

SELECT COMMITTEE ON SALINITY

REPORT ON

VISITS OF INSPECTION

To

DENILQUIN AND WAGGA WAGGA, 6 – 7 NOVEMBER 2000

HUNTER REGION, 21 – 22 FEBRUARY 2001

LOWER MURRAY REGION, 1 – 4 MAY 2001

June 2001

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MEMBERSHIP & STAFF

Chairman The Hon Pam Allan MP, Member for Wentworthville

Members

Mr Jim Anderson MP, Member for Londonderry

Mr Peter Black MP, Member for Murray-Darling

Mr Kerry Hickey MP, Member for Cessnock

Mr Daryl Maguire MP, Member for Wagga Wagga

Mr Gerard Martin MP, Member for Bathurst

Mr Anthony McGrane MP, Member for Dubbo

Mr Donald Page MP, Member for Ballina

Mr Tony Windsor MP, Member for Tamworth

Staff

Mr Leslie Gönye, Committee Manager

Ms Christina Thomas, Project Officer [from 8 December 2000]

Ms Susan Want, Research Officer [from 2 January to 2 March 2001]

Mr Chris Papadopoulos, Research Officer [from 13 March 2001]

Ms Cassandra Adams, Assistant Committee Officer [from 19 March 2001]

TERMS OF REFERENCE

A select committee has been appointed to inquire and report with the following terms of reference:

To examine:

- (a) Business opportunities created by salinity that contribute to the improved management of groundwater recharge and discharge areas.
- (b) The options for salinity management that are available to local councils, including but not limited to, planning instruments, building codes, urban water management plans, differential rating, development of local council expertise and resource-sharing between councils.
- (c) Any barriers to adoption of salinity management strategies by local councils, and means to overcome the barriers.
- (d) The adequacy of the Commonwealth's response and contribution to addressing salinity.

CHAIRMAN'S FOREWORD

This report provides a public record of the visits of inspection undertaken by the Select Committee on Salinity from November 2000 to May 2001.

Salt occurs naturally in the Australian landscape. However, land use changes have exacerbated salinity problems. These land-use changes include: land clearing for agriculture and urban development, replacement of perennial native vegetation with annual crops, over-watering in irrigation areas and urban areas and built structures which intercept underground aquifers. Native vegetation is efficient at using up rainfall. Widespread land clearing and over watering has caused more water to run-off the land and soak into the ground water table. In low lying areas and at the bottom of slopes the ground water table rises close the surface bringing up ancient salts buried in the ground. When ground water is in the root zone of plants [two metres from the surface] plants die. Where salt water comes to the surface there are salt scalds, the land becomes bare and soil erosion occurs. Areas of land clearing and over watering which cause these problems are called 'recharge' sites because they add water to the ground water table. The areas where the problems emerge are called 'discharge' sites. This is where the saline water comes to the surface.

Ground water systems are complex. In local systems the causes may only be a few metres or kilometres apart. However, in regional ground water systems the causes may be 100 kilometres from the effects.

Whilst salinity is a national problem, the causes, impacts and solutions can vary from area to area. Three of the Committee's four terms of reference require the Committee to look at the management of salinity by local councils and business opportunities in addressing salinity. There are strong regional factors for councils in addressing salinity.

A council area can experience irrigation salinity, dryland salinity, urban salinity or all three. The causes and impacts vary in each area. In some areas there may be local causes and impacts that can be addressed. In other council areas, particularly those towards the bottom of the western slopes of the Dividing Range, they may bear the brunt of salinity damage caused by the clearing of vegetation from slopes. Council areas down-river may bear the burden of the salinity caused by activities further up the river. Councils vary in the level of damage to their urban infrastructure and the rates base available to address the problem.

There are also regional factors in the opportunities for businesses that address salinity. Salt interception schemes in irrigation areas such as the Wakool-Tullakool Sub Surface Drainage Scheme provide business opportunities in aquaculture and salt harvesting as do discharge sites in dryland areas. The Committee saw evidence of potential opportunities in Green Gully, the Kyemba Valley and in the Riverland and Murray-Mallee of South Australia.

Bores and holding ponds to pump salt water from under urban areas, which the Committee inspected in Wagga Wagga, can also provide similar business opportunities. Where there are identifiable "point sources" of salinity such as from the power stations and mines that the Committee visited in the Hunter region it is possible to establish salinity credit schemes which cap the level of salinity and provide market incentives to reduce saline discharge.

Some dryland business opportunities, such as growing saltbush in the range lands, are commercially viable. However, many dryland business opportunities which prevent recharge such as agroforestry, new environmentally sustainable crops, deep rooted perennial pasture and changed cropping cycles are probably still at the experimental stage. The Committee inspected one of the trial sites for the Murray Riverina Farm Forestry project funded by the Natural Heritage Trust. The project promotes the establishment of joint venture commercial forestry plantations on cleared agricultural land.

On the basis of meetings and discussions held on these three visits of inspection, members have highlighted several issues which they regard as particularly relevant to the Inquiry. These issues are dealt with in the opening section of the report.

I would like to extend my sincere thanks to all the landholders, councils, parliamentarians, businesses and officers of government agencies who assisted members during the trip and allocated time to discuss their experiences. I would also like to thank the staff of the Secretariat for their organisation prior to, and during, the visits.

Mr Jim Anderson MP
Acting Chairman

OBSERVATIONS FROM THE VISITS OF INSPECTION

Salinity has regional causes and impacts which affect the way it can be managed. The capacity to manage salinity and the opportunities for businesses also varies across regions.

BUSINESS OPPORTUNITIES WHICH ADDRESS SALINITY

The Committee has looked at irrigation salinity and its management through engineering works in Deniliquin, Wakool and on the Lower Murray in South Australia. It is clear that the holding ponds and evaporation basins of engineering works provide ready made business opportunities in aquaculture and salt harvesting. At Noora in South Australia gypsum is mined from the salty soil. These businesses can offset some of the costs of engineering works.

Discharge sites in dryland areas also present business opportunities for aquaculture and salt harvesting. The Committee inspected the Coorong District Council Fish Farm Project at Cooke's Plain in South Australia. The Department of Primary Industries and Resources sponsor the project. Ground water is pumped into pools and tanks where fish are farmed, wastewater is pumped into evaporation ponds where salt is harvested for preserving hides and for stock feed. The brine that is left is processed for use as a road stabiliser and soil conditioner. Over three years the water table has been reduced by 60 centimetres.

The Committee also inspected an inland fish farm operated by Strother Fish Pty Ltd at Meningie West. The property was a beef farm but became a liability when the land was degraded by salinity. Roger and Ken Strother leased out their water allocation and started a fish farm in 2000. Finfish are grown in tanks using ground water, brine shrimps are grown in wastewater and the residual salt water is evaporated in shallow ponds for salt harvesting.

Strother Fish Pty Ltd has 15,000 Black Bream and 10,000 Mulloway. Mulloway are replacing the slower growing Bream that they used initially. The changed land use involved an investment of \$500,000 and they are looking at a ten-year return on this investment. Roger and Ken Strother believe that if neighbouring farmers changed to fish farming there would be a region-wide reduction in salinity and significant rehabilitation of the land.

Tourism is another possible use of saline land. The evaporation basin at Noora in South Australia has 100 hectares of permanent waterfowl habitat. The South Australian Field and Game Association undertake revegetation in return for shooting rights in the duck- hunting season.

Banrock Station, the flagship development of BRL Hardy Wines, have used their "green credentials" as part of the marketing of their wine. The Station uses state of the art irrigation management practices including drip systems, organic fertiliser and high quality [which requires less land] grapes to minimise the impact on the land. A percentage of the sale goes to the restoration of extensive wetlands on their property.

Wetlands Care Australia, the Bookmark Biosphere Trust, schools and other groups are partners in this project.

The property had been suffering the effects of 100 years of intensive agriculture. Through the program the 600 hectares of Mallee woodland and 900 hectares of floodplain and wetlands

are being progressively restored. Birds, frogs and snakes have returned to the property. The Banrock Station Wetlands are an eco-tourism destination and Banrock Station is in the process of marketing the destination to birdwatchers worldwide.

There have been a number of initiatives in place for some years through the Murray Darling Basin Commission and Land and Water Management Plans to address irrigation salinity.

Irrigation is highly structured and organised. Irrigation Districts were privatised in 1995. Each irrigator landowner is a shareholder. The number of shares held by members is in proportion to their water entitlements.

Murray Irrigation Limited in NSW, for instance, supplies irrigation water and drainage services to 2,400 farms in an area of 80,000 hectares. Water is traded which provides a market mechanism through which water is valued and water-use efficiency encouraged. Irrigation companies have close links with the NSW Government through licensing and funding. To ensure that irrigation practices become environmentally sustainable the NSW Government requires Land and Water Management Plans to be implemented. The Plans include education for farmers, adjustment from unsustainable practices, better irrigation water use, recycling and fertiliser management, protection of remnant vegetation, controlling water seepage from supply channels and monitoring and review.

Land and Water Management Plans involve a commitment of \$498m over 30 years shared between the regional community [76%] and state and Commonwealth Governments [24%].

The River Murray Catchment Water Management Board in South Australia has also been successful in improving irrigation practices at the property and regional level. Their many initiatives are discussed at 18.2.1 of this Report.

The Committee inspected irrigation farms at Loxton where the landholders had whole of farm plans, maps and moisture probes to save on water use and to grow better quality crops which means that more produce is grown on less land. The Committee also inspected irrigation farms in the Deniliquin district where landholders had introduced environmentally sustainable practices such as revegetation, storage of run-off and rainwater and use of Lucerne on permeable soils.

The management of dryland salinity, however, is still at the planning stage.

At the time of the visits, the recently established Catchment Management Boards were in the process of advising the Minister for Land and Water Conservation on end-of-river salinity targets and developing Catchment Management Plans. Dryland land and water management plans do not have the status or funding of the plans for Irrigation Districts. It is unclear what the role of councils in the management of salinity will be and how this will integrate with the role of Catchment Management Boards.

At NSW Government level, there are plans under-way to address these issues through the *NSW Salinity Strategy*, *Plan First: review of plan making in NSW* and a *Memorandum of Understanding between the Local Government and Shires Association and the DLWC*. However, the 'view from the ground' gained by Committee members on these visits has been that there is a great deal of uncertainty and a level of frustration by land holders and councils at the perceived slowness of the planning to translate into action on the ground.

At Green Gully and in the Kyeamba Valley area the Committee inspected properties affected by salinity where the landholders were putting in place initiatives to address it. Landholders emphasised the need for whole of farm management plans based on professional advice. The initiatives they were trialing included: broad acre Saltbush planting on discharge areas and adjacent to waterlogged gullies to prevent further recharge; partnerships with Landcare groups; native tree planting, other revegetation and irrigated woods.

These are excellent initiatives but are not connected to a larger plan with funding as they are in irrigation areas. The initiatives rely on the level of awareness, commitment and investment capacity of individual landholders.

Landholders and councils identified the need for financial support, information, and mapping of a type and scale that suited their needs and for better coordination by governments of the numerous plans, bodies and activities in the management of salinity. Landholders pointed out to the Committee that salinity is only one symptom of waterlogged land. This raises the issue of the need to address environmental problems holistically rather than as separate issues such as salinity, biodiversity, acid soils, greenhouse gas and so on.

The Committee also observed that whilst business opportunities to exploit salinity can be readily established at a local level, and indeed in some areas have already been established, businesses opportunities which prevent recharge to groundwater are still largely at an experimental stage. Most current initiatives, therefore, rely on government for support and development.

Nevertheless there are some very useful initiatives. At Waikerie in South Australia the Committee inspected properties participating in the Mallee Sustainable Farming Project. It is part of a larger program being conducted across NSW, Victoria and South Australia to encourage farming practices that match land use capability.

Business opportunities that prevent recharge to groundwater are often addressing salinity problems on a large scale that requires coordination, institutional structures and the balancing of competing interests. It appears to the Committee that business opportunities in the prevention or remediation of salinity are likely to involve incentives within a planning and/or regulatory framework.

The Hunter River Salinity Trading Scheme managed by the Environment Protection Agency with assistance from the DLWC provides an example. Concerns about the level of salinity in the Hunter River led irrigation farmers, environmentalists and other community groups to strongly oppose the development of any more mines and power stations. However, mines and power stations are a significant source of employment in the Hunter region that has been affected by industrial restructuring.

The conflict was resolved through the Hunter River Salinity Trading Scheme. It is a regulatory scheme that prescribes the total amount and timing of the discharge of saline wastewater from power stations and mines in the Hunter region. Of particular interest, is the market component of the scheme that provides salinity credits.

Power stations and mines have to hold salinity credits which entitle them to discharge a certain amount of saline wastewater. Power stations and mines, which find ways to reduce their output of saline water, can sell their credits to other power stations and mines. This has created a market incentive to reduce saline discharge. Bayswater Power Station extracts salt

from the water and is selling some of these salts commercially. It is also taking saline waster water from nearby mines to process. Bengalla Mine and Bayswater Power Station both expressed their support for the Scheme.

The development of regulatory schemes and market mechanisms to address dryland salinity will be more of a challenge. The power stations and mines in the Hunter region are identifiable and measurable sources of saline water. The sources of dryland salinity are numerous and diffuse, the causes are distant from the impacts and the time-scale is variable. The salinity that appears as salt scalds now may have been caused two hundred years ago or ten years ago depending on the particular ground water system.

State Forests is involved in several trials to establish commercial forestry in low rainfall areas of NSW. Under the Murray Riverina Farm Forestry project funded by the Natural Heritage Trust, State Forests have established plantations on seven private properties near Wagga Wagga to supply the Visy Pulpmill at Tumut. The CSIRO Australia Tree Seed Centre has also planted trees on private properties in the Wagga Wagga area to trial native species. The Committee inspected "Burnbank" one of the participating properties.

A separate issue, which emerged in discussion with Peppertrees Vineyard, relates to business opportunities in salinity mapping. Peppertrees Vineyard informed the Committee that DLWC is not able to provide maps that meet the need of landholders in planning land use capability. Peppertrees Vineyard wanted soil maps that map a range of soil properties as well as providing salt pathways in ground water tables close to the surface.

Peppertrees Vineyard had contracted the Environmental Research and Information Consortium [ERIC] to undertake this mapping. ERIC had informed Peppertrees Vineyard that their gamma ray technology is much cheaper than the mapping program which has been developed by the Commonwealth Government that will use Aerial Electro-Magnetics. Peppertrees Vineyard understood that the reason for this is that aerial gamma ray data already exists for most of NSW.

ERIC subsequently informed the Committee that they believe that government agencies monopolise the mapping market and there is a lack of independent scrutiny of all available mapping technologies. The Committee does not have a position on this matter, as it needs to seek comment from the relevant government agencies. It does, however, intend to explore these matters further.

COUNCILS

In relation to the management of salinity by councils, the Committee had the opportunity to see the work of a number of councils in the management of salinity. The Coorong District Council has a Local Action Plan to address salinity. Local Action Planning was initiated by the Murray Darling Basin Commission in 1995 to provide support to community initiatives in the Basin to tackle a range of environmental issues. Coorong District Council has formally recognised the Local Action Planning group as a committee of Council.

The Plan has identified priority areas and options to address salinity in these areas. The Murray Darling Basin Commission has provided funding for the initiatives. The Committee works with landholders to encourage them to adopt techniques that reduce salinity. Financial incentives are provided to overcome short-term economic loss whilst establishing some of the options in the Local Action Plan. On-ground assistance and expert advice is available on

establishing and managing new farming systems. There is on-going research to develop farming systems and techniques suited to local soils and rainfall and as various options are implemented they are documented so that local expertise continually increases and is shared. The fish farm discussed earlier was one option being implemented by the Council using saline water.

The Murray Darling Association represents 80 local government municipalities along the Murray, Darling and other rivers in NSW, Victoria and South Australia. Community groups, businesses and individuals are also members. The Association has a network of 11 regions. It provides a focus for local government and community participation in the major issues of the Murray Darling Basin. It is particularly involved in conservation and sustainable regional development.

The Murray Darling Association has a Dryland Salinity Program and manages dryland salinity projects. It has a scoping study funded by the Murray Darling Basin Commission which is looking at the capacity of local government to engage in Catchment Management as it relates to the Murray Darling Basin's Integrated Catchment Management document. The report will be available at the end of June 2001. The Association informed the Committee that it supports partnerships between catchment management organisations and councils as the regional model for the implementation of the Commonwealth Government's National Action Plan for Salinity and Water Quality.

The Murray Darling Association has organised a National Local Government Summit on Salinity in Moama in July 2001 which members of this Committee will be attending. This Conference will discuss council management of salinity and relationships between catchment management organisations and councils.

The Murray Darling Association has also engaged a firm of consultants to provide salinity risk assessment reports to councils on a discounted fee for service basis. The service is being trialed in Buloke Shire in Victoria and will be further trialed in Wakool Shire in NSW. Lack of information on salinity and lack of mapping of a type and at a scale suitable for councils has been a major issue identified by this Committee. The Committee looks forward to being informed of the results of these trials.

The Murray Darling Association was successful in obtaining a Natural Heritage Trust grant in South Australia to advise councils on policy reforms to address salinity in their areas. This will commence after the scoping study is finished.

Councils have raised the lack of NSW and Commonwealth funding for salinity management as a barrier. The Department of Water Resources briefed the Committee on the Draft Dryland Salinity Strategy for South Australia. The Committee notes that the South Australian Government wants to include councils as a partner in the management of salinity and has allocated \$110m over seven years to local government for the management of salinity.

The Committee was also able to discuss with Wagga Wagga City Council their approach to the management of salinity. Wagga Wagga City Council was the first council to in NSW to address the problem of salinity and has a systematic approach and well-established programs.

There are a number of initiatives by other councils that address salinity but in general councils do not yet have a strategic approach to addressing salinity. Part of the reason for this is the

existence of a number of barriers. The barriers identified by Wagga Wagga City Council include:

- lack of direction by the NSW government in the use of planning powers;
- a lack of clarity in how its role will fit with Catchment Management Boards;
- a lack of clarity in how its salinity plans will fit with Catchment Management Plans;
- the lack of a funding formula by governments to fund salinity remediation and prevention; and
- the unresponsiveness of the NSW Government to addressing some issues such as rights of access to property to carry out works, swimming pool discharge and public liability.

THE COMMONWEALTH GOVERNMENT'S APPROACH TO SALINITY

In relation to the Commonwealth Government's contribution and approach to salinity, the Hunter Catchment Management Trust and the DLWC expressed concerns that the Hunter had not been included as one of the priority catchments under the National Action Plan for Salinity and Water Quality. The priority catchments will receive funding. The Committee was informed that the Hunter River has higher EC levels [a measure of the amount of salts in water] than the rivers identified in the priority areas. It appears that salinity affected areas outside of the Murray Darling Basin are being excluded. The Committee has sought further information from the Commonwealth Government.

DENILIQVIN AND WAGGA WAGGA, 6 – 7 NOVEMBER 2000
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1 MURRAY REGION OFFICE OF THE DLWC, DENILIQVIN

1.1 PARTICIPANTS

Department of Land and Water Conservation [DLWC]

- Kaye Dalton
- Saji Joseph
- Bill Currans
- Nimal Kulatunga

Murray Irrigation Limited [MIL]

- Geoff McLeod, Manager Environment
- Adrian Smith
- Carl Mathers

Greening Australia

- Martin Driver, Regional Manager

1.2 PROCEEDINGS

DLWC and MIL gave an outline of the Murray Region and irrigation districts and briefed the Committee on the Murray Land and Water Management Plan.

1.2.1 DLWC – Murray Region

The DLWC is a NSW government agency established in 1995 to integrate the management of land, water, soil vegetation and coastal resources of NSW. The department is the natural resources manager for NSW.

The Department's annual report for 1999-2000 stated that:

The department's work is diverse, and is increasingly undertaken in partnership with regional and local communities as well as other state and local government agencies. It includes:

- *developing and implementing policies on resource use and management,*
- *maintaining databases on the condition of the state's land, soil, water, coast and vegetation,*

- *managing assets such as crown land across the state including the crown reserve system, dams and fishing ports,*
- *providing expertise and financial support to local councils and communities for the management of the coast, estuaries, flood risk, soils and vegetation,*
- *managing the Country Towns Water Supply and Sewerage Program,*
- *managing the planning, and sharing of water across the state, and*
- *offering a range of consulting services nationally and internationally.*

The Department has a network of eight offices and 100 local offices that deliver a broad range of services. The role of the DLWC regional offices has been refocussed to provide support and advice to Catchment Management Boards on their role of advising the Minister for Land and Water Conservation on end of valley salinity targets and developing a Catchment Management Plan with a series of management actions to address salinity.

The Murray Region is about 40,000 square kilometres in area with a population of approximately 100,000. Primary industries include cattle and sheep grazing in the east; mixed grains and irrigation crops; and timber. Secondary industries are located in Albury and Deniliquin.

Maps supplied by the DLWC show that in 1999, 396,740 hectares of land in irrigation areas of the region was threatened with salinity due to shallow groundwater. These areas are to the west and south of Wakool and east of Deniliquin through to Barooga. A 1998 map also shows that the areas surrounding Culcairn and Holbrook are vulnerable to dryland salinity.

Challenges in the region are to reduce:

- salinisation by confronting the salinity problem and implementing a salinity strategy including evaluation and mapping; and
- bio-diversity decline by minimising land clearing and implementing community based region vegetation plans.

1.2.2 Murray Irrigation Districts

MIL was formed in 1995 when the NSW Government Murray Irrigation Area and Districts were privatised and ownership transferred to irrigators. Each irrigator landowner is a shareholder in the company. Shares are held in proportion to the water entitlements held by each member.

MIL retains close links with the NSW Government through its Water Management Works and Environment Protection licenses.

MIL provides irrigation water and drainage services to over 2,400 farms owned by 1,600 family farm businesses in the Southern Riverina. Its area of operation covers 800,000 hectares of farmland north of the Murray. The area serviced by MIL produces agricultural products worth \$300 million per annum at the farm gate including:

- 50% of Australia's rice crop;

- 10% of NSW milk production;
- 75% of NSW processing tomatoes; and
- 40% of NSW potatoes

MIL has an annual turnover of \$35m and employs 120 permanent staff and also makes use of local contractors.

MIL is actively involved in temporary and permanent water trading. MIL and Southern Riverina Irrigation District Council run a daily water exchange service for their shareholders. In the 1999/2000 irrigation season the exchange sold 60,000ML involving \$2.2M. In 1999 the water exchange won an Australian National Committee Award on Irrigation and Drainage awarded for working relationships in the irrigation industry. Water is traded permanently between shareholders and with farms in the NSW part of the Murray Valley.

1.2.3 Land and Water Management Plan

The Murray Irrigation Scheme was developed in the 1930s and extracts water from the Murray River at Yarrowonga through over 3,600km of channels. The threats to the system are the rising watertable, soil salinity and waterlogging and the loss of native vegetation.

To overcome some of these problems MIL has produced Land and Water Management Plans to ensure that shareholders use land and water management practices that are environmentally sustainable. They are integrated strategies, take a regional approach, seek active community participation, partnership between the community and government and is a fully audited process.

Each plan includes:

- education leading to better farming practices;
- adjustment from unsustainable farming systems;
- better irrigation water use, recycling and fertiliser management;
- protection of remnant vegetation;
- controlling water seepage from supply channels; and
- monitoring and review.

The Land and Water Management Plans involve a commitment of \$498m over 30 years shared between the regional community [76%] and state and commonwealth governments [24%].

They are also designed to address groundwater recharge and the enhancement of the natural soil water and vegetation resources of the region.

Outcomes have been:

- an increase in best proactive farm management;

- the planting of trees;
- construction of improved infrastructure and drainage [with the capacity to hold or store water high in nutrients before being let back into the Murray River];
- more viable agricultural systems [tightening rice growing criteria];
- the stabilisation and decline of watertable levels; and
- retarding the area of saline land.

2 ODDY’S DRAIN

2.1 PARTICIPANTS

Department of Land and Water Conservation

- Saji Joseph
- Bill Currans
- Nimal Kulatunga

Murray Irrigation Limited

- Carl Mathers

Greening Australia

- Martin Driver

2.2 PROCEEDINGS

The Land and Water Management Plans have identified the need to remove stormwater run-off from the landscape within 4 or 5 days of the rainfall to avoid unnecessary recharge of the groundwater system. The stormwater removal will also minimise soil waterlogging that could otherwise lead to productivity loss and the decline in health of native vegetation.

Oddy’s Drain is located 15km north of Deniliquin where a series of stormwater drainage channels are being constructed to manage water run-off and to get water off the landscape. Gates control the flow if the water is not suitable to be let back into the river system. Oddy’s Drain will service 4,100 hectares, 17 farms and will be 18km in length.

The channels are only constructed following an environmental impact statement, monitored in accordance with Environmental Protection Authority [EPA] schedules for salinity, nutrients and pesticides. They are operated in accordance with license conditions determined by the DLWC and EPA.

3 IRRIGATION FARM “LOCHINVAR”

3.1 PARTICIPANTS

Property owner

- Daniel Liphuyzen

Department of Land and Water Conservation

- Saji Joseph
- Bill Currans
- Nimal Kulatunga

Murray Irrigation Limited

- Carl Mathers

Greening Australia

- Martin Driver

3.2 PROCEEDINGS

“Lochinvar” is an irrigation farm of 483 hectares owned by Daniel Liphuyzen that produces rice, winter cropping, wool and prime lambs. The property demonstrates the principles of the Land and Water Management Plans – sustainable development to minimise watertable accessions, and so improve farm viability and enhance the natural environment. A whole farm plan has been developed to identify future farm development including:

- a new on farm storage facility to enable irrigation tail water and rainfall run-off to be collected and stored to minimise the disposal of poor quality water off-farm;
- improved irrigation infrastructure to enable more efficient irrigation water use and the pumping of groundwater; and
- an ongoing revegetation program including establishing lucerne on more permeable soils.

4 WAKOOL TULLAKOOL SUB SURFACE DRAINAGE SCHEME

4.1 PARTICIPANTS

Wakool Tullakooll Sub Surface Drainage Scheme

- Carl Mathers, Manager

Wakool Shire Council

- David Shannon, Mayor

Department of Land and Water Conservation

- Saji Joseph
- Bill Currans
- Nimal Kulatunga

Murray Irrigation Limited

- Ian Morton, Board Member
- Bill Hetherington

Greening Australia

- Martin Driver

4.2 PROCEEDINGS

The Committee inspected the Stage II evaporation basins.

MIL owns and operates the largest salt interception scheme in the Murray-Darling Basin, the Wakool Tullakool Sub Surface Drainage Scheme [WTSSDS]. In 1999, 240,000 tonnes of salt were pumped into evaporation basins. MIL is looking at commercial uses of the saline water such as the feasibility of saline inland fish farming in the basins.

Irrigation in the area commenced in 1936. The watertable began to rise and, in 1975, more than 2000 hectares of land were completely out of production and crop yields declined by 50% in the remaining rice growing areas. The WTSSDS was constructed between 1979 and 1988 at a capital cost of \$30m funded by the Commonwealth and NSW governments.

The evaporation basins are laid out in rectangular bays ranging in areas from 25-50 hectares and hold water to a depth of one metre. Three metre deep peripheral drains trap seepage water from the basins and adjoining land surrounding the basins. Water from the drains is pumped back into the basins. Groundwater pumped from the scheme enters a basin through an inlet. Water is progressively concentrated in the bays and finally enters the crystallisation bay where the brine evaporates to leave salt. Some of the basins are leased to commercial salt interests but harvesting has not taken place. There is also the potential to grow seaweed.

The Mayor of Wakool also briefed the Committee on the effects of salinity on individual farmers, including himself. With a population 350, salinity has had a negative impact on the community of Wakool.

5 GREEN GULLY

5.1 PARTICIPANTS

Property Owners

- Robert Mears, “Multarra”
- Joan and Ian Ferguson, “Womboo”
- Steve Holshier, “Paringa Vale”

Department of Land and Water Conservation

- Saji Joseph
- Bill Currans
- Nimal Kulatunga

Murray Irrigation Limited

- Carl Mathers

Greening Australia

- Martin Driver

5.2 PROCEEDINGS

Green Gully is the ancestral bed of the Murray River. It carried up to three times of the modern Murray’s flow and was diverted from its course by a geological uplift about 25,000 years ago.

Widespread loss of perennial vegetation has led to regional dryland recharge and rising watertables. This has been exacerbated by localised channel seepage and irrigation induced recharge. Being the lowest point in the regional landscape, Green Gully is the initial discharge point of the regional watertable. This first became apparent in the mid 1970s and waterlogging and salinity have increased in extent and severity. The landscape was full of dying and stressed gum trees.

The Green Gully Landcare Group was formed in the late 1980s and, with funding from Landcare, Natural Heritage Trust, Cathay Pacific and Greening Australia, much on groundwork has taken place. This has resulted in broad scale saltbush planting and fencing for regeneration.

5.3 INSPECTIONS

The Committee inspected the following properties:

- “Bultarra”

Robert Mears was the first landholder to trial broad acre saltbush planting to reclaim discharge areas and limit recharge adjacent to Green Gully.

- “Womboo”

Womboo is an integrated property development of saltbush, lucerne, lamb farming, natural regeneration and irrigated woods. Jan Ferguson, the secretary of the Green Gully Landcare Group, has been a driving force behind the community action.

- “Paringa Vale”

Scott Holschier has established his own propagation unit to grow saltbush and strategically revegetate to address discharge and recharge.

5.4 GREENING AUSTRALIA

Greening Australia is a non-profit organisation that works with the community to restore and extend native vegetation cover for the good of the environment. It is a membership-based organisation, managed by a voluntary board of directors elected by the membership. Individuals, schools, councils, farmers, businesses and government agencies are encouraged to become members and share the organisation’s vision of helping Australians to create a healthy diverse and productive environment. At the Green Gully properties, the Committee was told of its seedbank network and fencing programs.

The seedbank is a seed collection and storage facility operated to help coordinate the distribution of local native plant seed to local landholders, landcare, community groups and nurseries. Greening Australia has raised awareness of native revegetation and understorey restoration. It provides workshops and training as well as advice on native vegetation management and property planning.

Greening Australia has a Fencing Incentive Program and has funding of \$1,200 per kilometre to protect areas of remnant vegetation from grazing. The management of stock being the first step in revegetation. This protects and promotes understorey plants [wattles, hobbushes, peas and other low shrubs] that are crucial in helping maintain healthy vegetation systems. In turn, shrubs provide food and shelter for a diverse range of birds, insects and other animals that help maintain tree health.

6 KYEAMBA VALLEY

6.1 PARTICIPANTS

Property Owners

- Rick and Pam Martin, “Burnbank”
- Sid Clarke, “Samarra”
- Peter Cregan, “Teneriffe”

Department of Land and Water Conservation

- Greg Bugden, Advisory Services Manager
- Geoff Fishburn
- Warwick Ford

Wagga Wagga City Council

- Kevin Wales, Mayor

Murray Riverina Farm Forestry

- Rob Kuiper

6.2 PROCEEDINGS

The Committee proceeded on an inspection of dryland salinity in the Kyeamba Valley situated 15 kilometres east of Wagga Wagga. The inspection included visiting properties and meeting some property owners. The Committee also gained information from the accompanying officers of the DLWC and Murray Riverina Farm Forestry.

6.3 KYEAMBA VALLEY

Kyeamba Valley consists of Kyeamba Creek, Corienbob Creek and Mates Gully Catchment an area of over 100,070 hectares. It is predominantly an agricultural area adversely affected by a rising watertable, that is causing waterlogging and salinity problems. Twenty percent of the valley is subject to waterlogging and 10% by salinity. This has resulted in dryland and urban salinity, gully erosion, high costs for road maintenance, infrastructure damage to houses, sites sinking and ground water pressure.

6.4 MURRAY RIVERINA FARM FORESTRY

Murray Riverina Farm Forestry supports and promotes the establishment of both hardwood and softwood plantations on cleared agricultural land for commercial timber production. Established in July 1996 it has three farm forestry extension staff located in Albury, Wagga Wagga and Narranderra with the Project Manager based in Nathalia, Victoria.

The current Wagga Wagga position is funded through the Natural Heritage Trust [NHT] and focussed on the 500-700mm rainfall range of the Riverina and South West Slopes. A further two years of NHT funding has been approved for all extension staff.

The focus in Wagga Wagga includes the establishment of trial joint venture plantations of *pinus pinaster* in conjunction with State Forests and the coordination and establishment of an NHT funded native species and provenance trial in cooperation with landholders and the CSIRO.

Pinus pinaster has a deep taproot, has a reasonable level of salt tolerance and can survive on as little as 450mm annual rainfall. It is being planted to combat rising watertables and to supply local sawmills and the Visy Pulpmill in Tumut.

A total of seven private properties [170 hectares] have been used to establish plantations over the past two planting seasons with NHT funds providing 50% of the cost and State Forests the balance.

Native species trials are being conducted on seven properties [25 hectares]. The CSIRO Forestry and Forest Products Division assisted with the site layout, species and provenance selection and the CSIRO Australia Tree Seed Centre supplied the seed for the eucalypt

species. One of the trials is being conducted on “Burbank” [a property inspected by the Committee].

6.5 INSPECTION OF PROPERTIES

- “Burnbank”

Burnbank is a property owned by Rick and Pam Martin. It is 940 hectares. It was purchased by the family in 1947 endured rabbit plague, a fire in 1952 and is now one-third waterlogged and unproductive. It is located in one of the worst affected areas of the Kyeamba Valley. It has been placed under a whole of farm management plan.

The Committee was shown a piezometer to demonstrate the high watertable and the native tree planting trial. The trial sites on Burnbank were chosen because of the salinity levels and the desire to rehabilitate the land through revegetation with trees. The sites were deep ripped by a bulldozer, the riplines cultivated with a mound plough, sprayed, fenced, planted in August/September and fertilised in October. It will be monitored to see how they cope with different levels of salinity. They are aiming to harvest forest products 30 years down the track.

- “Simarra”

Simarra is a 275 hectare property owned by Sid Clarke. Mr Clarke made the point that there needed to be an education program before all the good work done by neighbouring property owners was undone by the inaction or poor practices of only one neighbour.

- “Teneriffe”

Teneriffe is a smallish property of approximately 200 hectares owned by Peter Cregan. Fifteen percent of the property is planted with pasture improvement and trees. Mr Cregan demonstrated the depth of the high watertable and the reclamation work on a salt scald area.

6.6 KEY ISSUES

6.6.1 Property Owners

The key issues raised by property owners were:

- the need for professional advice and a professional whole of farm plan;
- farm plans need to be coordinated with a whole of catchment management plan [particularly farmers in the upper catchment areas];
- greater water use efficiency is gained by using a percentage mix of trees and deep rooted perennial pastures;
- productivity and environmental sustainability can be improved dramatically by using a whole of farm plan approach;
- environmental sustainability with whole of farm and catchment planning must be promoted to the landholder as the most efficient way to increase profitability;

- the promotion should come with strong financial backing as farmers have had years of low profitability with high debt and low equity [they would not want to take on more debt to service the environment];
- many farmers see environmental landcare and tree planting as long term solutions as their main priority is short term survival;
- it will take 10 to 20 years before landholders get a return on the environmental investment dollar;
- farming is a demanding physical activity with an aging labour supply. Landcare is another physical and time consuming activity that must be allocated to the work program;
- the government and community should be encouraged to develop a high profile priority and passion for the environment;
- the community at large expects, as a right, daily access to clean, healthy, fresh and cheap food. There is a cost to the environment and to the landholder to service this expectation – the community must share the cost;
- the landcare movement has been a very successful “bandaid” catalyst over the last 10 years – it is now time the community at large adopted an urgent and realistic aid to the environment with more funding;
- catchment management boards should be used to identify priority areas and prepare catchment strategies;
- “hot spots” should be targeted for immediate work;
- there should be a continuing source of funding for landcare;
- salinity is only one symptom of the problem of waterlogged land;
- existing land and water management plans should be recognised; and
- priority areas within a catchment [ie: Kyeamba Valley] should be used as a pilot study area.

6.6.2 DLWC

Key issues raised by officers of the DLWC were:

6.6.2.1 Kyeamba Valley Land and Water Management Plan

The Murrumbidgee Catchment Area is covered by three irrigation Land and Water Management Plans and around 30 to 50 dryland plans. The Irrigation Land and Water Management Plans have a formal process of accreditation by the NSW Government and attract significant funding for works to be carried out.

The dryland Land and Water Management Plans were initiated by DLWC with local landcare groups. Some funding to develop the plans was secured through the former Salt Action

Program. The Landcare Group contributed ‘in kind’. The DLWC regional office informed the Committee that the plans have been through all the same economic analysis as the Irrigation Plans but that the NSW Government was not willing to formally accredit them and provide funding.

This meant that the plans could not be systematically implemented. The plans along with many other bids for grants went to the Catchment Management Board and were assessed and a list in rank order of priorities for funding was provided to state and commonwealth governments. Items in the plan were implemented when a grant, was secured, for instance through the NHT.

The plans set targets that landholders applying for a sub-division of their land must meet:

- steep land needs 100% revegetation
- mid pitch land needs 30% revegetation and
- low lying land needs 15% revegetation.

As the government is not willing to “sign-off” on the status of the plans is unclear if landholders object to these requirements.

Further, it is unclear whether, or how, these plans will be integrated into the Catchment Management Plan. The plans are in limbo as the government position is for the council to wait for the Catchment Management Plans. The Murrumbidgee Catchment Management Board must develop its plan by June 2001.

6.6.2.2 Incentives and Penalties to bring about best management practice by landholders

About 25% of landholders in the Wagga Wagga area are implementing best management practices. However, some of this land is affected negatively by the poor practices of landholders on adjoining land. A system of incentives and penalties is needed to bring about more widespread change to better management practices. Investment is needed to move in landholders who are able and willing to bring about land-use change and restructuring is required to move out those who are unable or unwilling to implement necessary land-use changes.

Previously DLWC drew up individual plans for landholders and compared them to the dryland plans for the area to provide a holistic view of what changes to land management practices were needed to improve the environmental health of the land. The landholder would have to pay for the work themselves as part of the sustainability process on their own land. Landholders of ‘moderate means’ ie those with less than \$1.5m equity [assets minus liabilities] would be eligible for a loan through the Rural Assistance Authority. The loans were provided over 10 to 15 years and the first two years were interest only.

Landholders have ceased to take out these loans as the whole system is in transition. With the establishment of Catchment Management Boards, Environmental Services Investment Fund and the National Action Plan on Salinity and Water Quality, landholders are anticipating that there may be subsidies for salinised land. DLWC considers that it is important that good land management practices are rewarded and poor management practices penalised. As landholders benefit from any investment to improve their land, they should be expected to

contribute and those whose on practices have exacerbated salinity should not simply be bailed out.

It is recommended that a portion of the Commonwealth Government funding under the National Action Plan on Salinity and Water Quality be provided to the Rural Assistance Authority. The funding can be used to assist landholders to contribute to an investment arrangement. Graziers in the Wagga Wagga area have very little cash flow due to commodity prices being low for a long period of time.

There are a number of other possible incentives and penalties. These rely on the availability of an environmental health report card on agricultural landholdings.

The DLWC currently provides “an NRMA-style report” on the health of agricultural land for sale for prospective purchasers on a consultancy basis. A number of indicators of the health of the land are taken and compared to a set of benchmarks. The data that is provided includes:

- the proximity of ground-water to the surface;
- soil health;
- salinity;
- land management options; and
- the likely costs of remediation eg the percentage of land that needs to be planted back to trees or perennial pasture.

A report card system on agricultural properties is being used in pilot Environmental Management Systems that underpin produce accredited as being “environment friendly” in their production.

DLWC, Department of Agriculture and National Parks and Wildlife Service are doing land-capability mapping based on land-class system with eight categories [land capability]. Associated work is being carried out on best management practices. These agencies have the technical capability of providing information on whether landholders are complying with the optimum land use in line with the capability of their land.

DLWC does not, however, have the resources to provide a report card on land for sale. Currently DLWC’s regional resources are directed to supporting Catchment Management Boards and then implementing the Plan.

This “report card” could be the basis for incentives and penalties outlined above.

Councils are one agency that potentially have a role to play in this system of incentives and penalties.

Planning certificates list matters affecting the land. The Wagga Wagga City Council includes on section 149 certificates how close to the surface ground-water beneath the property is and refers the applicant to a map. The Council does not currently issue planning certificates on the sale of agricultural properties. The true value of agricultural land can currently be disguised. It currently depends on the expertise of purchasers whether they pay a fair price for the land.

It is proposed that on the sale of agricultural land Councils provide information on the existing and future impact of salinity on a section 149 certificate and refer to information held by departments on a data-base.

The provision of section 149 certificates with information on the environmental health of agricultural land would act as a 'buyer beware' system and should mean that purchasers pay a fair price for land. Landholders who had remediated their land would be rewarded and those who had degraded their land would see this more accurately reflected in land prices.

It is further proposed that the Valuer-General's Office be required to change the way that land valuations are undertaken to include the de-valuation of land by environmental degradation or the increase in value by remediation. This would be a whole-of-government approach to land valuations rather than relying on the last sale to assess the value.

The Valuer-General's assessment can be used to differentially rate land.

Lending institutions in Wagga Wagga require a civil engineering report to be carried out on the impact of salinity on houses for sale, where the purchasers are seeking a mortgage. It is proposed that lending institutions are encouraged to adopt a policy of requiring a "report card" on the impact of salinity on agricultural land along with an assessment of the affect on the value of the land from any investments proposed to be undertaken to remediate the land.

6.6.2.3 Australian Standard for Building Codes

Six hundred homes in Wagga Wagga are seriously affected by salinity and around 2,000 homes have some damage to bricks and mortar.

The DLWC, Murrumbidgee Regional Office is represented on a Department of Urban Affairs and Planning Ministerial Building Regulation Advisory Committee Working Party on Salinity and Rising Salt Damp. The Working Party, was to meet for the first time had its first meeting in December 2000.

The DLWC is collecting data from civil engineers in the Wagga Wagga area on why the Australian standards that underpin building codes are not satisfactory. For example, plastic damp proof coursing is not thick enough to resist salinity, concrete strength needs to be 30 megapascals rather than 20. The concrete needs to be vigorously vibrated to remove any air and saline resistant pavers need to be installed. The Council cannot implement new building codes without the development of a new Australian Standard.

These changes to building requirements will add \$10,000 – \$15,000 to a residential property. There has already been one insurance pay out in the Mudgee area for salinity damage. Insurers are likely to support changes to the building codes.

6.6.2.4 Indemnity

The DLWC advocates that a Salinity Management Model is developed by the Department of Urban Affairs and Planning similar to that of the Flood Plain Management Model. This provides guidelines and good faith indemnity against liability for councils for flood plain works and advice.

Wagga Wagga City Council has taken the initiative to lower the ground watertable under the city by bore water pumping into a holding pond. The houses that were saturated may crack

when they dry out leading to liability claims. Similarly, revegetation on the slopes that will reduce salinity will also dry out houses and may lead to cracking.

The Council has also been removing rubble pits and installing storm water pipes. It was unable to negotiate easements over the parts of the affected residential land due to the costs and could be liable for any damage caused by the execution of this work or its affects.

7 WAGGA WAGGA

7.1 PARTICIPANTS

Wagga Wagga City Council

- Kevin Wales, Mayor
- Lindsay Vidler, Deputy Mayor
- Gary Wells, Manager of Engineering Services
- Bryan Short, Manager, Design Services
- Elizabeth Madden, Urban Salinity Facilitator

7.2 PROCEEDINGS

The Committee was welcomed at Wagga Wagga Civic Centre by Mayor Wales and was briefed on the history, extent and nature of urban salinity and related problems in Wagga Wagga.

7.3 BACKGROUND

Wagga Wagga is located on the western slopes of the Great Dividing Range in the Murrumbidgee River Catchment. The western slopes have been extensively cleared of vegetation. Without trees and perennial plants to soak up the water, it runs down the slopes and seeps into the groundwater system. The watertable rises and on lower ground actually comes to the surface, bringing with it the salts present in the ground.

Urbanisation in the Wagga Wagga area has dramatically increased recharge [from around 1mm per year to 40mm per year] resulting in a rise in the watertable. Sources of groundwater recharge in the Wagga Wagga area are rainfall, rubble pits, pipe leakage [water supply and sewer] and irrigation.

Much of Wagga Wagga is situated in a large drainage basin on heavy clay soils with a small catchment discharge point preventing groundwater leaving easily. Groundwater levels increase behind this restriction and build up until they reach the surface causing water logging and salinity.

A groundwater map was produced and released in 1996 to make information available to the community. It is a general guide to groundwater depth. The map has certain limitations including the requirement to understanding the urban salinity process; groundwater level

readings can only be used as one tool in assessing the salinity potential of a site and there is a difference between actual and potential groundwater level.

The impact of salinity in Wagga Wagga includes visible evidence of high watertables and salinity on recreation areas, parks and gardens. This includes:

- dying turf and salt crystals on the soil;
- destabilisation of road foundations, weakening of pavement, rapid potholing, increased ageing of bitumen, fretting of asphalt and corrosion of concrete structures;
- corrosion of metal, concrete and asbestos cement pipes, resulting in leaking pipes;
- failure of septic systems;
- 600 homes at risk of being salt affected – of these houses, 50 to 100 require immediate repairs; and
- changing salt levels affecting the environment of local flora and fauna.

Urban salinity was first recognised in Wagga Wagga in 1993 at the Wagga Wagga Showground. The problem was recognised as a groundwater problem. The first step taken was installation of sub-surface drainage. Since then salt tolerant grasses have been planted and the drainage water is directed to the Urana St evaporation basin.

Wagga Wagga's first Urban Salinity Action Plan was developed in 1994 and with the support of Wagga Wagga City Council, DLWC, EPA, Riverina Water County Council, Charles Sturt University and Kendall and Sellick Engineers. A committee was formed. The Urban Landcare Group formed soon after the initial salinity committee began.

Investigation showed the watertable in some areas to be within half a metre from the soil surface in a number of locations.

Wagga Wagga City Council believes that major government funding programs are needed to tackle dryland and urban salinity. Wagga Wagga City Council believes that local government is a logical partner for State Government in these activities but most councils have not become involved because they cannot afford to do so. The Local Government and Shires Association was negotiating a Memorandum of Understanding with the state government at the time of the visit. Wagga Wagga City Council saw this as a first step in defining how the state/local government relationship might work.

Wagga Wagga City Council had obtained funding from the NHT at the time of the visit and was about to embark on 90 small projects in their rural area.

The council is also seeking NSW Government assistance in the following policy and legislative areas.

7.4 FUNDING

Wagga Wagga City Council has an annual budget of around \$25m, of this it spends \$1m annually on salinity control.

The Council has spent \$3.5M over three years and has received \$1.2M of NHT funding and \$75,000 from the Salt Action Program. The Council has sold its gas business to Southern Energy and is using the proceeds to fund salinity control. The Council wants to raise an environmental levy.

The Council has approached both the NSW and Commonwealth Governments to seek \$12.5M funding required for implementation of the Council's Natural Resource Management Plan. The Council was informed that the amount sought was too large and that they should instead seek funding on a project basis. The Council has lobbied government departments and ministers for funding and is asked to wait until the next stage of salinity planning is available.

The Council advocates that the funding formula should be the same as that of flood mitigation works which is dollar matching by both the NSW and Commonwealth Government of every dollar spent by the Council.

7.5 INDEMNITY

The Manager of Design Services stated that councils are not protected from indemnity claims in regard to salinity. Wagga Wagga City Council advocates the statutory provision of good faith indemnity as applies to Floodplain Management.

7.6 OLD TEACHERS' COLLEGE SITE DEVELOPMENT

The old Teachers' College in Wagga Wagga was sold to developers who put in a residential rezoning application. The land is affected by salinity. The DUAP declined to be involved initially. Wagga Wagga City Council had no guidelines, policy or precedent from DUAP on which to base any decision. They were also uncertain of their legal situation in any damages claims arising from a refusal to permit development of the site.

The Council lacks guidance on whether it should base its decisions on where salinity is impacting at present, where it will impact in future or the whole of the LGA. The Manager of Design Services said that Council lacks reliable predictive data on the precise areas of the LGA that will be affected by salinity. Council cannot enforce salinity measures through building codes if it cannot base these decisions on reliable scientific data.

The Council is reluctant to be the only Council enforcing salinity measures through building codes. The relevant measures add \$4,000 to the cost of larger houses.

If the Council gives advice on salinity on development applications that have been submitted, they can be legally liable if the information turns out to be incorrect.

7.7 ASSESSMENT OF NATURAL RESOURCE MANAGEMENT PLANS

The Council prepared a Natural Resource Management Plan about four years ago with encouragement from DLWC.

The Kyeamba Valley Landcare Group also produced a Land and Water Management Plan.

The Council would like the plans signed off by the NSW Government and access to funding for revegetation. The NSW Government requires Irrigation Districts to prepare Land and Water Management Plans. These plans are assessed and signed off by NSW Government. Funding is available through a funding formula to implement the measures in the plans.

As Council's Natural Resource Management Plan is not signed off by NSW Government it has limited statutory power. If landholders who put in development applications are required by Council to revegetate they question the status of the Plan. If landholders take the matter to the Land and Environment Court they may well be able to argue against the requirements.

7.8 RELATIONSHIP WITH CATCHMENT MANAGEMENT BOARD

10-15 LGAs fall within the boundaries of the Catchment but there are only two places on the Board for Council representatives. Arrangements for representation are not clear.

The Council is concerned about the standing of its own Plan and priorities viz the Catchment Management Plan. If funding is to be allocated by the Catchment Management Boards then this also causes the Council concern. The NHT application process demonstrated to Wagga Wagga City Council that the Catchment Management Board would not necessarily share their view of priorities. Catchment Management Boards vet NHT applications and did not support Wagga Wagga's application. [the Commonwealth Government over-ruled them so funding was provided]

7.9 NHT PROGRAM

Council has been successful in gaining funding from this source but notes that monitoring is not stringent. The Commonwealth Government has never made a grant visit to sight the works funded.

7.10 ACCESS TO PRIVATE LAND

The Council wants their statutory power to enter properties to undertake works restored. It was removed in the new Local Government Act. The Department of Public Works and Services and Sydney Water have retained the right.

Council has a program to remove rubble pits [storm water soakaways on residential properties] and to connect house roofs to a storm water disposal system. Council has decided not to negotiate legal easement rights with each landholder. Each easement would cost \$2,000. A survey would have to be undertaken, there would be negotiations with the landholder, the mortgagee would be involved and the easement would need to be registered with the State Land Information Centre. This would need to be done for each property. Negotiation of an interest in the property cost would be as much as the works themselves.

7.11 SWIMMING POOL DISCHARGES

The Local Government Act prevents the discharge of swimming pool water into sewers or stormwater drains. There is, therefore, no means of flushing or emptying pools for maintenance. Water is being discharged onto the ground exacerbating salinity problems. An EPA process is needed to legislate how swimming pool water may be discharged.

7.12 COMMERCIAL USE OF SALINE WATER FROM HOLDING PONDS.

Both Dubbo and Wagga Wagga City Councils have borefields that pump ground water into holding ponds to lower the watertable under the towns. A pilot project will involve the extraction of the salt from the water via a mobile filtration unit. The salt will be harvested for commercial purposes. Councils will be charged a tariff per megalitre. The tariff will depend on the extent to which profits from commercial sales offset the costs of extraction.

The project involves:

- ◆ **Department of State and Regional Development \$100,000**
- Geoprocessors\$80,000
- Dubbo City Council\$40,000
- Wagga Wagga City Council\$40,000

\$260,000 is being sought from the Commonwealth Government. Geoprocessors will fund a percentage of the cost of processing on the basis that they can sell the idea to a larger company to use if it is successful.

7.13 LOCATION OF THE DLWC URBAN SALINITY UNIT

Wagga Wagga City Council has hosted presentations and site visits for national and international visitors who are interested in urban salinity. This has been their time and their expense. If the Urban Salinity Unit was based in Wagga Wagga, it could take over this educative role.

7.14 SALINITY CREDITS

Wagga Wagga Council advocates that councils should be participants in salinity credit schemes.

The Council could be eligible for credits for re-using its effluent water on sporting fields and for revegetation in the Catchment. The credits could off-set the discharge of borewater pumped out from under the town. The credit could be based on the net reduction of saline water entering the irrigation district that would have benefits for irrigators.

7.15 PROGRAMS

The Committee was given an outline of council programs.

- Education: community and school information sessions; publications; liaising with residents; and publicity programs.
- Revegetation: completion of Natural Resource Management Plan; set prioritised areas and targets [25 hectares p.a]; community involvement; agreements with private landholders; and programs with rural landholders through NHT funding.
- Leakage reduction: reducing inputs from house roof run-off [rubble pits].
- Borefields: lowering the watertable in the worst effected areas by pumping out water.

8 SALINITY TOUR

8.1 PARTICIPANTS

Wagga Wagga City Council

- Kevin Wales, Mayor
- Lindsay Vidler, Deputy Mayor
- Gary Wells
- Bryan Short, Manager, Design Services

DLWC

- Greg Bugden

The Committee proceeded on a guided salinity tour of Wagga Wagga. The Committee inspected:

- piezometers to measure the depth of the watertable;
- bore pumps to discharge ground water;
- numerous instances of road break-up;
- numerous examples of brick deterioration in house foundations;
- work on the removal of backyard rubble pits and the connection of house roofs to storm water disposal pipes;
- the Old Teachers' College site; and
- disused Charles Sturt University Oval.

9 DLWC – RIVERINA FIELD STUDIES CENTRE

9.1 PARTICIPANTS

DLWC

- Greg Bugden

Riverina Field Studies Centre

- Geoff Beale, Research Scientist
- Peter Barker, Research Scientist

9.2 PROCEEDINGS

The Committee was briefed by DLWC Officers.

The Murrumbidgee Regional Office covers the Riverina area including Wagga Wagga.

The Regional Office provides advice to the Murrumbidgee Catchment Management Board that was preparing its advice to the NSW Government on end of valley targets for salinity.

The Regional Office will be recommending to the Catchment Management Board that EC levels rather than salt loads are used to measure end of valley targets. The salt load varies too much according to where the reading is taken. The monitoring station is at Balranald and salt load readings at this site are unsuitable.

Of the water in the Murrumbidgee River 27% flows out of the system, 54% is used for irrigation and 17% remains within the system in wetlands and evaporation.

The unregulated rivers above Wagga Wagga are contributing most of the salinity. The Regional Office is looking at 12 priority catchment areas above Wagga Wagga. Auditing is being undertaken to determine changing factors so as to predict future levels.

The salt load from the irrigation area is 5,000 tonnes but from dryland salinity in the Murrumbidgee area it is 23,000 tonnes.

The DLWC is using FLAG modelling predictions to locate saline water flows to particular geological features and can map salt spikes to specific sites. This can locate where freshwater flows are and where saline flows are. Forestry programs can be used to soak up local sources of saline water to prevent recharge. Planting can be avoided in areas that would soak up freshwater.

The DLWC is undertaking Flow Tube Modelling with CSIRO. This shows the EC savings that can be made under different land management scenarios.

HUNTER REGION, 21 – 22 FEBRUARY 2001

10 BENGALLA MINE: PRESENTATIONS AND ROUND TABLE DISCUSSION

10.1 PARTICIPANTS

- Cathy Cole, Regional Director, DLWC
- Jill Pattison, Acting Director Regulatory Innovation, EPA
- Mitchell Bennett, Head Regional Operations Unit – Hunter, EPA
- Amanda Payton, Environmental Officer Muswellbrook City Council,
- Harold Sternbeck, Chairman, Hunter Catchment Management Trust
- Dean Chapman, Catchment Manager Water, Hunter Catchment Management Trust
- James Bailey, Environmental Manager, Bengalla Mine

10.2 PROCEEDINGS

The DLWC and the EPA briefed the Committee on their role in addressing salinity in the Hunter Region as well as current challenges that they face. The Committee was briefed on the environmental protection measures put in place by Bengalla Mine. Bengalla Mine is a participant in the Hunter River Salinity Trading Scheme. Committee members were provided with a tour of the Bengalla Mine site to inspect environmental protection measures including the infrastructure for the controlled discharge of saline water and the infrastructure to re-use saline water on the site.

10.3 DEPARTMENT OF LAND AND WATER CONSERVATION

The Hunter Catchment Management Trust along with inland Catchment Management Boards, are due to advise the Minister for Land and Water Conservation of a suitable end-of-valley salinity target at by March 2001. The target will set out the reduction in average EC levels by 2010. The end-of-valley target for the Hunter River will be measured at Greta. The NSW Government will then assess these recommendations and finalise end-of-valley targets. The second task for Catchment Management Boards and the Hunter Catchment Management Trust will be to draft Catchment Management Plans by September 2001 which recommend actions to reduce salinity which will meet the targets set. The Government will assess the Plans that will then be exhibited for public comment.

The NSW Government is conducting a salinity audit of the Hunter Region as part of its Salinity Information Program This will fill gaps in data about salinity in the Hunter Region.

10.3.1 Discussion

The Hunter Region is the coastal catchment with the highest incidence of salinity. This is due to the effects of industry, agriculture and urbanisation on the naturally saline geology of the area.

Dryland salinity currently affects 13,000 hectares in the Upper Hunter and 18,000 hectares in Maitland and Cessnock.

The affect of salinity on water quality is measured by electroconductivity [EC units], the higher the EC, the higher the level of dissolved salts in the water. Water is suitable for drinking when it measures less than 800 EC. Some crops are affected when irrigation water is 400- 800EC.

The EC levels in the Hunter River are as follows:

- Moonan Flat 200 EC
- Muswellbrook 400EC
- Liskinfyne 800EC

Tributary flows to the Hunter River are naturally very saline, often at levels of 2-3,000 EC.

These are average levels and under certain conditions the EC levels are higher. The Private Irrigation District that covers Pokolbin draws water from the Hunter River. They must turn off the pump when salinity reaches 800EC to avoid damage to crops. 90% of vineyards are unofficially irrigated in the period February – April.

Industrial and dryland salinity has occurred in the Hunter Region due to inadequate knowledge, past policies and market failure. Market failure occurs when the impacts of environmental damage do not appear in the same time and place as the causes. This means that consumers of the product do not pay for the costs of addressing the damage and the cost is passed onto the general community.

The current approach to addressing salinity has delivered some local gains but on the symptoms rather than the causes. The Government and community must now address the causes.

One of the causes of salinity in the Hunter Region is the discharge from industry. Both mining and power generation produce saline water that is discharged into the Hunter River. The discharge is controlled by the Hunter River Salinity Trading Scheme that has been in place for a decade. Salinity levels are kept to agreed targets. The Scheme is managed by the EPA and the DLWC carries out the monitoring of salinity and discharge water in the Hunter River [This is explained in more detail by the EPA]

The other cause of salinity is rising ground-water which brings up buried salts as these come within 2 metres of the soil surface vegetation dies and ‘salt scalds’ appear on the surface. This is called ‘dryland salinity’. It is caused by deforestation, irrigation and water-use in towns. The Committee was informed that dryland salinity is emerging as more of a problem than the industrial causes of salinity in the Hunter Region. It is more challenging to address. The NSW

Salinity Strategy sets out whole-of-government measures to address it. The challenge is to develop and implement a strategy for large landscapes.

A key feature of the NSW Salinity Strategy is the need to harness public and private investment to reduce the rate at which salinity is increasing. This recognises that businesses can benefit from reducing salinity, such as investment in forestry for carbon credits.

The Committee was informed that the community in the Hunter Region needs to be made more aware of dryland salinity so that there is support to address the causes of salinity before the signs appear, such as dying vegetation and salt scalds.

The Commonwealth Government has a National Action Plan for Salinity and Water Quality. It sets 20 priority catchments that will receive Commonwealth/State funding. The Committee was informed that the Hunter Region has not been included in spite of the fact that the EC levels in the Hunter River are higher than those of the priority areas selected.

The Hunter Catchment Management Trust is negotiating to have the Hunter Catchment included as a priority catchment.

10.4 THE ENVIRONMENT PROTECTION AUTHORITY [EPA]

The EPA is a NSW Government agency. The Hunter River Salinity Trading Scheme is a pilot pollution control program managed by the EPA under the Environmental Protection Operations Act. It applies to the Hunter River below Glenbawn Dam and above Singleton.

The Scheme has been operating since January 1995. It manages the discharge of saline water from mines and power stations to ensure that the salinity in the river does not exceed levels that are harmful to agricultural production or environmental quality downstream [below 900 EC units in the lower reaches and below 600 EC units in the upper reaches of the Hunter River]

Participation in the Scheme is compulsory for any industries holding a licence to discharge water into the Hunter River. There are currently 20 participating industries.

Non-participants must desalinate the water on site or ship it out. These options are more costly than participating.

Croft and Associates in 1993 undertook a detailed study of the possibility of mines using desalination as salt management technique. The capital cost ranged from \$30 - \$50 million and annual operation would have been \$3.7M in 1998.

Macquarie Generation partially desalinates its wastewater. The saline water still leaves concentrated brine for which disposal remains an issue. If they had the capacity to desalinise all the saline water that was discharged from 1995 – 98, the operating cost would have exceeded \$1.5M per annum on average.

Prior to the commencement of the Scheme, licence holders were allowed to discharge a small amount of wastewater at any time irrespective of the height of the River flow or the level of salinity in the River. There was pressure from industry for new mines but as the water quality was degraded there was not community support for new development so it was prohibited.

Following community debate over competing water uses, a trial of managed discharge was agreed in 1993 and the current water quality goal was set for the upper and lower reaches of the Hunter River. The trial was successful and the pilot scheme was established in 1995. The Scheme provides for continuous monitoring of the water quality in the River and has public support.

The Scheme is an emissions trading scheme whereby the environmental regulator decides on the total amount of emissions that are acceptable and divides this total into tradeable units called credits or permits. The units are allocated to participating organisations, in this case mines and power stations. Participants must have sufficient credits to discharge a particular quantity of pollutants. The Total Allowable Discharge changes every day according to the river flow. This is monitored by DLWC. If ambient salinity is above the water quality target then there can be no discharge by industry. Discharges and river conditions are monitored and recorded in a River Register operated by DLWC and funded by scheme participants.

The number of credits initially provided to industries is based on environmental and economic criteria including:

- numbers of people employed at the mine;
- the amount of coal produced;
- the mine or power station's environmental performance; and
- physical need.

Mines and power stations which find ways of reducing the amount of pollutants they discharge can sell their credits to other power stations or mines that find it more difficult or too expensive to reduce their pollutants.

Participants are given a 75% discount on licence fees for water management in the Hunter Valley. Participants pay \$170,000 to the DLWC for the river monitoring and modelling service but this only represents 60% of the full costs.

In August 2000 the Scheme was the first water emissions trading scheme in the world to move to on-line trading of credits through the Internet. This allows participants to make better opportunity of high river flows for temporary trading of credits. This means that if conditions are right for the release of discharge water but an industry does not need to release its water at that time, it can sell that right to another industry for that time only.

10.4.1 Discussion

The EPA is formalising the Hunter River Salinity Trading Scheme that has operated as a pilot scheme. *The Proposed Protection of the Environment Operations [Hunter River Salinity Trading Scheme] Regulation 2001* has been circulated for public discussion.

Industry would like greater certainty than that afforded by a pilot scheme. There is also feedback from the public in support of the Scheme. The draft Regulation includes some changes to improve the way the scheme operates and to ensure the scheme can accommodate on-going development.

The Scheme currently has 1,000 credits. In 1995, 800 were given out and 200 were held in reserve. Only 85 credits are left in reserve and there are seven new developments for the Hunter Region that want to participate in the Scheme. It was anticipated that participants who had reduced their discharge of saline water would sell their credits. However, some participants have been holding onto their unused credits. A large number of credits remain unused during discharge events and some are never used at all. However, there has been a great deal of good will between existing participants in the Scheme in regard to temporary trading, with some industries temporarily trading credits for no cost.

If participants hold onto their credits this can have the effect of keeping out new developments and is therefore anti-competitive. A new allocation system is needed.

The Draft Regulation will introduce periodic re-allocation of credits by auctioning those that have expired. Initial parcels of 200 credits will be provided to licensees in the pilot scheme and to new licensees allocated credits following commencement of the Regulation but before the first auction. Each parcel will include equal proportions of 2, 4, 6, 8 and 10 year credits. As credits expire they will be auctioned. This means that 20% of credits will expire every 2 years. Private trading can take place as now. Auctions will provide market price information to inform private trading.

Changes in the draft Regulation also mean that credits can be purchased at auction by non-licensees such as brokers and environmental groups. It is anticipated that the maintenance fees paid by credit holders will put people off sitting on credits.

The Regulation also extends the life of some credits for up to 10 years to provide industry with more certainty.

The Regulation introduces new flow thresholds. There will be fewer days of unrestricted discharge and more days when discharge is controlled using credits. This is needed because mining developments have increased in the upper part of the catchment and are projected to increase further. If all these participants released all their saline water during flood flows the salinity target would be exceeded. Some conditions that are currently classified as “flood flows” which allow for unrestricted discharge will be reclassified as “high flows” which require the use of credits.

The draft Regulation also introduces changes to the administration of the Scheme.

A Services Coordinator be established to take over the role currently performed by DLWC. There will be a new Operations Committee to replace the Steering Committee. The Operations Committee may take on the role of Services Coordinator. It will have the power to contract out this role and to recoup the full costs from Scheme participants.

10.5 BENGALLA MINE

Bengalla Mine is one of the 20 participants in the Hunter River Salinity Trading Scheme. The Bengalla Mining Company operates an open cut coal mine located 4km west of Muswellbrook in the Upper Hunter Valley in NSW. The duration of the initial mining lease is 1996 - 2017. Coal reserves would allow mining to continue beyond this period if approval is granted. At full capacity the mine will produce 6 million tonnes of coal per year.

The mine employs around 240 persons and this is estimated to increase to 270. Production is 36,000 tonnes per person per annum compared to an average in the Hunter Valley of 14,000 tonnes per person per annum.

The mine's environmental plans were a key feature in development approval as the mine faced two Land and Environment Court challenges prior to approval finally being granted.

The design of the mine minimises environmental impacts and ensures that agricultural land adjacent to the mine can continue to be productively used.

Bengalla Joint Venture owns 3,000 hectares of land, of which less than 1,000 is involved in mining. Land, which is not used in mining, is maintained for agricultural purposes. The Bengalla site has three dairies and a stud farm.

A detailed Environmental Management System has been put in place that is independently certified to the International Standard ISO 14001. A Real Time Environmental Monitoring System collects data on the meteorological, noise, and dust climate around the mine, blast results, inversion strengths and water management. The water management system monitors all dams on the site to ensure optimal water usage and manages the discharge of water in accordance with the Hunter River Salinity Trading Scheme.

Results are up-dated every minute to a central computer system. The data provided to mine staff allows them to make well-informed decisions about the mining operation to prevent any harm occurring to the environment and neighbouring residences. An alarm system alerts staff to any adverse conditions that require immediate action. Bengalla won the Hunter Catchment Management Trust Award for Environmental Excellence in 1999.

10.5.1 Inspection

On their tour of the site, Committee members observed that the mine infrastructure is surrounded by steep grassed embankments for soundproofing and to hide the mine workings from view.

The mine site is shaped to contain water run off in a series of dams. \$2.5m has been spent on this infrastructure purely for pollution control. Pumps transfer water between dams. Dust suppression and coal washing reuse saline water. There is limited use of Hunter River water for washing machinery and for showers for miners.

The mine is provided with information 24 hours a day on opportunities for discharge of saline water from the dams into the Hunter River. Censors monitor the flow of discharge water. It takes one and a half days to drain saline water from dam into the Hunter River. Dairy farm holdings owned by Bengalla Mine abut the discharge creek on the mine site.

The Committee was informed that the mine would flood before water overflows from the site. Mined out areas are rehabilitated. The Committee could see that spoil piles had been reshaped and revegetated with grass. The mine has a Revegetation Program that aims to cover 30% of the site with trees. Currently, 43,000 trees have been planted around the mine site.

11 BLACKJACK MOUNTAIN

11.1 PARTICIPANTS

DLWC

- Cathy Cole, Regional Director
- Tony Voller, Muswellbrook Office

11.2 PROCEEDINGS

The Committee was shown the rehabilitation work in progress by the local Landcare group on the property of Mr Ron Roberts. The local Landcare group has been active for ten years. The NHT and Salt Action Programs have funded the project. The area has been fenced off from grazing, salt tolerant grasses and trees have been planted.

DLWC assists landholders to develop property plans that also meet the objectives of the Catchment Management Plan. Landcare groups can become involved in the rehabilitation work on properties. Salinity mapping by DLWC can help to identify 'hot spots' where geological fault lines in the Hunter Region cause saline water to come to the surface. Salinity problems are also caused locally when sediments bound in clay are exposed by the removal of topsoil.

12 BAYSWATER POWER STATION

12.1 PARTICIPANTS:

Bayswater Power Station

- John Neely, Manager
- Peter Sewell, Production Manager
- Sandra Carter, Executive Assistant

12.2 PROCEEDINGS

Bayswater Power Station is a participant in the Hunter River Salinity Trading Scheme.

Bayswater and Liddell Power Stations run by Macquarie Generation supply 22% of the demand in the National Electricity Market. Macquarie Generation is the third largest water user in NSW. In 2000, 65,406 megalitres of water were diverted from the Hunter River [off-allocation] and 5,853 megalitres of wastewater were discharged from Lake Liddell under the Hunter River Salinity Trading Scheme containing 5,534 tonnes of salt.

Bayswater's four 660-megawatt generating units were built in the mid-1980s. Each turbine generates the equivalent power of sixteen 747 jet engines at full thrust. The turbine hall housing the generators is over half a kilometre long.

Electricity is produced in modern coal-fired boilers and steam-driven turbo-generators. The plant is automated, and few items require manual operation. The boilers are single furnace, twin drum type using natural circulation, with divided back pass and balanced draught. The furnaces are designed to cleanly and efficiently burn pulverised local black coal.

Cooling water is supplied from the Hunter River via a pumping station about 15 kilometres from the station. Plashett Reservoir provides buffer water storage. Wastewater from the plant processes is treated and recycled to restrict discharge into the environment, which takes place only under EPA licence conditions.

Each turbo-generator unit circulates cooling water at a rate of 15,200 litres/sec. About 36,000 megalitres of fresh water annually are needed for cooling, boiler make-up and general usage.

Four huge natural draught cooling towers cool the station's circulating water. The water make-up to replace what is evaporated at the cooling towers is approximately 100 megalitres/day. The storage capacity of Lake Liddell, which is shared by Bayswater and Liddell, is 152,000 megalitres.

Bayswater's coal is conveyed to the station from nearby open-cut coalmines. From the coal, Bayswater achieves a thermal efficiency of over 36% in converting the energy in coal into electrical energy sent from the power station.

Macquarie Generation conducted an audit of its environmental management processes in 2000 [6: Annual Report 2000]. Continuous up-grading of the power stations' environmental monitoring and reporting systems is a key component of the Corporation's Business Plan. The Corporation is pioneering the use of untreated wood waste [biomass] as a fuel supplement in firing Liddell Power station. The Corporation has also introduced innovations in water management with a brine concentrator that extracts salt from wastewater. The Corporation states that its water treatment system reduced net salt levels in the Hunter River by more than 7,500 tonnes in 2000 [14:Annual Report 2000]. The by-products from saline water are sold to recoup some of the costs of operating the brine concentrator.

12.2.1 Discussion

Bayswater is the largest power station in Australia. It was commissioned in the 1980's. It employed 624 people [excluding casuals] at 30 June 2000. Its water treatment infrastructure cost \$110m that was, at that time, world class. The water infrastructure is used by both Bayswater and Liddell power stations.

Macquarie Generation supports the Hunter River Salinity Trading Scheme. It is a net remover of salt from the Hunter River. 23,000 tonnes is removed per annum and only 2 –5,000 tonnes is put back into the River. The by-products of the salt extraction [Calcium carbonate, lime, Calcium Sulphate and Gypsum] are sold for agricultural purposes.

The Committee was informed that reducing salinity in the Hunter River is in the interests of Macquarie Generation. Macquarie Generation has to desalinate the water from the Hunter River before it can be used because high levels of salt in the water block the cooling towers. The less salt in the water the lower the costs of desalinating the water for use. Wastewater from the power stations is stored in Lake Liddell that has no fresh flows of water into it. This water is also desalinated to reduce salt levels from 520EC- 390 EC before it is reused or discharged into the Hunter River.

Macquarie Generation has the technical capacity to avoid discharging water into the Hunter River but the reduction in salinity below 350 EC is costly to achieve. The release of discharge water saves Macquarie Generation between \$100 and \$400 per million litres discharged.

Macquarie Generation holds 229 salinity trading credits. The usefulness of the credits has declined with the introduction of river flow rules for the Hunter River in 1998.

A high proportion of discharge opportunities are not used. If Macquarie Generation cannot release its allowable discharge it sells the right to local mines as a temporary trade under the Hunter River Salinity Trading Scheme. It is currently charging \$4.00 per credit as a nominal sum as the market value of salinity credits has not been established.

Macquarie Generation has also established an arrangement with three local mines to take their wastewater and put it through the brine extractor plant. Bayswater is 11km from the Hunter River but the mines are further away and have no access to the River and no holding pond. Macquarie Generation is paid a fee by the mines. Macquarie Generation is currently only charging the cost of the operation because are still finding out what the costs are. This arrangement is cheaper and more effective for the mines than constructing a dam at a cost of \$2m that would still leave them with saline water to dispose of.

Bayswater Power Station is interested in self-regulation with a Water Authority Licence from the Environment Protection Authority so that it can make decisions on pumping and releasing discharge. It would report to the EPA in the same way as with a pollution control licence. Bayswater Power Station have costed this option and is prepared to put the infrastructure in place at the DLWC for automatic monitoring.

Discussions concluded the Committee was taken on a tour of the water management system at Bayswater Power Station. The process involves pumping water 11km from the Hunter River, then it goes through a lime softening plant, alkalinity removal, reverse osmosis and a brine concentrator.

13 PEPPERTREES

13.1 PARTICIPANTS:

Peppertrees Vineyard

- Chris Cameron, Managing Director/Chief Winemaker

Cessnock City Council

- Michael Alexander, Environmental Planning Officer

13.2 PROCEEDINGS

The Committee inspected Peppertrees Vineyard's desalination plant.

13.2.1 Inspection

The Audrey Wilkinson Vineyard owned by Peppertrees has been a vineyard since 1866. Of the 275 acres owned by Peppertrees, 120 acres is under vine. The current owners took over in

1993 and have invested time and money in land-use management analysis and planning, including for salinity. With advice from DLWC, the layout of the vineyard and irrigation system has been changed to combat soil erosion and saline resistant rootstocks have been planted.

Landuse planning which takes into account the environmental sustainability of the land relies on detailed mapping including soil land features, thermal changes, crop yield estimates and salinity. The mapping provides landholders with information on the parts of their land that are most suitable for crops and parts of the land that may need rehabilitation.

There are several soil types in the one vineyard and this affects the way the land is used. Salinity mapping at landscape level is important as it is salt pathways or sinks in the surface 5 metres of the soil which affect land-use. Mr Cameron informed the Committee that the maps which the DLWC can provide are not suitable for land-holders and that Peppertrees has contracted the Environmental Research and Information Consortium [ERIC] at a cost of \$60,000 – 80,000 to provide this data. ERIC use existing gamma-ray data sources to provide soil maps which provide information on a range of soil properties, including salinity. ERIC also maps salt pathways under the ground.

The DLWC is assisting Peppertrees to measure the level of the ground water table beneath the vineyards.

The Vineyard is the first in the Southern Hemisphere to have a desalination plant. The use of fresh water produces a dramatically better harvest. Peppertrees developed their own desalination plant which uses reverse osmosis. The unit cost around \$100,000.

The Plant uses reverse osmosis to reduce the salinity of the water before spraying it onto the vines.

Most desalination plants have bore water as their water source, the plant at Peppertrees draws water from the dam surface. The Plant reduces salinity in the water from 2,500 parts per million down to 40. This process takes two days. It takes two hours to pump the filtered water onto the vineyards. Peppertrees have to be water-wise. The lower the salinity in the source water the faster the salinity can be filtered out. The salt concentrate left from processing goes into a sealed ‘turkey’s nest’ which will eventually have to be removed. The winery treats its effluent with ozone.

Access to water will become easier for Peppertrees, which is a shareholder in the Private Irrigation District that has been established. The pipeline was opened by Premier in October 2000. Irrigation management plans are part of the licence conditions for Private Irrigation Districts. Shareholders pay a rate of \$260 per megalitre per year for the water. The 147Km pipeline was funded by 380 shareholders at a cost of \$9m.

The Committee was impressed with the measures taken by Peppertrees to ensure that their land-use is environmentally sustainable. Mr Cameron explained that Peppertrees is owned by a large company, John Fairfax Holdings and that other vineyards may not be able to afford to invest in these measures.

14 INSPECTION OF DERELICT MINE SITE - ABERDARE EAST

14.1 PARTICIPANTS:

Department of Mineral Resources

- Greg Summerhayes, Principal Environment Officer,

Cessnock City Council

- Michael Alexander, Environmental Planning Officer,

Hunter Plant Operation Training School [HPOTS]

- Phil Warren, General Manager,

14.2 PROCEEDINGS

Seepage from abandoned mine sites is one cause of salinity. The Department of Mineral Resources is responsible for rehabilitating disused mine sites under the Derelict Mined Lands Program. The Program also provides funding for rehabilitation of mines and is increasingly working in partnership with community organisations and other government agencies on rehabilitation projects. The Department spent \$1.6 million through the Program during 1999-2000.

Aberdare East near Cessnock is one site which is being rehabilitated in a joint project by the Department of Mineral Resources and the HPOTS which now occupies the pit top facilities on the former mine site.

The mine was partially rehabilitated in the 1970's but still had problems with saline residues and acid leachate. The site has "no go areas" which are affected by previous mining activity.

In 1998/99 remedial studies and mapping were undertaken. The Report showed that there were 15 areas that required rehabilitation. The Department of Mineral Resources provide information and funding for the program. In 1998/99 the project received \$175,000 under the Derelict Mines Program to rehabilitate four areas of the site. The funding was the largest under the program that year.

The soil has been capped off with clay, soil and bio-solids placed over it and native trees planted on it to revegetate the site. Half the trees were planted by the local high school as part of their curriculum.

Erosion and turbidity in the creek have been addressed. A five hectare natural wetlands adjacent to the mine site has been preserved.

The Committee was informed that it would take another three years to complete the rehabilitation of the site. Funding has been sought from the NHT and Derelict Mines Program.

HPOTS that became fully commercial in 1997 is interested in business opportunities to provide training in the management of salinity.

LOWER MURRAY, SOUTH AUSTRALIA, 1 – 4 MAY 2001

BACKGROUND – SALINITY IN THE MURRAY

Salinity in the Murray Darling Basin occurs naturally through salt accumulating from the weathering of rocks, from groundwater and from rainfall. However changes in how the environment is managed has rapidly accelerated the salinisation of the land and water resources of the basin.

GROUNDWATER

One of the main causes of increasing salinity in the Murray River is the inflow of highly saline underground water. Groundwater storage or aquifers are found in all types of rock and soil. Formations throughout the Murray Darling Basin.

Water enters the region's aquifers in areas called recharge zones, as a result of rain or surface water infiltrating the soil and passing through the root zones of native vegetation or crops.

At the other end of the cycle, water leaves the aquifer in discharge areas, normally in or near the Murray River but also including lakes, swamps, springs and low-lying seepage areas.

The time taken for water to pass through the region's aquifers, from recharge to discharge can vary greatly. Equally, the distance between recharge and discharge points can also vary from a few metres to thousands of kilometres.

DRYLAND SALINITY

Much of the Murray River catchment in South Australia is semi-arid Mallee forest. In natural areas of Mallee, a soil-water-vegetation balance has evolved resulting in very low recharge rates that amount to less than 0.2mm of rainfall seeping through to the aquifer each year, in areas where rainfall is around 250mm per year. Under these conditions, the Mallee adds very little to the groundwater flow into the river.

However, in areas where the Mallee has been cleared, the recharge rates in cropped areas have increased by up to 10,000% as an extra 5 to 20mm per year of water percolates through the soil to the aquifer below.

This increased recharge has two immediate effects. The aquifer begins to fill and brings saline groundwater towards the surface. The increasing volume of water pressurises the aquifer, greatly boosting the rate of flow of saline groundwater into the river.

IRRIGATION RECHARGE

Inefficient irrigation practices and infrastructure have long been seen as sources of increasing salinity in the Murray River in South Australia.

Over watering of irrigated crops has resulted in the formation of groundwater mounds. A head of water builds, forming a pressure gradient that forces both natural groundwater and irrigation drainage water into the river.

Floodplain seepage and tree death due to rising saline groundwater are some of the outcomes of raised groundwater levels.

SALINITY AUDIT

In 1999, the Murray Darling Basin Ministerial Council commissioned a Salinity Audit of the Basin.

The audit provides a comprehensive account of the main sources of salinity in the Basin and predicts potential salinisation over the coming 100 years.

The findings of the audit are that substantial economic and environmental damage will continue to occur in the Murray Darling Basin without radical changes to land and water management. The audit found that:

- 3 to 5 million hectares will become salinised by 2100.
- Salinity in the Lower Murray will increase by 50% by 2050.
- Salt loads in the Macquarie, Namoi, Loddon, Lachlan and Avoca catchments will more than double by 2050.
- Agricultural productivity decline and infrastructure losses in the Basin will be costing \$1billion per year by 2100.
- The Macquarie Marshes, Great Cumbung Swamp, Avoca Marshes, the Chowilla complex and other wetlands will suffer major environmental damage.

Less than half of the salt mobilised in the basin is flushed out to sea. Most is deposited within the Murray Darling region, mainly in irrigation areas and floodplain wetlands.

While irrigation areas have been the source of large volumes of salt, effective management systems are being put in place to arrest this trend. In future, the Salinity Audit shows, the main source of increased Murray River salinity will be dryland farming and grazing rather than irrigation.

15 DISHER'S CREEK BASIN

15.1 PARTICIPANTS

- Jack Seekamp, Horticultural Management and Drainage Consultant, Honorary Research Assistant, Flinders University and former fruit grower

Murray-Darling Division, Department of Water Resources

- Ross Stockdale, Senior Technical Officer

15.2 PROCEEDINGS

Ross Stockdale briefed the Committee on the Noora Drainage Disposal Scheme of which the Disher's Creek Basin is stage two. The Committee inspected the site. The Noora Drainage

Disposal Scheme aims to reduce salt levels in the Murray River by directing the salt from run-off water.

Approximately 1.3 million tonnes of salt enters the Murray River each year. Thirty six percent of this total, ie 470,000 tonnes enters the River in South Australia.

In 1968, following a period of low river flows and consequent high salinity, the River Murray Commission obtained the approval of the governments which are party to the River Murray Waters Agreement [the Governments of South Australia, Victoria, New South Wales and the Commonwealth] to engage consulting engineers to investigate the salinity problem.

Their report, *Murray Valley Salinity Investigations* [1970] contained tentative proposals for salinity investigation. It stimulated the three states to undertake further investigations and develop detailed control proposals.

In South Australia, this resulted in an Engineering and Water Supply Department report, the *South Australian River Murray Salinity Control Program* released in 1978. It proposed six control measures. The main proposal, in terms of both cost and contribution to salinity reduction, was the Noora Drainage Disposal Scheme, involving the pumping of saline drainage water from the riverside evaporation basins [Berri, Disher's Creek and Bulyong Island] which serve the Berri and Renmark Irrigation Areas to a new evaporation basin at Noora, 20km east of Loxton.

The significance of the evaporation basins in contributing to salinity was highlighted in the 1978 report, which estimated that about 100,000 tonnes of salt entered the Murray River in South Australia at that time from evaporation basins and was increasing.

Construction of the scheme began in April 1980, and Stage 1 was commissioned in October 1982. This first stage involved construction of a pumping station at the Berri Evaporation Basin, a rising main to a surge tank at Bookpurnong, a gravity main to the Noora Basin and construction of the Basin itself.

Stage 2 was commissioned in February 1983, and included a pumping station at Dishers Creek, a rising main to a surge tank at Lyrup Heights, and a gravity main to link up with the Bookpurnong – Noora gravity main south of Lyrup.

The total cost of the completed Noora Scheme was around \$12 million. It is estimated that the Scheme will remove 84,000 tonnes of salt annually from the Murray River. Very salty water is held and only let back into the river when flows are very high to dilute it.

The point was made that 50% of the salt going into the river is from natural groundwater.

16 CHOWILLA WETLANDS

16.1 PARTICIPANTS

- Jack Seekamp, Horticultural Management and Drainage Consultant ,Honorary Research Assistant, Flinders University and former fruit grower

Murray-Darling Division, Department of Water Resources

- Ross Stockdale, Senior Technical Officer

16.2 PROCEEDINGS

Jack Seekamp briefed the Committee on the features of the Chowilla Wetlands with commentary as the Committee proceeded through the floodplain:

- “Calperum Station”

Calperum Station was previously a sheep station purchased by Environment Australia. Now all sheep, goats and rabbits have been removed the natural vegetation is slowly recovering.

- “Lake Woolpolool”

Destroyed by an attempt to exclude the 1956 flood, it now has permanent, very saline [100,000+EC] water at less than 1 metre. It is only allowed to be flooded to a shallow depth. No other apparent solution except engineering works to first lower the watertable.

- “Rotten Lake”

Last filled in 1956, it is a source of seed gypsum. A possible evaporation basin for Lake Woolpolool, or for a ‘salt works’.

- “Lake Merreti”

A freshwater lens ensures the health of the lake bottom and most of the surrounding trees. A shallow, very saline [52,000EC at about 2.5 metres] watertable around the northern shore will prevent any box tree regeneration. A carp exclusion structure and a valve to retain water after flood peaks to, partly, simulate ‘old time’ floods.

- “Clover Lake”

Clover Lake is very infrequently flooded and is slowly becoming more saline. It is doomed in the long term without more frequent flooding and/or engineering works to lower the watertable. Water is 60,000EC under the bed of the Lake.

- “Chowilla driveway”

Chowilla driveway has saline groundwater [40,000 – 60,000EC at four to five metres] that is causing the surface to, slowly, become more saline with a vegetation change to groundcover salt tolerant plants. Grazing still occurs here.

- “Coppermine Waterhole”

It is still fairly healthy, with water of 11,000 to 13,000EC at 1 to 1.5 metres. There is, probably, a ‘freshwater lens’ floating on the more saline water below. It needs frequent flood replenishment for continuing survival.

- “The Werta Wert”

Has water of 8,000 to 12,000EC at about 2 metres under the dry lakebed. It is still very healthy but is dependent on frequent flooding to maintain the freshwater lens. Before river regulation this was a permanent almost freshwater billabong. It has a control structure to help extend flooding after a short peak. All stock were removed from the Werta Wert ramp to the border.

- “Coombool Swamp”

Water is 60,000EC at 1.5 to 2 metres under the bed of the lake that is, slowly, becoming salinised. Many of the surrounding box trees are starting to show signs of stress. It needs a river flow greater than 80,000ml per day to fill so is unlikely to receive frequent flooding. It needs an, almost immediate, flood and/or heavy rain if it is to survive long enough for the tubewells to have an effect on the vegetation.

- “Lake Limbra”

There is a total animal exclusion on the top side of the road for ‘encouragement’ of revegetation on the first rise.

The lakebed is highly salinised with dead coobas, dying samphire and patches of salt on the surface. The lakebed watertable is 50,000 to 100,000EC at 1 to 1.5 metres. Most of the surrounding box trees are still in fairly good condition – with help from rain run-on from surrounding high ground. A new structure to retain water after a high flow should assist with salt leaching after tubewell installation – provided that floods are not regulated in the future.

- “Lake Littra”

Dead trees are visible from the road. It needs a flow greater than 50,000ml/day to flood and three or four times this to irrigate all the box trees. There is a marked difference in the health of trees receiving or denied rain run-on. The bed is, surprisingly, non-saline with water 20,000 to 30,000EC at about 1.5 metres. A new structure allows carp exclusion and post-flood water retention – up to flows of 100,000ml/day and more.

- Old E & WS piezometer cluster

These are bottomed in different aquifers with water pressure in the deepest one standing above the lower lying soil surface. The Committee noted recently dead gums on bank of dry creek behind – these missed out during the high river flows in 1998, and again in 2000. River peaks must be better managed to give the Lower Murray more ‘floods’.

- Green Variant Littra No.1

This area is thriving with a watertable of 60,000EC at 3 to 3.5 metre depth. With no flood since 1993 and only a few heavy rainstorms over the same period, watertables are currently at their lowest levels since readings began in 1989. Green Variant is a box tree that has cross bred with mallee.

- Sheepskin Creek

The Committee noted the salt seeps and odd pools in the bottom [which are the top of the watertable].

- Gum Flat

The gums died after the watertable rose in the early 1930's following commissioning of the locks. Soil salinity has increased since then and now the coobas are also dying.
- Gum Flat runout

More gums are dying here as the freshwater lens is exhausted.
- Chowilla stock-water pump

It pumped water from 40km of the river. It was installed during the years of the 'wool boom'.
- Abandoned irrigation canal to Lake Limbra

This is a relic of the wool boom. Irrigation was tried on most of the lakes at Chowilla but was defeated by salt after a couple of seasons.
- Site of tubewell pumping trial in 1992

The community is waiting for work to commence on the tubewells.
- Punkah Creek and the 1988 bank proposal

This initiative was seen as urgent by the engineers in 1988, but vetoed by the local community on account of damage to the environment.
- The Garden of Eden

This site is an elliptical patch with a shallow freshwater lens that is now being exhausted because of lack of a flood since 1993. Large gums on the left are dying. It has been the subject of a fairly intensive piezometric survey.
- Lake Limbra flood and carp control structure

It is fully functional at low flows of up to 50,000ml/day but is overtopped at flows greater than this.
- Trial planting of Green Variant box trees

A patch of seedlings was planted in 1992 and a patch of clones in 1994. Groundwater is 60,000 – 70,000EC at 3.5 to 4.5 metre depth under the whole area. It needs a river flow of 100,000ml/day to cross Coombool track.
- Natural Green Variant box trees

Aged green Variant box trees [one of which is approximately 300years old] are surviving better than the adjacent 'normal grey' box trees.
- Brandy Bottle Waterhole

Some water remained from the 2000 high river flows but it came too late to save some of the gums. For this South Australian section of floodplain, a minimum flow of 85,000ml/day for three weeks once every three years is needed.

16.3 KEY ISSUES

16.3.1 Too little water flow

The biggest impact on the river have been the locks as they regulate water flows. There was a rise in the watertable when the locks were built as the locks now make the water flow into lower creeks.

Jack Seekamp suggested strict applications of the caps on all streams in all states; buying back water licences; improved irrigation practices [particularly converting irrigation canals to pipes]; and reducing evaporation.

16.3.2 Pollutants

Pollutants in the river include dissolved pollutants; floating material; mud; turbidity; weed; carp and algae.

Dissolved pollutants can be reduced by reducing groundwater recharge; stopping further land clearing; reducing nutrients entering the river from storm water, sewage, houseboats, feedlots and stock drinking; chemicals from spraying cotton/rice and urban stormwater. Remedies suggested were salt interception schemes; changing farm practices using more deep rooted perennials in rotation and increasing tree and deep rooted perennial planting; and assisting local government with improved effluent disposal.

Mud in the river is a problem caused by not keeping stock away from the banks and by carp. Petroleum from two stroke motors and urban storm water are also a problem.

Living pollutants such as weeds and algae may be reduced by eradication, increasing flows and minimising nutrients from stormwater, sewage and feedlots running off. There is still uncertainty as to action to be taken to eradicate carp, though carp screens are utilised in channels going to lagoons and creeks.

16.3.3 Environment

The Committee witnessed the evidence of the damage to the natural environment of the Chowilla floodplain arising from low water flows. Jack Seekamp suggested South Australia needed a minimum of 85,000ml per day for three weeks every three years as an environmental flow.

16.3.4 Business Opportunities

Jack Seekamp suggested that sheep should never have been grazed at Chowilla. Salt harvesting and tourism were the only viable business enterprises possible.

17 NOORA DRAINAGE BASIN

17.1 PARTICIPANTS

Murray-Darling Division, Department of Water Resources

- Ross Stockdale

17.2 PROCEEDINGS

On the drive to Berri, the Committee inspected the evaporation basin at Noora. Here there is also 100 hectares of water controlled by weir to maintain a permanent water fowl bird habitat which has a very active water fowl population. The South Australian Field and Game Association have undertaken revegetation planting work around here in return for shooting rights during duck hunting season. Another business opportunity is the mining of white gypsum from the salty soil here. The gypsum is 95% pure and is used to mix in with soil to make it friable.

18 RIVER MURRAY CATCHMENT WATER MANAGEMENT BOARD

18.1 PARTICIPANTS

River Murray Catchment Management Board

- Jeff Parish, Presiding Member and CEO of Central Irrigation Trust
- Graham Broughton, General Manager

Local Government

- Margaret Evans, Mayor, Berri Barmera Council
- Michael Hurley, CEO, Berri Barmera Council
- Jan Cass, Mayor, Loxton Wakerie Council
- Trevor Burgemeister, CEO, Loxton Wakerie Council
- Rod Thomas, Mayor, Renmark Paringa Council
- Bob Waples, CEO, Renmark Paringa Council

Local Action Planning

- Bruce Tonkin, Chairman, Loxton to Bookpurnong LAP
- Julie Sippo, Project Officer, Loxton to Bookpurnong LAP
- Theresa ter Bogt, Chairman, Renmark to Border LAP
- Todd Goodman, Project Officer, Renmark to Border LAP

- John Gorman, Chairman, Riverland West LAP
- Peter Waanders, Project Officer, Riverland West LAP
- Daryl Wuttke, Chairman, Berri Barmera LAP
- Michelle Campbell, Project Officer, Berri Barmera LAP
- Keith Payne, Chairman, Murray-Mallee LAP

South Australian Government

- Ross Forster, Regional Manager – Riverland, SA Water Corporation
- Peter Forward, Manager – Salinity Control, SA Water Corporation
- Tony Meissner, Regional Manager, EPA Murraylands
- Neville Wurst, Chairperson, Murray Mallee Soil Conservation Board

Irrigation Trusts

- John Peterson, Chairperson, Central Irrigation Trust
- John Craker, Chairperson, Renmark Irrigation Trust
- Barry Harden, Chairperson, Golden Heights Irrigation Trust
- Tony Rae, Chairperson, Sunlands Irrigation Trust

Murray Darling Association

- Leon Broster, General Manager
- Les Hill, Chairman – Region 5

Mallee Water Resources Committee

- John Berger

18.2 PROCEEDINGS

Committee members mixed with invited guests for discussions on matters of interest over dinner. After dinner presentations were given by the project officers of Berri Barmera LAP, Riverland West LAP and Murray –Mallee LAP.

18.2.1 River Murray Catchment Water Management Board

The role of the River Murray Catchment Water Management Board [RMCWMB] is to manage the water resources of the Murray River catchment in South Australia. It works in partnership with the catchment communities and stakeholders to achieve its objective of a

sustainable balance between the economic, environmental and social needs of the catchment and its communities.

18.3 KEY ISSUES

18.3.1 Improved Irrigation Efficiency

A primary goal of the RMCWMB is to encourage improved irrigation efficiency to ensure the sustainable use of land and water resources.

Some of the initiatives are:

- to improve awareness of the benefits of improved irrigation practices;
- a RiverCare course, involving field days and irrigator testimonies;
- property management and business planning;
- one-to-one technical support to aid implementation of improved irrigation practices;
- financial incentives for improved irrigation via irrigation scheduling and the use of consultant services;
- installation of water meters on individual properties and bulk water meters at the district supply level;
- data collection and analysis for monitoring, regulation, policy review and continuous improvement;
- a catchment environment levy on both water allocation and metered use and/or drainage volumes; and
- Standards and Codes of Practice for irrigation development and management.

In the medium to longer term, initiatives are:

- setting conditions/standards for compliance upon water allocation licenses;
- user-pays water pricing;
- district level upgrading/renewal of water supply infrastructure;
- an irrigation drainage strategy for integrated farm and district level programs;
- licensing of drainage discharges or basins under the Environment Protection Act 1993;
- wide scale reuse and/or recycling of irrigation drainage water;
- identification of the need for and implementation of comprehensive drainage schemes in unserved irrigation areas;

- identification of the need for and implementation of groundwater mound depletion works; and
- identification of the need for and implementation of further salt interception schemes.

The RMCWMB is selling improved irrigation efficiency at both the property and regional level with positive impacts on both the environment and the irrigation industry, such as:

- improved crop yields and income per mega-litre of applied water;
- reduced fertiliser applications;
- availability of more water for expansion of the irrigation area, temporary or permanent trade of water and security of supply in times of drought;
- improved farm prosperity for irrigation communities;
- trade of excess water; and
- improvements to the environment [reduced salinity, reduced nutrient loads and reduced wetland and floodplain degradation].

18.3.2 Local Government

The RMCWMB allocates the water but local government has the planning controls. Therefore local government has significant role to play in the management of natural resources in the RMCWMB area. It is included in the 18 organisations with roles and responsibilities that operate at local, regional, state or basin level within the catchment. While there are many links between these organisations, there is also a lack of clarity and knowledge about the roles of other organisations and how they can best work together. At local level, the administrative areas of 11 local government authorities fall within the RMCWMB area.

Local government has a wide range of responsibilities, including those relating to the assessment of new developments and the management of recreation and open space, and land and water. There are ten Local Action Planning groups, either wholly or partly in the RMCWMB area and a further group in metropolitan Adelaide, which focuses on urban users of Murray River water. At local government level, there are 18 development plans, which relate to the RMCWMB area, although this will be reduced to 11 as newly formed councils merge their development plans. The current development plans do not incorporate much detail and they do not have a consistent approach.

18.3.3 Local Action Planning

In 1995, the Murray Darling Basin Commission instigated Local Action Planning [LAP] as a means of providing support to community initiatives in order to tackle a range of environmental issues at the local level. Currently there are eleven LAP groups operating in the South Australian part of the Murray Darling Basin.

Typically an LAP committee is formed to address, in collaboration with other stakeholders, the specific environmental issues in each area. The Committees are made up of a cross section of the local community and their aim is to develop and implement a local action plan.

Presentations were made by the Project Officers of the Berri-Barmera LAP and the Riverland West LAP. They outlined their LAP priorities and key issues as:

- irrigation and drainage [for example, 132 tonnes of salt a day goes into the river at Berri];
- wetlands health;
- improving soils for the ecological sustainability of horticulture;
- bio-diversity both in both wetlands and drylands;
- improving water quality, reducing salinity and effluent;
- improving recreation facilities; and
- coordination of the community [the point was made local community ownership would be reluctant to handover their work to a bureaucracy].

The Chairman of the Murray-Mallee LAP [a non-river LAP] had a differing set of issues:

- farm profitability;
- soil erosion;
- bio-diversity; and
- water use.

19 LOCK 4

19.1 PARTICIPANTS

River Murray Water Catchment Management Board

- Jeff Parish, Presiding Member

19.2 PROCEEDINGS

Jeff Parish briefed the Committee on groundwater sources, ground clearing, the locks, salinity, pipeline scheme and protection of the river valley corridor whilst at Lock 4. Lock 4 is on the Murray River being between Berri and Loxton.

- The geological background is that the area was once a sea and the natural groundwater movement that originates from the Grampians in Western Victoria flushes out the salt. Now with a regulated river only 20% of water gets to the sea.
- The biggest problem has been the clearing of the Mallee as a lot more groundwater percolates to the surface and is pushed into the river.

- The locks are for navigation of the river and to maintain irrigation levels. This has come at a cost and created new tensions as the river is now at times just a series of lakes and backwaters. The waterlogging has killed trees.
- The salt load created by nature is about 600 tonnes per day at Banrock – irrigation has doubled the salt loads. However, salinity would not be as big a problem if there were sufficient water flows in the river.
- The RMWCMB pipeline scheme took out land from production [of unproductive lines]. This was challenged through litigation by so called “lifestylers” [not so much by the farmers].
- The biggest issue in South Australia was how best to protect the river valley corridor. Jeff Parish put his personal views that the caps had to be appreciated. He pushed facing a 1% reduction in water take out/usage over the next 10 years [this could be gained through efficiency savings] and tuned into an increased flow.

20 PROPERTIES AT LOXTON

20.1 PARTICIPANTS

RMWCMB

- Jeff Parish, Presiding Manager

Central Irrigation Trust

- Reg Bristow, Operations Manager

Property Owners

- Peter and Jackie Schultz
- Peter Kernich

20.2 PROCEEDINGS

Peter and Jackie Schultz briefed the Committee on the cultural change in their farm practices. They gave an overview on the use of technology: maps showing farm soil types; planting; root depths; irrigation lines; and moisture probes that indicate where, when and how much water to use. The Schultz's can thus save on water usage that in turn minimises the output of drainage water. They also get a better grape quality [at \$1,300 per tonne] so they can grow fewer grapes compared to poor quality grapes [at \$500 per tonne] and get a greater income. The cultural change in more efficient farming practices is driven by the economies of agriculture and the market.

Reg Bristow advised that through the Central Irrigation Trust, the farmers can dial up water orders for irrigation. The new distribution system allows flexibility to order delivery of water or hold off an order if there is rain in the meantime. It is the best practice irrigation system in Australia as it uses the best infrastructure.

The infrastructure required for best water management practice are: pipes; good on farm sprinkler systems; effective soil moisture measurements on farm; and the effective measurement of water going onto the farm.

Peter Kernich and Reg Bristow demonstrated the electronic metering system at the Kernic property. The meter shows flow rates as well as consumption.

Proceeding on to Banrock, Jeff Parish pointed out the “floating flag” piezometers as a part of the general public awareness campaign demonstrating watertable levels within the Loxton district.

Jeff Parish gave his views on the interconnectedness of all the bodies and instruments. LAPs are not backed by legislation but have community goodwill; real power is with the South Australian Departments for Water Resources, Planning and Heritage and Primary Industry [which control soil boards]; planning powers are with local government; water and irrigation bodies which allocate the water, prepare land and water management and drainage plans. There is too much bureaucracy across the three agencies which, in time, will go towards total catchment plans [under an integrated agency]. He would prefer to see a single minister for natural resources.

Jeff Parish also provided the background on obtaining the funding for the irrigation piping infrastructure work. Piping commenced in the 1970s with funding from the South Australian government. In 1983, the Growers Council persistently approached and lobbied the Commonwealth Government for funding. They were successful in getting funding at 40% commonwealth, 40% state and 20% from the growers. The opportunity for commonwealth funding was argued on increased productivity.

21 BANROCK STATION

21.1 PARTICIPANTS

Board Walk Supervision

- Wayne Piltz

21.2 PROCEEDINGS

Wayne Piltz gave the Committee an overview of various aspects of operations at Banrock Station and their outcomes. Banrock Station is the flagship development of BRL Hardy Wines.

It lies at the junction of Banrock Creek and the Murray River between Loxton and Waikerie. The 1750 hectare property had been intensively farmed for approximately 100 years. BRL Hardy Limited acquired the property in 1994, and has developed a 240 hectare vineyard planted to premium grape varieties [not quantity]. The property also has 900 hectares of flood plains and wetlands, 600 hectares of Mallee Woodland and 12.5km of river frontage.

The property was suffering the impacts from prolonged farming and grazing in what was a very fragile environment. Wetland Care Australia, a conservation group had carried out some wetland restoration work with the previous owners to restore the Banrock Lagoon.

This scenario was the catalyst for BRL Hardy to embark on a project to continue the wetland work and return the property to its natural state by de-stocking and re-vegetating and using part proceeds from the sale of Banrock Station wines to fund more wetland restoration projects around Australia.

The vineyards are managed using state of the art practices to maximise grape quality and minimise off-site impacts on the surrounding Mallee woodland and Murray River wetlands. Irrigation of the vineyard is by a drip system and only natural animal or organic based fertilisers are used on the property. BRL Hardy Limited has implemented an ongoing management strategy to restore the remainder of the property, including the mallee woodland, the Banrock Lagoon and floodplains. To do this it has formed partnerships with government agencies, Wetland Care Australia, the Bookmark Biosphere Trust, schools and other interest groups.

The rehabilitation of the environment and ongoing work has seen birdlife, frogs and snakes return. Banrock Station wetlands is a tourist attraction. Users of the boardwalk are spaced to control the numbers who visit. They want to market the destination to the estimated 80 million birdwatchers worldwide. There are no plans for accommodation but there is a conference facility.

21.3 WETLANDS CARE AUSTRALIA

Wetlands Care Australia is a community-based, not-for-profit organisation, headed by 16 voluntary board members with expertise in practical wetland management, wetland policy, freshwater and marine research, law, finance, administration, public relations and community education. It enlists the aid of government agencies, landholders, and corporate and private sponsors to help meet objectives.

Its aims are to establish partnerships between people whose common objectives will:

- restore, create, conserve and manage habitat to increase the population of native waterbirds and other wetland species in Australia;
- promote and conduct scientific research, education and publication concerning wetland related issues; and
- provide encouragement, inspiration and awareness to our supporters.

22 SALT INTERCEPTION SCHEME – WOOLPUNDA REACH

22.1 PARTICIPANTS

South Australia Water Corporation

- Peter Foreward, Manager – Salinity Control

22.2 PROCEEDINGS

Peter Forward gave the Committee an overview of the problem and the extent of the engineering solutions.

The point was regularly made that the Murray River is South Australia's life blood, and the State's development depends on a guaranteed supply of good quality water from the Murray. On average, about half of the State's irrigation, stock, domestic and industrial water supply comes from the river. This increases during dry periods. The Murray River not only supplies Adelaide with water but many pipelines carry water to the "Iron Triangle" as far north as Woomera and as far as Keith in the south-east.

Salinity upstream of Echuca is minimal but the quality of the Murray River deteriorates as saline waters flow into the river downstream. A substantial increase in salinity occurs in South Australia with by far the most concentrated point of increase being in the WOOLPUNDA Reach. Woolpunda Reach is a 30 kilometre stretch of the river below Lock 3 [below Kingston] where the natural inflow of saline groundwater is about 250 tonnes of salt daily. This represents approximately 8-10% of the total salt load in the Murray River.

The groundwater with a salt content 20 000mg per litre (two-thirds of the salt content of sea water) seeps into the river in this Reach because the river cuts through an area of high groundwater, and in effect, drains it.

The Woolpunda Salt Interception Scheme is designed to prevent saline groundwater reaching the river. Groundwater inflow is intercepted as it moves towards the river by 49 bores set in 2 lines, each side of the river and 600m back from the valley cliffs. The groundwater flows to these bores rather than the river. The water is then pumped away from the river.

As an engineering solution the scheme is very big. Each 250 mm diameter bore is about 110m deep with a fibreglass slotted casing. The standing water level in the bores is generally 40m below the surface. A stainless steel electric submersible pump is installed at a depth of 70m and pumps water at the rate of 4 litres per second. The pumps operate non-stop, delivering 15 million litres per day to the disposal basin.

There is also a total of about 85km of below ground pipeline. The saline water is pumped out of the bores and into the interception mains via 100mm diameter UPVC spur mains. The interception mains increase from 150 to 375 mm in diameter as they carry the water from more bores. The saline water is pumped from the interception manifold pipe into the disposal pipeline that ranges from 450 to 550 mm in diameter and carries the saline water to the disposal basin at Stockyard Plain. The pipes are laid at a minimum of 750 mm below ground. A mild steel concrete-lined pipeline beneath the river transfers water from the north side to the disposal system on the south.

The saline water is discharged from the disposal pipeline to a natural basin at Stockyard Plains about 15km south-west of Waikerie, and is disposed of by a combination of evaporation and infiltration.

Intense geological investigations were made on 26 possible locations before the site of the disposal basin was finally selected. The site is within a natural depression, is well defined and only minor embankments and interconnecting channels were required to form the whole basin. The underlying soils are relatively permeable so that planned leakage would constitute a large proportion of the water disposal. The disposal basin site covers approximately 2.5 square kilometres. Land around the basin is degraded, and is not suitable for cropping. There is little natural vegetation and hence the site will have minimal environmental impact. The basin attracts and supports a healthy bird population, and there may be other recreational uses

to which the basin could be put. Salt harvesting opportunities have not been utilised to any great extent.

23 MALLEE SUSTAINABLE FARMING PROJECT

23.1 PARTICIPANTS

Mallee Sustainable Farming project

- Allan Buckley, Vice President [and Property Owner]

River Murray Catchment Water Management Board

- Ian Kroehm, Board Member

Department of Primary Industries and Resources

- Chris McDonough, Rural Solutions,

23.2 PROCEEDINGS

The Committee proceeded to Allan Buckley's property where Chris McDonough explained to the Committee aspects of the Mallee Sustainable Farming project. It is being conducted across NSW, Victoria and South Australia to improve farming systems, so that farm practices are matched to land capability. This reduces both soil erosion and ground water recharge.

Potential future problems associated with ground water recharge include rising groundwater levels, increasing groundwater salinity and increased influx of saline water into the Murray River. It is therefore important that land use strategies are adopted in the Mallee that maximise water use and minimise groundwater recharge on all land types. Areas with bare soil or poor plant cover should be targeted to overcome rainfall recharge to the groundwater.

Matching land use to land type or farming to land capability means managing each land type within its inherent limitations to ensure that the condition of land is at least maintained, whilst retaining its economic productive potential. Where land is used beyond its capability, it will ultimately degrade and lose its productive capacity.

In some situations it is possible to alter the land capability class by management. For example, in many situations applying clay to non-wetting soils can improve the land capability. Conversely, poor management or neglect of fragile soils causes reductions in productivity and increased susceptibility to erosion, thus degrading the land capability.

Alternative management practices can ensure land is used within its capability. For example, the use of chemical weed control combined with judicious grazing to replace cultivation prior to autumn can significantly reduce the potential for wind erosion over the summer period.

The main benefits of matching land use to land type include:

- Optimised economic utilisation of each land class/type, giving the potential for better whole-farm profitability and sustainability in the longer term;

- Minimise risks of erosion and land degradation on all land classes/types and
- Improved management of land resources [including water, vegetation etc.] on a district and regional scale.

The core South Australia site is at Waikerie where there are 45 trial paddocks, including some on Allan Buckley's property, to monitor best practice. Allan Buckley practices the concept of no tool farming and never leaves any paddock fallow. He grows a crop all the time without pulling out or turning over stubble. This has resulted in less soil erosion and ground moisture is soaked up and water is not lost into groundwater recharge. He has also cropped to soil type and has found production on sandy soil has improved but decreased in the heavier soils.

The bottom line is that improved soils improve farm profitability and profitability goes hand in hand with sustainability.

This key messages were that:

- Farmers are pro-active; and
- better farming practices reduce groundwater recharge.

24 RAMCO LAGOON

24.1 PARTICIPANTS

South Australia Water Corporation

- Peter Forward, Manager – Salinity Control

24.2 PROCEEDINGS

Peter Forward briefed the Committee on the Waikerie Salt Interception Scheme. This scheme covers a 20 kilometre stretch of the Murray River around Waikerie, with Ramco Lagoon at the end of the scheme. In this area, about 105 tonnes of salt a day enters the river with Ramco Lagoon having an EC level of 45,000 [which is basically equivalent to sea water].

The engineering of the Waikerie Interception Scheme consists of 17 interception bores, 90-125 metres deep, and 27 kilometres of pipeline to convey the intercepted saline groundwater to the Stockyard Plain disposal basin. Electricity driven stainless steel pumps are installed 50 metres below river level, and draw saline groundwater from both sides of the Murray, preventing it reaching the river. The total pumping capacity for the scheme is 21 megalitres per day.

The trees around the Ramco Lagoon are stressed by the salt and one of the aims of the scheme is to reduce the salinity of the lagoon and to revegetate the floodplain.

25 SELECT COMMITTEE ON THE MURRAY RIVER

25.1 PARTICIPANTS

South Australian House of Assembly

- The Hon David Wotton, MP, Chairman, Select Committee on the Murray River
- The Hon Mark Brindal, MP, Minister for Water Resources, Minister for Employment and Training and Minister for Youth
- Mr John Hill, MP
- Ms Karlene Maywald, MP

25.2 PROCEEDINGS

The Committee held informal discussions with members of the South Australian House of Assembly Select Committee on the Murray River at Parliament House, Adelaide.

The Select Committee on Murray River has as its Terms of Reference

To consider and report on the following matters of importance in relation to the Murray River with particular reference to:

- (a) the state of the environment of the Murray River particularly as it affects South Australia and including:
 - (i) environmental and economic flow management; and
 - (ii) riparian and flood plain management;
- (b) economic values and sustainability;
- (c) river regulation and state and federal controls; and
- (d) any other relevant matters.

The Committee, which was appointed in November 1999, published an interim report and was looking to table its report in June or July 2001.

Key issues were river flows and putting a price on water. Mark Brindal advised that South Australia takes out water to the value of \$650m every year but it is estimated \$20 billion will be needed over 30 years to fix the various problems. John Hill argued that South Australia needs a greater flow. Currently on 20% of the river flow gets to the sea whilst experts say it needs 40% flow for it to be sustainable. Hence put a cap on the water taken out and let the market determine the best uses of the remaining water.

26 LOWER MURRAY IRRIGATORS ADVISORY BOARD – MURRAY BRIDGE

26.1 PARTICIPANTS

Lower Murray Irrigators Advisory Board

- Wayne Thorley, Chairman
- Terry Lee, General Manager,
- Hans van Dyk, Financial Manager

26.2 PROCEEDINGS

Hans van Dyk and Wayne Thorley gave the Committee a historical outline of irrigation on the Lower Murray, current issues and farming practices.

The original irrigation scheme on the Murray River was established in the 1870s when 23 swamps were reclaimed and turned into irrigated lands with about 140 irrigators on about 5,000 hectares. The current holdings have 16-80 irrigated hectares, carrying about 3 – 5 cows per hectare, and producing around 6,500 litres of milk per megalitre of water.

As the irrigated lands are below river level, irrigation is by flooding. Thus there is no metering of water being drawn out and farmers have no water allocation. The barrages at Goolwa artificially raise the river level by 1 ½ metres to help the efficiencies of the farms. Farmers are looking to increase future productivity through genetics and better feeding regimes.

In 1992, the Lower Murray Irrigation Action Group was formed, consisting of representatives of the Department of Primary Industries and Resources, South Australia Water, EPA, RMWCMB, irrigators and dairy farmers. Its vision is to have an environmentally and economically sustainable dairy industry in the Lower Murray. Current issues are:

- water use;
- irrigation drainage;
- rehabilitation of water deliver infrastructure;
- best farm management practice; and
- corporate restructuring.

A relevant problem is the pumping of water off the land back into the river as it contains high levels of E coli. They are looking to reduce the quantity of water being drawn out to reduce the E coli and nutrients going back into the river.

27 WATER SUPPLY OFF-TAKE AND FILTRATION PLANT – TAILEM BEND

27.1 PARTICIPANTS

Coorong District Council

- Bill Patterson, CEO

United Utilities

- Darren Garrett, Process Controller

27.2 PROCEEDINGS

Bill Paterson explained that the water supply off-take and filtration plant at Tailem Bend was built by Riverland Water and was being bought back over 25 years by SA Water who have contracted the plant to be run by United Utilities.

The Committee examined the sludge lagoons that hold the river organics taken out of the water by filtration. Some 600 – 700 tonnes are taken out annually which is taken to a tree nursery in Meningie. There is some value in it as a fertiliser on alkaline soils but not enough to be commercially marketed.

Darren Garrett demonstrated the contrast between the water going in and the water coming out of the filtration process. Salt removal is not in the contract.

28 COORONG DISTRICT COUNCIL FISH FARM PROJECT

28.1 PARTICIPANTS

Coorong District Council

- Bill Patterson, CEO
- Clarry Fisher, Manager, Environmental Services

28.2 PROCEEDINGS

Clarry Fisher briefed the Committee and led an inspection of the Coorong District Council Fish Farm Project at Cookes Plain. The Department of Primary Industries and Resources sponsor the project.

There is a problem of dryland salinity with groundwater being only 1.5 meters below the surface of this low lying area.

The aim of the project is to use the groundwater to grow finfish and produce betacarotene in tanks for sale on the commercial market whilst lowering the water table level and reclaiming salt effected soil.

A bore was sunk to pump out salt water into a settling tank to oxide out the iron before being pumped into pools and tanks where Black Bream, Snapper and King George Whiting are grown. The fish tanks are inside tunnels for temperature control and prevent birds taking the fish. Brine shrimps are also grown as feed for the fish.

The wastewater is pumped into evaporation ponds where a salt product is harvested and used for preserving hides and for stock feeds. The brine that is left is used as a road stabiliser and as a soil conditioner.

This demonstrates potential business opportunities and in three years the water table has been reduced by 60cm.

29 COORONG LOCAL ACTION PLAN

29.1 PARTICIPANTS

Coorong District Council

- Bill Patterson, CEO

Coorong LAP

- Graham Gates, Project Officer

South Eastern Water Conservation and Drainage Board [SEWCDB]

- Julian Desmazures, Presiding Member
- Evan Pettingill, Executive Officer

29.2 PROCEEDINGS

The Committee was briefed on the Coorong Local Action Plan, Meningie.

Coorong District Council recognises that dryland salinity is a major threat to the well being of the area. The current dryland salinity problem is causing significant cost to landholders and the wider community. More than 57,000 hectares of land are already salinised and a further 70,000 hectares [about 14% of the LAP area] are at risk within 20 years.

A 1999 report showed that the Nett Present Value [8%, 20 years] of costs if nothing is done to address the problem in the Coorong District is over \$77m.

The development of a long-term plan to coordinate community efforts over the whole area is vital if threats to agriculture and the natural environment are to be prevented. In this way, Coorong District Council has formally recognised the LAP group as a formal committee of the council. This provides the whole community with an opportunity to be involved in the preparation of the local action plan. The plan has identified areas within the region requiring the most urgent work, and the actions that will have the most impact, thus enabling resources to be used more effectively. The plan has also identified the benefits of taking action, compared to the costs associated with doing nothing, and has established a fair way of sharing the cost of on-ground works to assist all stakeholders.

Throughout the Coorong District study area, there has been widespread clearing of deep-rooted perennial native vegetation and it has been replaced with shallow-rooted crop and pasture species. Investigations into recharge rates under different land uses at Coomandook have shown more than 100-fold increase in the rate of recharge under some annual cropping systems compared with that under native vegetation.

The greatest contributor of recharge to the watertable is land under annual pasture (improved and unimproved). This contributes approximately 76% of the recharge across the entire district. By comparison, the perennial land uses have generally very low recharge rates and make very little contribution to the groundwater.

A rise in the water table has been measured over virtually all of the council area at a rate that averages about 5 to 10cm per year in years of average rainfall. A number of studies demonstrate that the reintroduction of perennials into farming systems offers the best opportunity for increasing water use and controlling recharge. The deep roots of perennial plants have the potential to use water stored deep in the soil profile. The strategic establishment of perennials will also reduce wind erosion, improve organic matter content, and may reduce problems associated with water repellence. This will ultimately lead to increased and more sustainable agricultural production for farmers.

Implementation of the Coorong LAP recommendations involve:

1. An increased understanding by landholders of the importance of each of the options in tackling the land degradation issues in the area.
2. Committed efforts by landholders to adopt techniques that will achieve the objectives outlined in their plan.
3. Financial incentives to overcome any short term economic costs of lost production whilst establishing some of the options, and to assist with the high costs establishment associated with some of the options.
4. Other incentives such as the provision of labour or specialised machinery to overcome other barriers to implementation.
5. Better utilisation of the existing experience and local knowledge of designated specialist farms, government staff and agribusiness advisers in the establishment and management of the systems outlined above.
6. Readily available on-ground assistance and expert advice on aspects of establishment and management of the various systems across the range of local conditions.
7. Better coordination and input to existing land management groups to ensure that research and extension programs and demonstrations are set up with maximum levels of community input and involvement.
8. Ongoing development of expertise in each of the options, and better recording and publication of information for the local area.
9. Ongoing research to develop systems and techniques that are suited to local soils and rainfall.

30 STROTHER FISH PTY LTD

30.1 PARTICIPANTS

Strother Fish Pty Ltd

- Roger Strother
- Ken Strother

South Eastern Water Catchment Drainage Board

- Evan Pettingill, Executive Officer

30.2 PROCEEDINGS

The Committee inspected, and was briefed on, the operations of Strother Fish Pty Ltd at Meningie West. Their goal is to grow salt water finfish in a fully enclosed recirculating system using saline ground water.

The Stother brothers were beef farmers who have leased out their water allocation and started fish farm operations about 12 months ago. Their land is degraded by saline ground water and they saw an aquaculture business as one way to solve the problem. Turning a liability into an asset by using saline water to produce marine species, such as fish and crustaceans.

The salt water is pumped from a bore into storage tanks alongside the shed. The water from the storage tanks is used in the shed to grow fish in tanks. The waste water is then collected outside in fully lined ponds, where it is used to grow other marine species, eg: Brine Shrimp, and the water is then evaporated in shallow ponds for salt harvesting.

They have 15,000 Black Bream and 10,000 Mulloway that are faster growers. They buy the fish as fingerlings and will grow them up for sale to the markets of Adelaide, Melbourne and Sydney. The fish are fed prepared pellets. The cost of the investment is \$500,000 and they are looking at a 10 year return. There are also export opportunities if the quantities of fish were large enough. The operation is also making an impact on the farm and if others farmers changed their practices there would be big impact on the environment.

31 UPPER SOUTH EAST DRYLAND SALINITY AND FLOOD MANAGEMENT PLAN

31.1 PARTICIPANTS

South Eastern Water Catchment Drainage Board

- Evan Pettingill, Executive Officer

31.2 PROCEEDINGS

Evan Pettingill explained that there had always been a surface water problem and that the drainage board had been in existence for 100 years. He went on to brief the Committee on the Upper South East Dryland Salinity and Flood Management Plan.

The management plan for the project involves the integration of key elements of surface water flood mitigation, agricultural production and on-farm measures, wetland management, coordinated drainage schemes and revegetation. It is felt all elements must be implemented for the solution to be effective.

This integrated strategy aims to ensure that rising groundwater and consequent dryland salinity and flooding problems are overcome while, at the same time, taking account of environmental, economic and social concerns.

Money for the drainage component of the integrated catchment management program, which has significant economic and ecological consequences for the South East Community and the state, will come from three sources: 37.5% from the South Australian Government; 37.5% from the commonwealth government; and 25% from the upper south-east community. The project is a partnership between all three. The project is costed at \$24m.

The Committee inspected Morella Basin at Salt Creek. The engineering works here are channels to run water off which in turn means the wetlands can be flushed. There are no natural rivers or creeks to get the water out. The engineering solution works here as there is somewhere to send the water – the adjacent Coorong.

The Committee also inspected a groundwater discharge channel in the southern scheme. The plan includes the construction of 450 kilometres of drains in the region over a 6 year period. Farmers pay a levy for the works and there is compulsory acquisition of the land corridor for channel construction without compensation to the landholder. Landholders do not seem to object as it is a solution to a greater problem.

32 MURRAY DARLING ASSOCIATION

32.1 PARTICIPANTS

Murray-Darling Association

- Leon Broster, General Manager

32.2 PROCEEDINGS

At Parliament House, Adelaide Leon Broster briefed the Committee on the Murray Darling Association [MDA] and its current work on salinity.

The membership of the MDA consists of local government, corporate groups and individual members. Funding comes from local government subscriptions, government contributions, members and fees for services [such as seminar attendance and project management].

The MDA has roles in:

- Advocacy on behalf of members on natural resource issues in, or impacting on, the Murray Darling Basin;
- Representation by providing members on steering committees, working parties and/or advisory groups;
- Information by the provision of access to information and transfer of information to and from the Basin community; and
- Awareness raising by providing a forum for discussion, facilitating visits to the basin and conducting seminars.

The MDA manages a range of projects, including:

- Waterwise – an urban based water conservation project;

- Houseboat Management – the SA project is finished. The NSW based project is in its early stages;
- Users Guide – a friendly, easy to read guide for visitors to the Murray River, the SA publication is now being reprinted with funding being sought for a NSW/Victorian publication;
- Murray Valley Trail – developing the concept for a multi-use recreational trail along the length of the Murray River to link existing and future trails throughout the whole area; and
- National Carp Task Force – managed by the MDA with the aim of raising both community and political commitment to doing something about carp.

In relation to salinity, the MDA is currently undertaking four main activities.

32.2.1 Scoping Study

The MDA is conducting a scoping study for which the terms of reference are to:

1. determine the current extent to which Local Government [LG] is involved in Integrated Catchment Management [ICM] in the Murray Darling Basin [MDB].
2. determine the needs of LG to be more effectively involved in ICM.
3. determine the key needs of Catchment Management Organisations [CMO] across the Basin from LG to help implement ICM.
4. determine the extent to which LG in the Basin is currently meeting the needs of CMO's.
5. summarise current state government contexts in which LG operates in the Basin states, including in state planning and natural resources management.
6. identify key drivers, key impediments, and opportunities to improving the strategic involvement of LG in natural resource management.
7. outline options for partnership programs and/or processes to strategically engage LG in ICM (including natural resource management [NRM]) and build on their capacity to participate. Options should be aimed at long term outcomes achieved through programs/processes that evolve with time, focussing on actions needed over the next 1-3 years, and help ensure alignment between the various partners.

It is noted that there are similarities with this Committee's terms of reference. The project is being implemented in a way to build relationships between LG and other key partners in ICM and its report should be ready by the end of June 2001.

Leon Broster gave a brief preliminary view on the findings to date:

- LG is not generally restrained by legislation from being involved in ICM or NRM;

- LG practice in ICM and NRM is very varied with a clear relationship between the financial affluence of a council and their level of involvement;
- About 70% of LG expenditure is committed to undertaking statutory obligations which left little funds for discretionary spending on salinity
- LG is (generally) keen to be more involved in ICM but wants a say in establishing their roles and responsibilities;
- LG (strongly) believes that their status as a democratically elected sphere of government together with rights as a result of this must be acknowledged and respected;
- LG has a major difficulty in any suggestion of integrating the roles of LG with CMO but has no difficulty in developing strong partnerships with CMO's either formal or informal;
- LG is keen to establish through fair and open dialogue with other stakeholders the roles and responsibilities of LG in ICM and NRM; and
- If LG is not adequately resourced to participate in ICM and NRM, LG will not be a willing player.

32.2.2 Salinity Summit

The MDA will be conducting the National Local Government Salinity Summit at Moama from 17 to 19 July 2001. The summit is endorsed by the Australian Local Government Association. The program will include:

- relationships between LG and catchment organisations;
- infrastructure – policy – planning including case studies and technical papers;
- plenary sessions looking at future options; and
- the role of LG in managing salinity at a local or regional level.

32.2.3 Risk Assessment Reports Trial

The MDA have engaged a firm of consultants to provide, at a discounted fee for service, a report on the likely risk to any particular council in relation to salinity. This service is currently being trialed in the Buloke Shire in Victoria and will be further tested in Wakool Shire in NSW. Following an assessment of the process this service will then hopefully be available to any council that seeks to participate.

32.2.4 Local Government Policy Reform

The NHT project was successful in South Australia to provide advice to LG in relation to policy reforms what may become necessary to address increased salinity in their areas. This project was submitted in all four Basin states but unfortunately was only successful in SA. Work will commence on this project when the scoping study is concluded.

Mr Broster advised that the MDA is committed to ensuring LG is equipped to properly participate in the decision making and implementation of actions within the Basin to combat salinity, and believes LG in partnership with CMOs could do a better job of implementing the regional actions expected within the National Action Plan. He also believes LG has a role in diminishing rivalry between the states.

33 SALINITY MANAGEMENT IN SOUTH AUSTRALIA

33.1 PARTICIPANTS

Department of Water Resources

- Paul Harvey, Manager, Murray-Darling Policies
- Judy Goode, Senior Policy Adviser, Salinity Management, Murray-Darling Division

33.1.1 Proceedings

At Parliament House, Adelaide, the Committee was briefed on salinity management in South Australia.

The goals of the South Australian government in salinity management are to protect:

- the quality of Murray River water and keep salinity below the guideline level of 800EC for drinking water at Morgan for 95% of the time;
- land resources from salinisation and stop the area of land currently affected by dryland salinity from increasing beyond the current area of 400,000 hectares; and
- the natural environment and bio-diversity resources by keeping salinity impacts to current levels and where possible to reduce them.

33.1.2 Draft Murray River Salinity Strategy

A draft Murray River Salinity Strategy was released for public consultation in August 2000. Its goals are:

33.1.2.1 Salinity arising from irrigation will not impact on the River Valley

The key proposals are to make all irrigators accountable for the salinity impacts arising from irrigation practices; new irrigation development will not be allowed unless it can be shown to have a positive or neutral effect on salinity; and all irrigators to achieve improved efficiencies.

33.1.2.2 The health of the floodplain and wetlands will be protected and enhanced

The key proposals under this goal are the management of enhanced river flows to improve environmental outcomes; flows managed to enhance salt removal; and floodplain irrigation drainage basins which have an adverse impact on river salinity will be decommissioned.

33.1.2.3 Management of Regional Groundwater Discharge

The key proposals are accountability by land managers for the impacts of future land management practices on salinity in the Murray River Valley; minimise recharge by improved farm practices; groundwater interception schemes where cost effective; revegetation in the Murray-Mallee; and research into the use of saline water.

33.1.2.4 Salinity Management in partnership with an informed and involved community

The key proposals are recognition of community groups in salinity management; salinity management and action plans to be delivered through an accountable partnership with the community; and assistance to communities to develop salinity management plans through technical support and skills.

33.1.2.5 Actions based on scientific knowledge

The key proposal is that innovation and adaptation will be a major focus of research into long term salinity management strategies.

33.1.3 Draft Dryland Salinity Strategy

In October 2000 a draft Dryland Salinity Strategy was released for public consultation. Its goals are:

33.1.3.1 On-ground works

On ground works include:

- reducing recharge by – native revegetation of cleared lands; farm forestry which is a commercial opportunity for farmers; and perennial pasture.
- managing discharge sites – including mapping.
- infrastructure – engineering options to complement recharge reduction with surface and groundwater drains.

33.1.3.2 Developing Partnerships

The government is seeking the desired outcomes of:

- communities having the skills and confidence to take on the responsibility;
- cost sharing to underpin partnerships and boost public and private investments; and
- better understanding among the broader community of the salinity problem and its impacts.

33.1.3.3 Improving knowledge

The desired outcomes of this goal are:

- research and development for better and more affordable salinity management; and

- monitoring data to provide feedback and highlight improvements.

33.1.3.4 Implementation

The desired outcomes are:

- coordinated planning to identify agreed priorities which are achievable;
- the strategy is effectively implemented by all partners; and
- regulatory options are identified.

Following the public consultation process the draft strategies were revised and are currently before Cabinet. The government wants to include LG as a partner and has committed \$100m over the next seven years to LG to deal with salinity. Ms Goode also said market based mechanism will also drive change. The responsibilities are sheeted back to individual farmers as economics will lead to a reverse in some farm practices, for instance, some land will be removed from irrigation as it should never have been under irrigation in the first place.

APPENDIX I – ITINERARIES

DENILIQVIN AND WAGGA WAGGA, 6 – 7 NOVEMBER 2000
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Day 1, Monday 6 November 2000

10.00am Murray Region Office of the Department of Land Water and Conservation, Deniliquin.

Briefings by:

Saji Joseph, DLWC, on an outline of the Murray Region;

Carl Mathers, Murray Irrigation Limited, outlining the Murray irrigation districts; and

Geoff McLeod, Manager Environment, Murray Irrigation Limited, on the Murray Land and Water Management Plan.

10.45am Proceed on inspections of:

11.00am Oddy's Drain, a part of the surface drainage scheme

11.30am David Liphuyzen's irrigation farm "Lochinvar" in the Denimein Irrigation Districts

1.30pm Wakool Tullakooll Sub Surface Drainage Scheme

3.00pm Properties in Green Gully area

4.30pm Return to Deniliquin

Day 2, Tuesday 7 November 2000

9.00am Proceed on inspections of properties in the Kyeamba Valley

1.15pm Wagga Wagga Civic Centre, welcome by Mayor Kevin Wales. Briefings by Bryan Short, Manager Design Services, Gary Wells, Elizabeth Madden, Urban Salinity Facilitator of Wagga Wagga City Council.

2.15pm Urban Salinity tour of Wagga Wagga

3.30pm DLWC, Centre for Natural Resources. Briefing by Geoff Beale, Research Scientist and Peter Banker of the Riverina Field Studies Centre.

5.00pm Return to Sydney

HUNTER REGION, 21 – 22 FEBRUARY 2001

Day 1, Wednesday 21 February 2001

- 12.00pm Bengalla Mine, Muswellbrook for round table discussion with:
- Cathy Cole, Regional Director, DLWC - Salinity in the Hunter and programs to manage it, including the Hunter Salinity Audit
- Jill Pattison, Acting Director Regulatory Innovation, EPA and Mitchell Bennett, Head Regional Operations Unit – Hunter, EPA - Hunter River Salinity Trading Scheme [with DLWC]
- Muswellbrook City Council, Mayor Councillor John Colvin and Amanda Payton, Environmental Officer – Trading Scheme, community consultation and development of commercial forestry on disused mine sites and irrigating with saline mine water
- Dean Chapman, Catchment Manager Water and Harold Sternbeck, Chairman, Hunter Catchment Management Trust salinity targets and national strategy
- James Bailey, Bengalla Mine
- 2:00pm Examination of mine water discharge site at Bengalla Mine. A presentation by the mining company on their participation in the salinity trading scheme and an inspection of the infrastructure in place to monitor and release discharges.
- Examination of a dryland salinity problem site at Antienne Creek
- 5:00pm Visit to Bayswater Power Station [Macquarie Generation] for an overview of salinity in the valley and brief inspection.
- John Neely, Manager Bayswater, Peter Sewell, Production Manager

Day 2, Thursday 22 February 2001

- 9am Inspection of desalination plant at Peppertrees Vineyard [Pokolbin]
- Chris Cameron, Managing Director and Vineyard Manager, Peppertrees
- 10.30am Inspection of derelict mine Aberdare East. Works to control saline/acid leachate from the old mine workings have been installed.
- Greg Summerhayes, Principal Environment Officer, Dept of Mineral Resources
- Michael Alexander, Environmental Planning Officer, Cessnock City Council
- 12.00 Leave Cessnock for Sydney

LOWER MURRAY REGION, 1 – 4 MAY 2001
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Day 1, Tuesday 1 May 2001

- 11.00am Arrive Renmark and proceed on inspections of:
- Disher's Creek Basin
 - Chowilla Wetlands
 - Noora Drainage Basin
- 5.00pm Arrive Berri
- 6.30pm Dinner hosted by River Murray Catchment Water Management Board

Day 2, Wednesday 2 May 2001

- 8.30am Depart Berri and proceed on inspection of:
- Lock 4
 - Properties at Loxton
 - Banrock Station
- 12.30pm Briefing on Salt Interception Schemes – Woolpunda Reach
- 1.30pm Mallee Sustainable Farming Project – Waikerie
- 3.00pm Ramco Lagoon
- 6.00pm Arrive Adelaide
- 6.30pm Dinner hosted by South Australian House of Assembly Select Committee on the Murray River

Day 3, Thursday 3 May 2001

- 8.00am Depart Adelaide
- 9.00am Briefing by officers of Lower Murray Irrigators Advisory Board, Murray Bridge
- 10.30am Inspection of Murray River water supply off-take and filtration plant, Taillem Bend
- 11.15am Inspection of Coorong District Council fish farm project, Cooke's Plain
- 12.15pm Briefing by officers of Coorong District Council on Coorong LAP, Meningie

- 1.15pm Inspection of Strother Fish Pty Ltd, Meningie West
- 3.00pm Briefing on Upper South East Dryland Salinity and Flood Management Plan, including inspections of:
- Morella Basin, Salt Creek [Northern Scheme]
- Groundwater Discharge Channel [Southern Scheme]

Day 4, Friday 4 May 2001

- 10.00am Briefing by Leon Broster, General Manager, Murray Darling Association at Parliament House, Adelaide
- 11.00am Briefing by Paul Harvey, Manager, Murray-Darling Policies and Judy Good, Senior Policy Adviser, Salinity Management, Murray-Darling Division of South Australia Department for Water Resources at Parliament House, Adelaide.
- 12.35pm Return to Sydney