All about salinity

2.1 What is salinity?

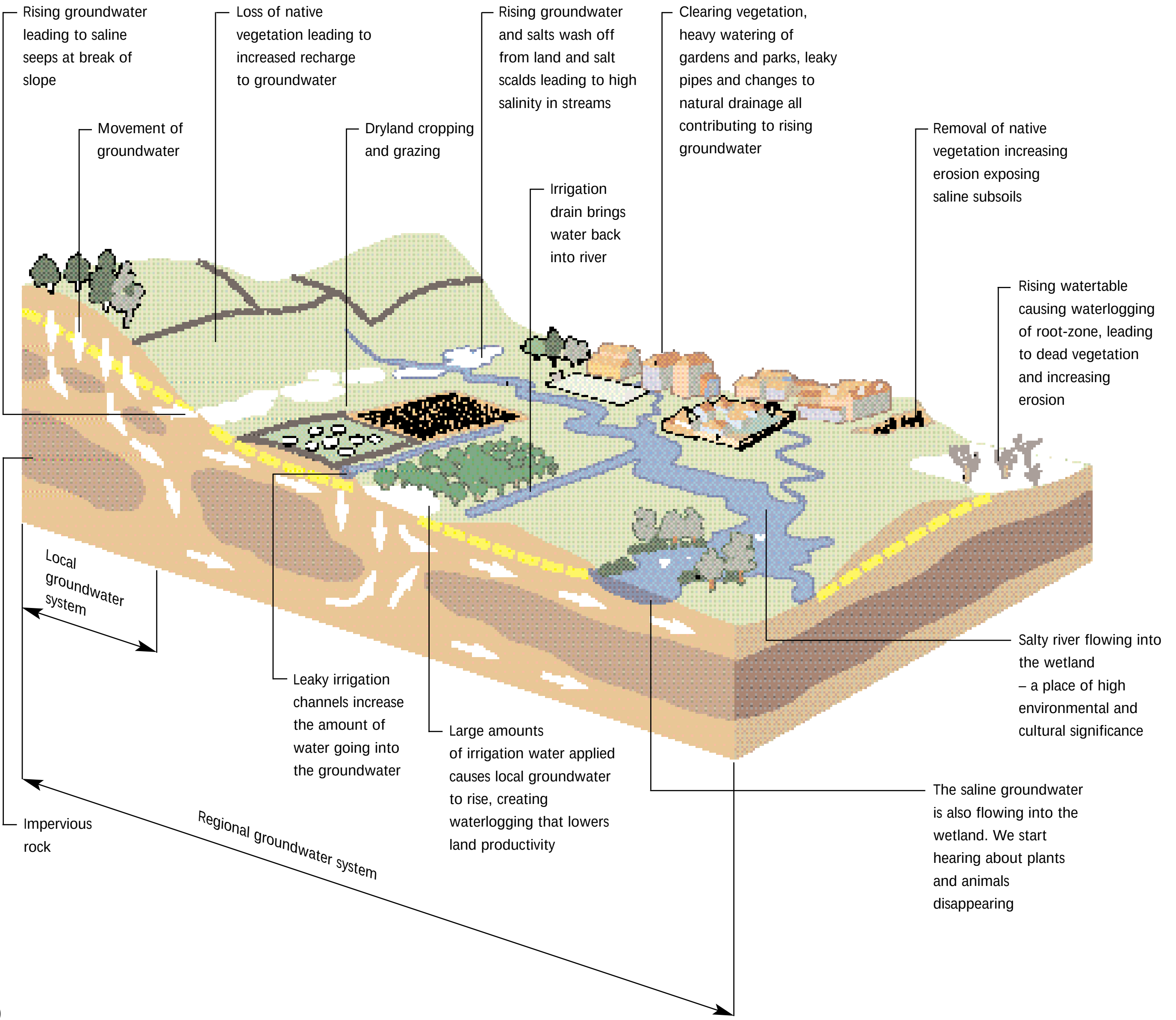
Salinity is the presence of salt in the land surface, in soil or rocks, or dissolved in water in our rivers or groundwater.

There is salt in many parts of the Australian landscape. When wind and rain weather rocks that contain salt, or carry salt from the ocean, then salt is left in the landscape. Salt has also been deposited in places that were under the sea in prehistoric times.

Salinity can develop naturally, but where human intervention has disturbed natural ecosystems and changed the hydrology of the landscape, the movement of salts into rivers and onto land has been accelerated. This is beginning to dramatically affect our natural environment, reduce the viability of our agricultural sector and damage private and public infrastructure.

The acceleration will continue until a new hydrological equilibrium is reached, but that equilibrium will impose an incalculable cost unless we act now. Even by taking action now, we will not be able to reverse all the damage, or do more than slow the rate of damage over the next ten to fifteen years.

Figure 1. Existing catchments



Salinity often occurs in company with other natural resource problems, such as decreases in soil quality, erosion and dieback of native vegetation.

Salinity can be categorised in a number of different ways: irrigation, dryland, urban, river and industrial salinity are examples of salinity types. They differ according to how and where the salt has been mobilised and what the impacts are.

Often these types of salinity have been managed separately, and not necessarily in the most effective way for the total salinity problem. **The NSW Salinity Strategy encompasses all these types of salinity and will deal with salinity wherever it is found in the landscape.**

2.2 Types of salinity

Aerial view of a salt scald in the Murrumbidgee Irrigation Area, in southwest NSW

Dryland salinity

Before widespread clearing of much of our landscape, native vegetation was effective at using most of the water entering the soil profile from rainfall, allowing only a small proportion of rainfall to reach the groundwater system. Water entering the groundwater system is known as *recharge*.

Dryland salinity occurs where removal or loss of native vegetation, and its replacement with crops and pastures that have shallower roots and different water use requirements, result in more water reaching the groundwater system. The groundwater rises to near the ground surface in low-lying areas or on the break of slope (this is known as *discharge*). Groundwater can also flow underground directly into streams. The groundwater carries dissolved salts from the underlying soil and bedrock material through which it travels.

As saline groundwater comes close (within two metres) to the soil surface, salt enters the plant root zone. Even where the groundwater does not bring much salt with it, the 'water-logging' of the root zone alone can damage or kill vegetation.

The impact of water-logging and salinisation will vary depending on soil type, climate and land use. Impacts can be barely noticeable to the untrained eye: reduced plant vigour, or a change in the vegetation mix in a particular area. More dramatic effects include the death of native plants and crops that are not salt-tolerant, and the development of totally bare patches of earth known as salt scalds. These areas act as the focal point for erosion to develop and spread, and for washing salt loads into rivers through run-off.

These impacts are additional to other factors that have degraded, and continue to degrade, natural habitats and further risk the viability of plant and animal communities and vulnerable species.

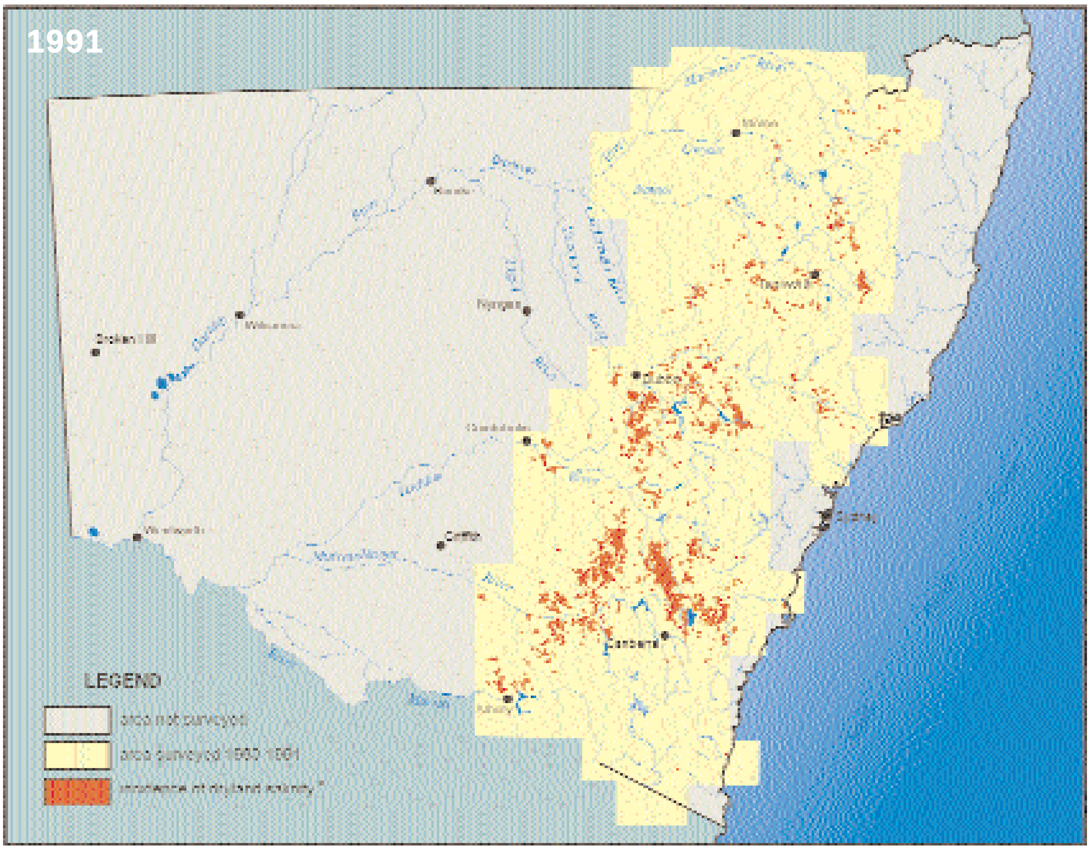
Estimations of the area of land affected by dryland salinity in NSW vary between 120,000[2] and 174,000 hectares[3] (Figures 2 and 3 on the following page show the mapping of dryland salinity that has been done up to 1999). Large areas of the Western Slopes, the Hunter Valley, and the Sydney Basin already have saline groundwater within two metres of the surface.

The findings of the Murray-Darling Basin Salinity Audit indicate that, if we continue to use our landscape the way we use it now, the area of land affected by serious salinisation could increase to 2-4 million hectares by 2050 in the New South Wales section of the Murray-Darling Basin alone. The extent of salinity increase outside the Basin is unknown.

Incidence of dryland salinity and areas mapped

Figure 2. 1991

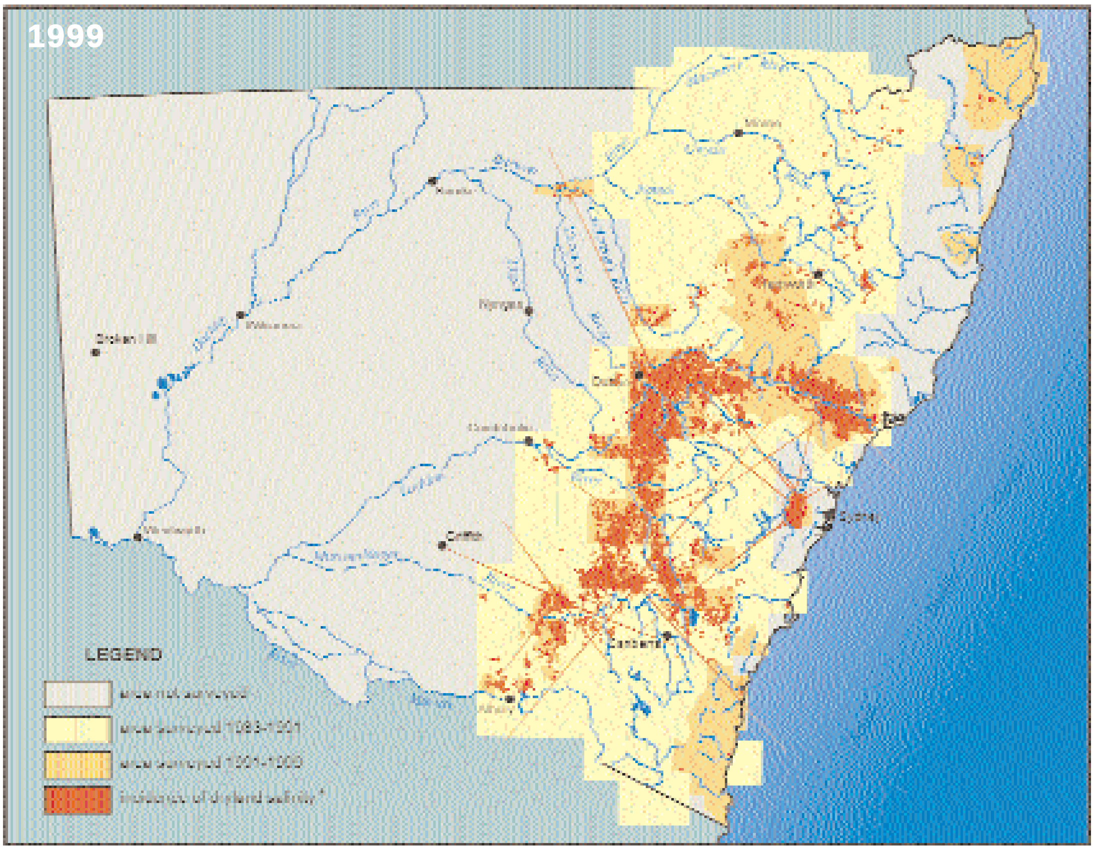
Derived from surveys 1983-1991



* General areas where salinity was observed: actual outbreaks can be quite small in area

Figure 3. 1999

Including data from surveys since 1991



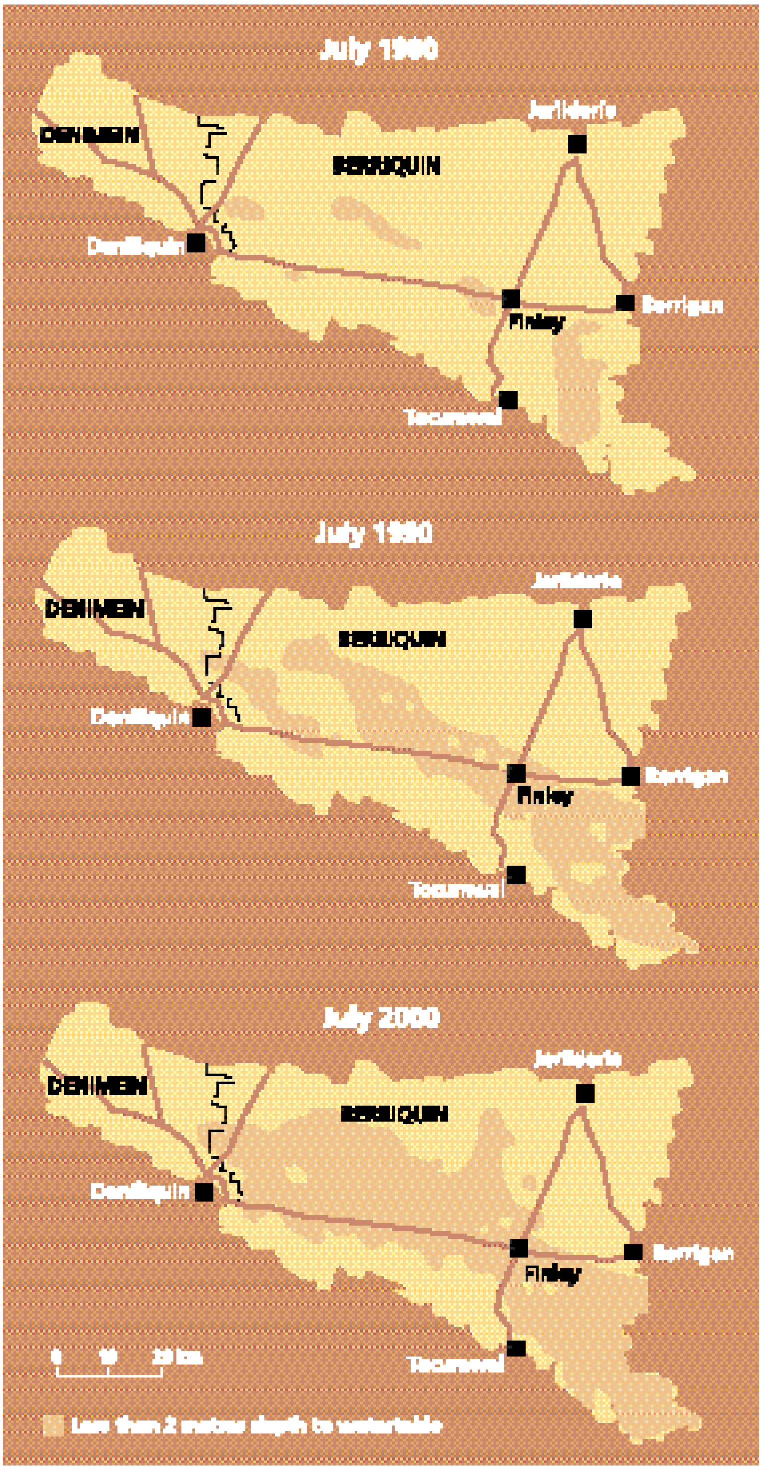
* General areas where salinity was observed: actual outbreaks can be quite small in area

Because of the slow movement of water underground, the impacts of salinity take time to emerge. Understanding groundwater systems allows us to understand the link between the cause and the effects of salinity. These systems, however, can be very complex. For example, groundwater systems can range from local (1-5 kilometres across) to regional (10-100 km across)[4]. Local systems can also be found on top of regional systems. In general, loss of vegetation in the upper parts of a catchment will affect the lower areas of the same or other catchments.

In some areas, dryland salinity is not related to rising groundwater. For example, in the Liverpool Plains, near Tamworth, the removal and loss of native vegetation, as well as some agricultural practices, have increased erosion rates and exposed naturally saline subsoils. Run-off carries the salt in these exposed subsoils into streams. In these situations, rising groundwater has little role in the development of the salinity problems. Management responses are therefore different from those required for areas affected by rising watertables.

Figure 4.

Predicted rise in watertables in the Berriquin and Denimein Land and Water Management Plan areas, within the Murray Irrigation Area in southwest NSW



Irrigation salinity

The main cause of this type of salinity is the application of large volumes of irrigation water, equivalent to as much as four times the average naturally occurring rainfall, compounded by the replacement of native vegetation by plants with different water use patterns.

The usual effect is to create a 'groundwater mound' where the water is being applied, so the impacts are normally very localised – the recharge and discharge zone can be the same place. In NSW, irrigation salinity occurs mainly in the irrigation schemes of southern NSW, along the Murray, Murrumbidgee and Lachlan Rivers. There are also localised instances in other valleys.

In contrast to dryland areas, where there are usually long lead times before salinity appears, irrigation salinity problems emerged soon after the establishment of the first irrigation schemes.

The problems of irrigation salinity are better understood than those of dryland salinity, although they have not been completely solved. Drainage systems have been constructed in several irrigation schemes to mitigate the salinity problem, and these discharge ultimately to land disposal sites or to a river. However, the drainage systems have not been entirely able to overcome the irrigation salinity problem and areas affected by water-logging and salinisation are continuing to increase.

Urban salinity

Urban salinity is a combination of dryland and irrigation salinity. It is caused both by rising watertables due to clearing, and by the application of additional quantities of water from:

- watering of gardens and parks;
- leaking water, sewerage and drainage pipes; and
- obstruction or modification of natural surface and sub-surface drainage paths.

The mechanisms that induce salinity can work very quickly to affect vegetation in drainage lines and on

sporting ovals, and to damage buildings, roads and pipe systems.

Salinity shortens the life of infrastructure such as roads and bridges, and increases building costs due to the need for protective works and use of higher specification materials.

Urban salinity currently affects at least 40 towns in the Murray-Darling Basin[5] as well as parts of Western Sydney[6] and the lower Hunter Valley[7].

River salinity

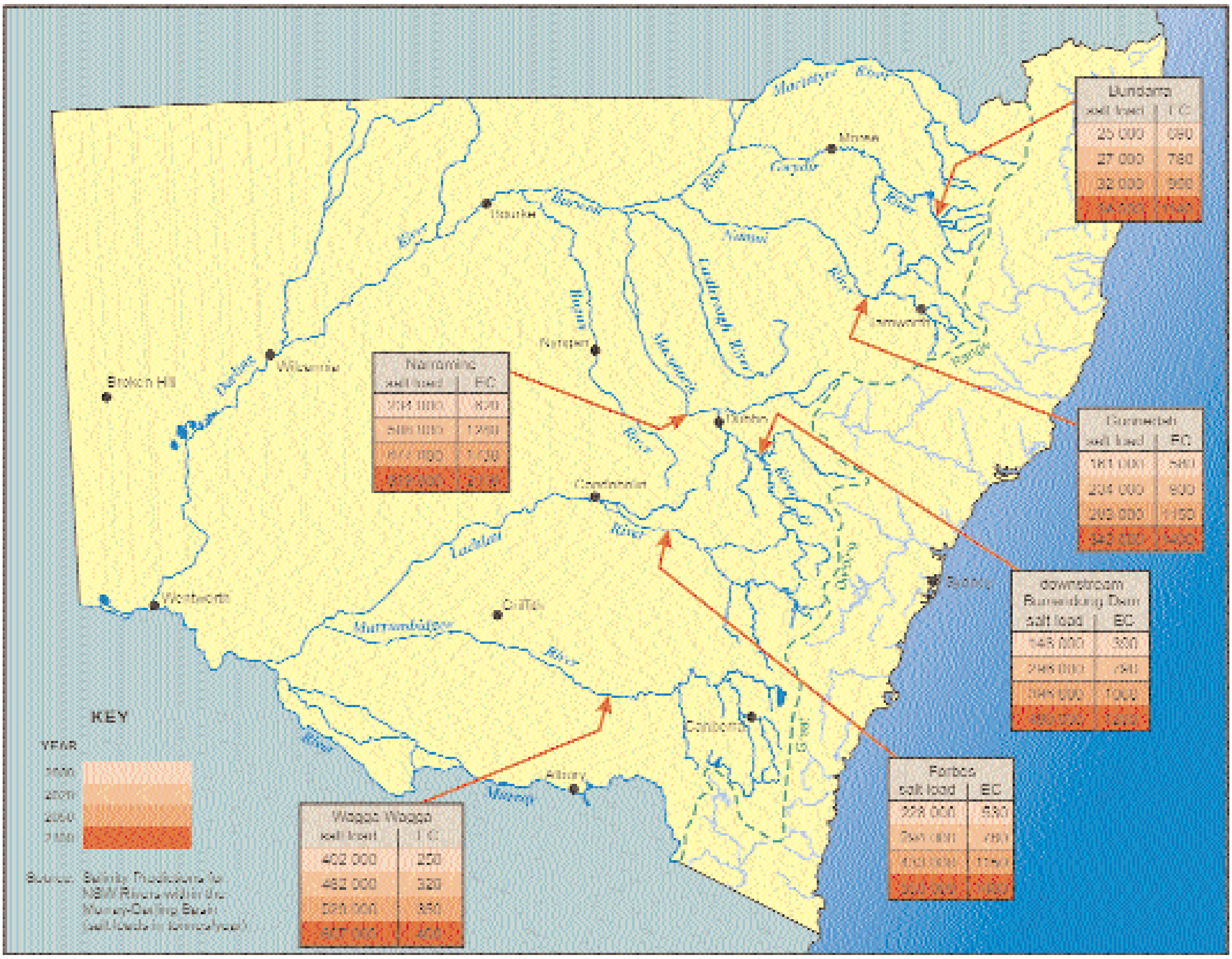
River salinity is caused by saline discharges from dryland, irrigation and urban salinity into creeks and rivers. Over time, as salinity within catchments worsens, the quality of river water declines, becoming more and more saline.

This is particularly the case west of the Great Dividing Range and in the Hunter Valley. Already, more than 230,000 tonnes of salt pass Narromine in the Macquarie River each year[5].

The Murray-Darling Basin Salinity Audit identifies where river salinities are likely to rise over the next 20, 50 and 100 years, unless we change the way we manage the landscape (Figure 5). The Macquarie, Bogan, Namoi, Lachlan and Castlereagh Rivers are highlighted as having high salinity levels in the future. The major findings of the Audit are shown in the figure below.

The Audit used electrical conductivity (EC) units to indicate salinity levels. EC is the most widely used and convenient method of measuring the salinity of water.

Figure 5. Current and predicted average river salinity levels in NSW



Industrial salinity

Salinity both has an impact on, and is influenced by, our industrial sector.

Effluent from towns, intensive agriculture and industry can contain high levels of salt. Coal mines need to manage saline water emanating from groundwater seepage and rainwater coming into contact with mine workings. Coal-fired power stations use water for cooling, a process in which water is evaporated and salt concentrated.

Mining activities undertaken before the development of strict rehabilitation requirements have led to abandoned mines being a major source of salt in some subcatchments.

2.3 The impacts of salinity

Increasing river salinity levels will put pressure on the provision of town water supplies and increase treatment and infrastructure costs. At Dubbo, on the Macquarie River, the water currently exceeds World Health Organisation (WHO) guidelines for the acceptable taste of drinking water (800 EC) six per cent of the time. This is expected to increase to over 80 per cent of the time by 2100, unless we change the way we use our natural resources[5].

Where the water for town supplies is 'hard' (the salinity being made up of high levels of calcium and magnesium), water may require extensive and expensive treatment before it is suitable for human use. Hard water can result in damage to hot water systems and household appliances, and increased use of soaps, detergents and water conditioners.

Water of low salinity is an important requirement of the manufacturing and food processing industries. Future development of these industries in regional locations is at risk from rising salinity levels.

The implications of river salinity are also costly for agriculture. The yields of some particularly sensitive plants, such as rice and horticultural crops, are affected by saline water at levels as low as 700 EC[8]. The impact of river salinity is more costly on high value enterprises such as irrigated crops and horticultural crops.

Our understanding of the impact of salt on natural systems is generally poor, but it is thought that, within rivers and associated ecosystems, adverse impacts are likely to occur when salt concentrations reach 1500 EC units over periods of time. However, there is no simple threshold below which the impacts are negligible or above which the impacts are significant. The impacts are by degree. The Murray-Darling Basin Salinity Audit reports that currently this threshold is estimated to be exceeded in the Macquarie Marshes four per cent of the time, and this is predicted to rise to 23 per cent of the time by 2100, if we do not change the way we use our natural resources. This would result in a loss of species diversity and composition, as well as salt scalding beginning by about 2020[1].

Dryland salinity can lead to lower agricultural production, lower profitability due to costs of mitigation, reduced yield, changed land use, and in extreme cases to the total removal of land from agricultural production. It affects production both in recharge areas, where productivity losses can occur from required land use changes (such as revegetation), and in discharge areas, where the direct impacts of salinity are experienced.

The estimated cost in lost agricultural production alone in Australia due to dryland salinity is $130 million each year[9] and increasing. This figure underestimates the total costs, because it does not include ecological and social costs. These costs are even harder to quantify, but are significant.

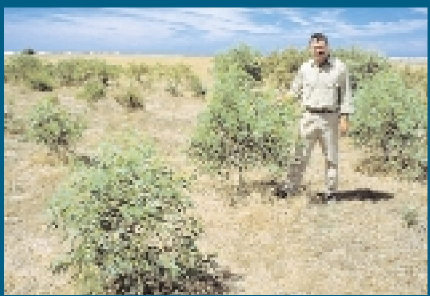
The Murray-Darling Basin Salinity Audit suggests, as a general rule, that total costs, including agricultural, infrastructure and environmental components, amount to approximately $1 million each year for every 5,000 hectares of visibly affected land.

A 1998 study of urban salinity in Wagga Wagga estimated that, in the absence of any preventative measures, the costs of salinity over the next 30 years would have a present value of $183 million[10]. In the south west of NSW alone, salinity is estimated to cause $9 million of damage annually to roads and highways[9]. Estimates of 'one-off' costs for other infrastructure, such as railways, have not been made. Expenditure is expected to increase as the problem spreads.

In the Hunter, mines and power stations have entered into a scheme that allows the discharge of saline water at times which do not impact on other users' needs[11]. If the background level of salinity increases, the viability of this scheme, in which over $100 million has been invested, will be threatened. Alternatives to this scheme would incur a major cost to these industries.

The social costs of salt-induced agricultural change, declining water quality and damaged infrastructure are also potentially enormous. If salinity's effects on agricultural production increase as predicted, some farms will no longer be financially viable, farmers will be forced to move off their land and rural communities and regional centres will suffer.

Even if they are able to remain on the land, as land managers feel the pressures caused by salinity problems, they are likely to have less time to be involved in their communities. Recreational and tourism opportunities may also be reduced, and cultural heritage, including Aboriginal cultural heritage, may be damaged.



Growing and planting native vegetation, so less water goes into the groundwater

2.4 What we need to do to manage salinity

Salinity is the result of biophysical changes to our landscape. In order to manage salinity effectively, we must halt or reverse some of those changes. This will require major adaptation of our current patterns of land use.

Protect and manage our native vegetation

Retaining existing native vegetation in good health is an essential first step in managing recharge, as it is easier to look after the plants that are already in the ground and using water than it is to revegetate. Preventing further loss of native vegetation is a fundamental requirement for managing salinity.

Native vegetation plays an important role in the diverse natural and social systems that abound in Australia. Australia's unique native vegetation evolved over millions of years and is well adapted to our soils and climate. Native vegetation provides food, shelter and breeding habitat for native animals, prevents soil acidification and erosion, and keeps carbon out of the atmosphere where it would contribute to the Greenhouse Effect. As we have seen, native vegetation can also manage recharge by using water where and when it falls.

Where they remain, stands of native vegetation can form the core areas for re-establishing vegetation in the landscape. They can provide the seeds and cuttings we need to rebuild recharge control systems. These native vegetation stands can also be valuable reference sites for the natural processes we are trying to restore.

The Native Vegetation Advisory Council is currently developing a Native Vegetation Conservation Strategy which will promote the importance of native vegetation for its variety of values, and put native vegetation into the context of total land management. Protecting and managing native vegetation for its salinity benefits will be undertaken in a way that is consistent with the aims of the Native Vegetation Conservation Strategy and the NSW Biodiversity Strategy, which identifies salinity as a threat to biodiversity associated with the clearing and fragmentation of native vegetation.

Change how we use our land so less water goes into the watertable

We need to change the mix of vegetation in recharge areas so that less water leaks through to the groundwatertable. One way to do this is to change agricultural practices to better suit the Australian landscape, by:

- changing the crops and pastures we plant;
- changing the way they are managed; and/or
- incorporating deep-rooted vegetation into our farming systems.

In some areas, we may also need to carry out broad-scale tree planting. Trees can be a valuable productive use of land in their own right, through plantation forestry or farm forestry. In other cases, it may be best to revegetate and take these strategic recharge areas out of agricultural production.

To manage salinity in urban areas, local councils need to consider the type of developments they approve. Clearing for new residential development, drainage design and building techniques can all have implications for salinity.

Using drip irrigation to efficiently water vines

Use water more efficiently and effectively

Wherever we manage rivers and groundwater there is a relationship between the amount of water available and the quality of the water. For example, when water is taken from a river for irrigation, it can increase the concentration of salinity downstream, as well as the amount of salt in the landscape.

Improving water efficiency will address many of the causes of irrigation, dryland and urban salinity. To reduce water usage in irrigation areas will require improvements in irrigation infrastructure and irrigation technology, as well as better matching of crops such as rice to suitable soil types. In dryland areas, water use efficiency means managing vegetation and land use to reduce recharge to the groundwater system. This includes management of remnant vegetation, revegetation and use of appropriate agricultural practices. In urban areas, water use efficiency means changing the way we water our lawns and gardens, including changing the amount of water we apply and when, what and how we water.

The draft NSW Water Conservation Strategy contains recommendations aimed at improving water use efficiency across all sectors of the NSW economy.

In some cases, additional water is needed to manage salinity. In areas such as wetlands, as river salinity increases, the amount of water (duration and flow) needed to maintain that wetland health will also have to increase to avoid over-concentration of salt. Under irrigation, salty water soaks though the soil and concentrates in the root zone, eventually preventing plant growth. One option is to pump water out from the ground water to lower the watertable. You can then 'over-water' to move the salt below the root zone.

As we can see, the relationship between water quality and quantity is complex. The NSW Government's water reform process is integrating the management of water quality and quantity, so that the two can be managed more effectively.

Use engineering solutions

Engineering solutions involve physically stopping the groundwatertable rising and/or salt from entering our rivers via pumps, for example. Where conditions are suitable and their impacts on the environment are minimal, they are cost-effective in quickly and significantly reducing salinity.

Engineering solutions can be helpful in cases where other salinity management actions may actually increase the problem in the short term. For example, if we plant trees, in the short term we may see a reduction in the amount of surface water running into the river. This may lead to higher salinity concentrations. In the longer term, the trees will soak up more water, so there is less saline groundwater entering the river, leading to a net reduction in salinity. We may use engineering solutions such as salt interception schemes in these situations to offset these undesirable short-term impacts.

Engineering solutions can also be low cost and on a smaller scale than salt interception schemes. For example, during a storm, the first 'flush' of water running off salt-affected land is usually highly saline. Land managers might use structures such as small dams to hold this first flush of saline water, preventing large salt loads running into rivers.

However, engineering solutions are ultimately a means of treating the symptoms of salinity, rather than its causes. Disposing of the intercepted salt can result in significant financial and environmental costs (although it can also present opportunities to benefit from the products of the salt).

At Yanco in southwest NSW, salt-affected land has been planted with saltbush. Two years later the land manager has achieved better groundcover and productive use of the land.

Make better use of land affected by salt

Where salt affects the landscape and cannot economically be removed, there are still options available to use the land productively. These options can involve use of more salt-tolerant crops and pastures, revegetation for wood products and possibly carbon credits, and development of new business opportunities such as aquaculture in salinised water.

Focus on priority salinity hazard landscapes

Not all landscapes in NSW are threatened by salinity. Of those at risk, not all are threatened to the same extent. Some landscapes are more saline than others or can potentially cause more salinity than others. **We need to know about the salinity features of landscapes in a catchment so we can concentrate our efforts and resources in landscapes where high salinity threatens productive uses of the land, social values or ecosystems.**

Scientists can analyse the natural features of a landscape to assess whether it is likely to be affected by salinity, or whether it is likely to cause salinity. To do this, they look at characteristics of the area such as geology, groundwater and soils and at changing features of the landscape such as its vegetation cover, changes in land use and long term climate cycles. The Department of Land and Water Conservation's scientists, in partnership with other scientists, will look at how salt is stored and mobilised in the landscape and the pathways that it follows. Modelling, together with an understanding of land use impacts, will help communities to decide what levels of salt they are prepared to live with in hazard landscapes. Catchment Management Boards, on behalf of communities, land managers, conservation interests and governments, will overlay social and economic considerations onto the biophysical salinity information.

The end product will be information, including maps, for each catchment showing which landscapes are a priority for managing salinity. This information will be used to inform land managers and communities about the salinity features of their catchments, help shape management targets for a catchment, guide extension work and determine investment priorities.

The NSW Government will release an explanatory paper about how its scientists and the Catchment Management Boards will work together to identify priority salinity hazard landscapes.

2.5 Why has salinity increased?

We have explained the biophysical processes that cause salinity and the biophysical responses that will help to address it, but what combination of factors has allowed these processes to occur, and what barriers lie in the way of fixing the problem?

These factors include a lack of fundamental knowledge about our natural resources and a phenomenon that economists describe as 'market failure', which encompasses a range of other factors.

At the two recent Salinity Summits, in Wagga Wagga and Dubbo, people have given the Government feedback about salinity management in the past, and how we should work in the future. Their views about the causes of salinity are incorporated here.

Inadequate knowledge about natural resources

It's easy to forget how much we have learnt about natural resource management in the last hundred, or even fifty, years.

Management decisions, both at government and individual levels, can only ever be based on the

knowledge available at the time. As a result, governments and land managers in the past made decisions based on what we now know to be inadequate information. The consequences of these past decisions for salinity are, in many cases, only now emerging.

We need to ensure that we do not repeat the mistakes of the past by not having the information we need to make good decisions. On the other hand, lack of 'perfect' information should not be an excuse to do nothing. Of course, what constitutes 'the best available information' will change over time, so we need to be able to work within an adaptive management framework.

Participants at the NSW Salinity Summit said that they need more information and consistent advice about the extent and impacts of salinity now and in the future, and about management options, to help them implement better salinity management on the ground. Participants said that research is a priority, in areas including:

- land uses, plant species, farming practices and industries that can use salt-affected land and saline areas as a productive resource;
- land use systems, farming practices and plant species that better mimic the water use pattern of native vegetation; and
- effects of increasing salinity levels on environmental assets including aquatic biodiversity.

Market failure

Market failure refers to the situation where a market does not efficiently allocate resources to achieve the greatest possible good. Participants at the NSW Salinity Summit saw the emergence of salinity as an example of market failure, and ongoing market failure as one of the major barriers to preventing, reducing or living with salinity.

One cause of market failure is that the individuals and industries creating the problem (those increasing recharge) may not be the same as those experiencing the problem (those in discharge or downstream areas). Economists call this an externality.

The watertable is a common resource. Because there is no financial incentive for individual land managers to manage the resource in the interests of the wider community, it is difficult to encourage land and water uses that lead to a reduction in dryland salinity.

Increased salinity is the result of a large number of decentralised decisions. Although each decision is a small one, cumulative effects result in the problem occurring on an enormous scale. We need to be able to change the signals and incentives for individual decision-makers, so that the sum of their decisions ameliorates rather than aggravates salinity.

Another cause of market failure is inadequate accounting for future costs. This can occur because of lack of knowledge, or it can be due to the natural human tendency to discount things that may happen far in the future. The fact that many types of salinity take a long time to emerge, and can be slow to respond to management actions, exacerbates this tendency.

Early in the history of Australia's European settlement, the goal of government was to create wealth through development of Australia's apparently abundant natural resources. The sheer amount of land led the early settlers to value it cheaply, and thereby manage it as if the supply were inexhaustible.

Governments of the day provided incentives to clear trees, through conditions on leases and tax concessions. From the 1860s to 1960, leases and conditional purchases were issued in NSW on proviso that a certain percentage of tree cover was to be removed each year. Failure to meet the condition could mean forfeiture of the lease or purchase. It was not until 1980 that any remaining clearing conditions were removed from leases.

Subsidised water supplies were provided to encourage the growth of irrigation industries, which have had considerable benefits for the economy. If water users are not required to factor in the true cost of water, there is little incentive to use water efficiently. As we have seen, excess water in natural systems is a primary cause of salinity.

Another challenge for the market is to be able to account for values that do not have an easily quantified financial cost or benefit. Over time, our appreciation of the worth of environmental values such as biodiversity has changed, but even now that they are recognised as having an intrinsic worth, it is difficult to assess their dollar value. The same applies to social and cultural values.

Participants at the NSW Salinity Summit also said that there is currently little incentive for land managers to fundamentally change the way they do business. They saw harnessing and strengthening existing markets, and creating new markets, to address land degradation as a positive direction, and looked at a wide range of market-based opportunities. They advised the Government to develop a special-purpose investment vehicle to attract private sector and other funds for salinity remediation purposes in both rural and urban areas.

2.6 An evolving policy response

The philosophy of natural resource management has changed over time, as our understanding of natural resource systems improves. Systems management of natural resources is relatively new. Government natural resource management was done on a licence by licence or consent by consent basis, without an overall management framework. Land, soil, water and vegetation were considered separately, rather than as part of a natural system. Cumulative impacts became significant, without any framework for addressing them.

Over the last two decades, there has been a growing recognition that management of natural resources requires a strategic, systematic response that addresses cumulative impacts. Some of the ways that NSW governments have dealt with this include:

- adoption of the principles of Ecologically Sustainable Development (ESD);
- the introduction of the *Environmental Planning and Assessment Act* in 1979;
- major amendments to the *Soil Conservation Act* in 1980;
- the introduction of Total Catchment Management during the 1980s;
- participation, in partnership with five other governments, in the Murray-Darling Basin Initiative since 1988;
- the creation of the Environment Protection Authority and the Resource and Conservation Assessment Council;
- participation in the Council of Australian Governments' water reform process;
- the amalgamation of land and water management functions in a single agency - the Department of Land and Water Conservation;
- development of outcome-based regulation such as load-based licensing under the *Protection of the Environment Operations Act 1997;*
- the introduction of the *Native Vegetation Conservation Act* in 1997;
- introduction of a legislative basis for carbon sequestration and renewable energy;
- entering a partnership with the Sydney Futures Exchange to develop environmental services trading, initially focusing on carbon; and
- the development of whole-of-government strategies and policies, including the Biodiversity Strategy, the Sustainable Agriculture Policy and the draft Water and Native Vegetation Conservation Strategies.

Major reforms in water and native vegetation management have also been introduced, commencing in 1995. Licences and consents for activities that have an impact on vegetation and water resources are now determined from within a planning framework. The conversion of water licences from an area-based to a volume-based system is one of many steps towards achieving greater water use efficiency. More cost-reflective water pricing is also important in this context.

Governments are also starting to look beyond the traditional tools of planning, regulation and education, to innovative mechanisms such as market-based solutions.

Land managers have responded to changing information and changing philosophies of management, adopting new cropping practices more suitable to the biophysical parameters of their land and, through movements such as Landcare, undertaking joint action to address degradation problems.

Governments now recognise that management of natural resources requires a partnership approach with the community, and institutional structures have been developed to deliver this. We will continue to support this participatory approach.

NSW has already been dealing with the problem of salinity for some time. Examples of current salinity management activities are set out at Appendix 2. Many land managers have also expended considerable time, money and resources on managing salinity. The NSW Salinity Strategy will build on the strengths and achievements of these activities.

2.7 Why isn’t this response enough?

We are seeing improvements from our changed management practices, and we will continue to see more in future. However, the worsening salinity problem shows that ‘business as usual’ is not enough.

Government actions on salinity to date have predominantly involved research and extension services and grants for investigations and on-ground works. Many actions have depended on project funding from Salt Action and the Natural Heritage Trust. While there have been some localised improvements and some promising research results, these generally do not flow on to broad-scale, longer-term, significant improvements. The scale of the action needed to make any difference in controlling salinity means that these *ad hoc* efforts are not sufficient.

Participants at the NSW Salinity Summit highlighted this issue, saying that, while there has been commendable work by individuals, groups and organisations dealing with salinity, it has been generally scattered, uncoordinated and of relatively small scale. They saw better coordination and an escalation of the current work of individuals, groups and organisations into targeted catchment and landscape scale projects as vital. Also, the scale of action needs to be sufficient to achieve defined targets within a set time-frame.

Current funding arrangements aggravate this problem. At the NSW Salinity Summit, people said that both State and Commonwealth Government funding for salinity management is not tackling the major landscape changes needed. Instead, they said it is focused on restoring degraded sites which, while significant at local levels, cannot strategically respond to the scale of the salinity problem.

Finally, participants said that regulations are so complex that they are being applied in a piecemeal and *ad hoc* way to salinity management.

In building a more strategic approach, people are seeking a clearly explained framework which clarifies the responsibilities of all involved. They also want to see a framework that allows some flexibility for local solutions instead of taking a blanket, State-wide approach.

None of these explanations are intended to blame governments, communities or individuals for actions that have led to salinity. We need to move on from blame to solutions, and work together in partnership to manage salinity.