan Reach pumping station to Swan Reach
 - Big Bend to Ngautgnaut

These could be considered suitable for the multiple use Regional Reserve designation.

2. Ensure the protection of scenic quality within existing parks and reserves of the National Parks system.

Floodplain scenic quality

3. Ensure tracks & roads on floodplains have culverts where they cross

anabranches to maintain water flows to lagoons and backwaters.

4. Pursue artificial flooding of floodplains and the watering of riverine trees.
5. Initiate planting programs of floodplains using locally indigenous species.
6. Increase river flows in River Murray including environmental flows to regenerate and maintain trees and aquatic life in lagoons and anabranches on the floodplain.
7. Retain drowned trees for their habitat value.
8. Remove willows where possible and revegetate with native species.

Housing development

9. Prevent further housing development on the floodplain.
10. Limit conversion or replacement of small dwellings with large houses.
11. Require replacement houses to be set back a minimum of 30 metres from the landward edge of the riparian zone to maximise the area in front of the house.
12. Require screening of housing by locally indigenous vegetation and trees.
13. Ensure blending of housing with the environment through appropriate colour, size and design.
14. Avoid primary colours.
15. Protect existing indigenous trees
16. Avoid planting exotic vegetation.

Cliffs

17. Ensure careful planning, siting and design of developments to minimise their impact on scenic quality and character.
18. Site developments, including housing, well back from cliff top and screen with vegetation so that they are not visible from floor of River valley.
19. Prohibit development & infrastructure on high and moderately high sheer cliffs

where it will be visible from the river and floodplain.

Waterfront

20. Retain natural river bank and protect it where it remains.
21. Restore the natural river bank.
22. Remove existing retaining walls and/or wharves where practical unless of heritage value.
23. Prevent construction of further retaining walls & wharves except where absolutely necessary.
24. Ban use of large rocks in retaining walls on the waterfront.
25. Ban the use of imported sand, associated flattening of banks and creation of beaches along the river bank.
26. Ban the use of tyres on jetties.
27. Remove existing tyres from jetties.
28. Promote and establish common jetties for groups of houses and the public.
29. Ensure jetties conform to a design standard and are subject to approval and inspection.
30. Protect remaining rushes and reeds along river bank.
31. Initiate action to re-establish reeds & rushes along River bank.

Houseboats

32. Prohibit permanent occupation of houseboats on the River.
33. Screen marinas from view of the River using locally indigenous trees.
34. Require houseboats to be located in off-river marinas when not touring.
35. Locate off-river marinas in areas that minimise the loss of landscape quality.
36. After a phase in period, require permanently occupied houseboats to move to off-river locations with proper services.

Caravan & recreation parks

37. Prohibit any form of camping within 30 metres of River.
38. Prohibit permanent living in recreation parks on the floodplain.
39. Provide environmentally sound toilets for recognised camping areas.
40. Ensure periodic supervision of informal parks during peak times.

Pumps

41. Tidy up, paint, cover irrigation pumps and screen with trees to blend with the surrounding environment.
42. Require the location & establishment of new irrigation pumps or replacements to be subject to approval, ensuring that they blend with the surrounding environment.

Dairy flats

43. Encourage planting programs around dairy flats using indigenous local species to enhance landscape quality.

Lakes Alexandrina and Albert

44. Enhance the scenic quality and character of the land surrounding of the Lakes Alexandrina and Albert by encouraging the planting of locally indigenous species.

