

FOCUS on salt

The Newsletter of Australia's National Dryland Salinity Program

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Salinity to bridge country and city



Australia's multi-billion dollar salinity challenge presents an opportunity to bring country and city together, according to the Chairman of the Grains Research & Development Corporation (GRDC), Mr Grant Latta.

"The wider community will need to share ownership of the salinity problem, and in turn, generate an environment of mutual understanding," he said.

"One of the positives to the salinity debate, it is that it might bring city and country together, like never before, with all parties rising to the challenge of creating a better future for all Australians."

Mr Latta took part in a two-day fact-finding tour of salinity-affected areas of

Western Australia. "I was very impressed with the innovative farmers and landcare groups we met, all of whom were dedicated to the cause of ensuring past mistakes weren't repeated," he said.

"But, more importantly, they all offered solutions which, when packaged together with other ideas, could bring a systems approach to tackling salinity on a big scale," he said.

The GRDC has committed \$12.5 million to R & D projects to develop productive solutions to salinity and is a core partner in the National Dryland Salinity Program.

Mr Latta noted that as part of the GRDC's commitment to providing salinity solutions, earlier this year it conjunctionally launched a new project which focused on a win/win for the environment and graingrowers.

Known as *A Million Hectares for the Future*, it will work with hundreds of growers in WA and SA to help them address salinity.

"Specifically, it focuses on the systematic development of the environmental buffers and management systems needed to minimise salinity across one million hectares of the grain belt."

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Grains Council of Australia President John Lush (left) with GRDC Board Chairman Grant Latta on tour in WA

National
DRYLAND
SALINITY
Program

Enhancing institutional support — response to the Discussion Paper



Background

Earlier this year, a Discussion Paper was circulated on the NDSP project *Enhancing Institutional Support for the Management of Dryland Salinity*. It was sent to more than 300 different agencies, groups and individuals as well as being made available on the NDSP website. The paper encouraged and invited discussion about the institutions needed to manage dryland salinity more effectively.

Two types of 'institutions' are considered in the paper. First, there are the institutional arrangements involving government departments and the host of agencies contributing to natural resource management — the 'big I' institutions. Second, there are the 'little i' institutions which affect our decision making. These include Australia's system of governance; our markets; policies, laws and regulations; social and cultural values, norms and practices.

The paper suggested that both types of institutions were major contributors to the problems that Australia is facing with dryland salinity and that, while by no means a panacea, attention to improving those institutions was essential to address dryland salinity in an effective manner.

The paper argued that we need to take action to re-align our institutional mechanisms and structures to encourage and facilitate the massive changes required in land use and natural resource management (NRM) to manage salinity.

The authors noted that each group of stakeholders affected by dryland salinity views the problem uniquely from their own perspective. While this is understandable, lack of broad views of the problem makes it difficult to find the common ground needed so that stakeholders can contemplate and ultimately implement the sort of changes in land use that could bring about landscape scale change.

One of the aims of the paper was to start to identify common ground by encour-

aging discussion about the different perspectives without attempting at this stage to prescribe what might be done about it. The authors felt that lasting progress towards effective management of dryland salinity was more likely to be made if a discussion could be initiated without the sense that any one group of experts had all the answers.

The response

In seeking comment and discussion on the paper, LWRRDC Chairman Alex Campbell wrote to the heads of the leading NRM agencies in Australia inviting them to circulate the paper and to contribute to the discussion. Following its release there was considerable media interest with radio interviews, talkback discussions and newspaper articles. The paper was circulated at a time when most of the states were developing or reviewing their salinity strategies. It followed soon after the

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across Australia to discuss the paper and to hear what others had to say on the issues. Rather than argue for any particular solution or approach, the aim was to add information to and enlarge the debate and encourage discussion.

Over 50 detailed responses were received, including those from the key NRM agencies at regional, state and national levels. The level and nature of the responses has far exceeded the expectations of most observers. The responses indicate that a large proportion of stakeholders support the basic contention that Australia needs to change its institutions and institutional arrangements if it is to be successful in addressing dryland salinity.

For some respondents, this was the first time that they had seen the 'little i' institutional issues discussed and these readers found the ideas in the paper challenging but interesting.



that it was considered 'too general', and it did not sufficiently advance our knowledge about potential solutions.

Some comments reflected the level of engagement of those responding — impatience on the part of those who were deeply involved in developing technical or economic 'solutions', frustration on the part of those who saw institutional issues as a sideline to their own interests and exuberant support from those for whom this was the first time they had seen arguments to support their own analysis of the issues. Other comments reflected the administrative pragmatism of current government machinery—how can these ideas be implemented.

Some respondents found the idea that dryland salinity would have to be allowed to run its course in some areas as highly challenging. Others found the idea that society should attempt to intervene and encourage large scale land use change as dangerous and potentially not in the public interest.

A majority of respondents agreed that rather than develop one policy instrument, a range would be required. There seemed to be support for the idea that dryland salinity needs to be treated as a symptom of inappropriate land use, and addressed as part of a more universal integrated approach to sustainable natural resource management (and perhaps regional economic development) rather than as a special case of its own.

Next step

Having used the paper to initiate discussion of the generic issues, the consultants are now seeking to work more closely with specific catchment groups and agricultural industries to explore jointly the institutions and institutional arrangements that will be most effective for those groups or industries.

This project is funded under the NDSP by the National Landcare Program, the Land and Water Resources R&D Corporation (LWRRDC) and the Murray–Darling Basin Commission (MDBC). The project's final report is due in December 2000.

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National Salinity Conference

By Nicholas Newland

Taking stock of directions and progress in dryland salinity R & D will be the focus of a conference to be held in November.

The conference, *Salinity Stocktake — Present and Future*, will gauge progress and directions nationally for dryland salinity biophysical, sociological and legal research, development and extension.

The conference will be held in Bendigo, Victoria from 14–17 November and will showcase some of the work of the Program partners, concentrating initially on aspects of biophysical research and the implications of results from that research.

The last day of the conference will be structured as a legal seminar, examining various aspects of the law as they relate to natural resource management in general and salinity in particular. These aspects include land-use planning, roles and responsibilities of various levels of government and catchment groups, common law implications of cross-property salinity spread and possible effects of international conventions, such as the Kyoto protocol, on salinity management.

Field trips will be provided as part of the conference, including an examination of urban salinity issues in the greater Bendigo area.

Locally, the North Central Catchment Management Authority and the Authority's Dr Dan Douglas are helping to organise the conference with assistance from Latrobe University — Bendigo and the City of Greater Bendigo.

While the conference will target technical and policy representatives from government and industry, organisers expect interest from catchment authorities, community groups and interested individuals.

More information on *Salinity Stocktake — Present and Future* can be obtained from: Gloria Turner Conference/Event Management, ph: (03) 5449 3825; email: gturner@netcon.net.au

Salinity to bridge country and city

from front page

The project was based on the premise that "if you aren't measuring it, you aren't managing it". Funding for the project comes from grain growers and the Federal Government through the Grains R&D Corporation and LWRRDC.

The two day fact-finding tour of WA's Great Southern involved Grant Latta, the Federal Minister for Agriculture Warren Truss, GRDC Board Deputy Chairman Terry Enright, Western Regional Panel Chairman Dale Baker and Program Manager John Harvey, AFFA Secretary Michael Taylor, State Salinity Council Chairman Alex Campbell and CEO Don Crawford, GCA President John Lush, AGWEST CEO Graeme Robertson,

Executive Director David Hartley and Project Manager Bill Porter and LWRRDC CEO Andrew Campbell and Program Manager Richard Price.

After the tour, which Mr Latta described as a revelation, he said there were no quick fix solutions to what was an enormously complex land management issue.

"During the two days, my views were effectively widened and I now better appreciate the sheer magnitude of the salinity problem, its complexity and the array of solutions."

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Engineering options for dryland salinity

By Chris McCauley

The debate on engineered options for the management of dryland salinity in Australia has been ongoing for many years. Engineered approaches, including groundwater pumping, sub-surface drains, surface drains and banks have found wide acceptance in irrigated areas and for the protection of infrastructure.

There have also been many successful applications in the dryland areas of the Western Australian wheatbelt and the south-east of South Australia. There is still, however, a perception that engineered approaches are too expensive to implement and that it is too difficult to dispose of the saline water generated.

Recent studies in Western Australia have emphasised that in the wheatbelt areas, the agronomic 'recharge management' approaches which have formed the mainstay of dryland salinity management over the last decade may, at best, only buy time but not reverse the processes of dryland salinity. These findings have brought the integrated use of engineered options in conjunction with other management approaches back into consideration.

Within WA, the efficacy of deep open drains used in conjunction with other management approaches has recently been assessed (see "State Round-up" for WA, this edition). These studies have brought together community, contractors and government technical staff to develop guidelines and codes of practice for the use of deep open drainage. This information will form part of an integrated approach to dryland salinity management.

The NDSP project

At a national level, the Stage 2 National Dryland Salinity Program incorporates a project to *Assess the Efficacy of Engineering Options for the Management of*

Dryland Salinity. This project brings together information on engineering options and where they can be most effectively applied within a dryland context. The output will be a series of information products, both paper and internet-based, which will help determine whether engineered options will work in a particular area and how effective they might be.

The objective of the project is to provide a tool to help salinity managers identify what options may be effective in a particular region. The basis of the approach is to relate a location to a salinity process and a range of engineering options for salinity management. The framework chosen is the *Groundwater Flow Systems Contributing to Dryland Salinity* developed as part of the National Land and Water Resources Audit.

Given the variation in local conditions, the process will rely on local knowledge that can be brought into the decision making by regional salinity managers.



This is not a design tool — the intention is to provide a sound basis for the selection of engineering alternatives for dryland salinity management, either alone or in combination with other management options.

As part of this study, an extensive review of the literature has been undertaken, leading to the following observations:

- The technical basis for engineering options has changed little — there

are no new 'magical' approaches. Generally progress has consisted of refinements to existing approaches.

- A significant key to success is to know enough about an area to enable effective design.
- Often an engineered option will effectively manage groundwater levels, but the means of disposing of the saline water has unacceptable impacts.
- Economic analysis of options has rarely been undertaken. Benefits from engineering options, and hence the motivation to persist, are often ascribed on the basis of perception rather than economic rationale.

Some useful tools for evaluating the economics of groundwater pumps, banks and open drains are already provided through the Agriculture WA website (<http://www.agric.wa.gov.au>), with further models under development. Although the initial studies indicate that economics isn't the only factor influencing land management decisions, the objective is to provide some means of determining what the costs and benefits might be.

From the literature, 24 case studies are being compiled. The case studies summarise successful and unsuccessful examples of the majority of engineered options. The process of working through the case studies is contributing to the development of the decision support process.

This project, funded by LWRDC under the NDSP, will be completed in December of this year with the outcomes available through the NDSP website (<http://www.ndsp.gov.au>).

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Developments nationally in natural resource management



GRDC — a partner in the NDSP

As the National Dryland Salinity Program moves toward a mid-term review of its achievements, activities and priorities, other important developments are occurring nationally, which may affect possible future approaches to natural resource management.

By Nicholas Newland

South Australia has released its River Murray Salinity Strategy and is finalising its Dryland Salinity Strategy. Work of a related nature is progressing in both Queensland and Victoria. Western Australia released the second edition of its Salinity Strategy in March this year.

Most recently we have the Basin Salinity Management Strategy and the policy statement on Integrated Catchment Management in the Murray–Darling Basin.

Officials from the relevant agencies of government in Australia have been busy preparing background papers and options for consideration at the November CoAG meeting.

A sequence of related events over the last few months has led to natural resource management, as a national issue, being included in the agenda of the next Council of Australian Governments (CoAG) meeting to be held on 3 November.

This has been precipitated by release of the Murray–Darling Basin Salinity Audit and a subsequent letter from the Premier of South Australia to the Prime Minister, drawing attention to the consequences of the audit for the future of that State. It also asserted the need for the issues of water quality and salinity to be considered nationally through the CoAG forum.

The discussion paper *Managing Natural Resources in Rural Australia for a Sustainable Future*, by Agriculture, Fisheries and Forestry — Australia, was also timely in drawing the attention of the community to the wider issues of natural resource management.

In addition, the Government of New South Wales released its Salinity Strategy on August 14 and the Government of

it presents an exciting and relevant opportunity for dealing with critical natural resource management issues

A possible outcome from the meeting may be an inter-governmental agreement on natural resource management, with salinity and water quality being principal issues. If governments can reach such an agreement, it could be an effective means of reinforcing the content of the salinity strategies in the states.

These are complex issues and the CoAG process is one that cannot always move with great speed. However, it presents an exciting and relevant opportunity for dealing with critical natural resource management issues. We look forward to developments over the coming months with great interest.

By Denys Slee

As part of a \$4 million per year investment in finding solutions to dryland salinity issues, grain growers and the Federal Government through the Grains Research and Development Corporation (GRDC) are supporting 35 research projects.

These are wide-ranging and include work on basic research issues such as watertable changes, to the very practical development of a farmer-friendly and affordable soil moisture monitoring meter.

These research activities are taking place from the eastern seaboard, through the southern grains belt, to Western Australia.

Dryland salinity has no respect for state borders and so the GRDC is ensuring that research outcomes are catholic in their application. A good example of this is the work being conducted on the search for new perennial legumes and grasses. This work is being conducted primarily in WA but the species and cultivars being developed will suit a range of soil types and environmental conditions far beyond WA.

The GRDC is a core partner in the National Dryland Salinity Program which ensures its activities mesh with those of other organisations.

In this issue of *Focus* there is a special insert detailing with the GRDC's involvement in dryland salinity research. If extra copies are required, please contact Maureen Cribb; (02) 6272 5525, m.cribb@grdc.com.au

Large scale recharge control — too hard?



By Bruce Munday

Twin rows of *Eucalyptus plenissima* and *E. polybractea* at 100m spacing, Kalannie, WA

Economically attractive options for the management of salinity are a strong imperative for land managers. So John Bartle's recent Adelaide seminar, as guest of the Landcare Association of SA, attracted considerable interest.

Citing on and off-farm costs, the community's unwillingness to accept a salt ravaged landscape and likely international pressure, John Bartle argued that the consequences are too severe for us to just live with salinity.

An agricultural scientist with Conservation and Land Management WA (CALM), John Bartle's proposition is that significant recharge control really can be achieved (in most landscapes) by extensive adoption of perennial plants. "However, this will mean a fundamental change to the suite of plants and range of practices used in agriculture," he said.

"The reality of farming as a business means that perennial crops for recharge control must provide economic returns at least comparable to the conventional crops they displace. It is already clear that duty of care alone is insufficient to prompt widespread adoption."

Managing recharge

"Perennials are too often seen as an add-on to conventional farming systems," says John Bartle. "But there are about 15 million hectares of recharge in WA, so we need perennials which are an integral part of mainstream agriculture, with all the attributes of a profitable and sustainable crop."

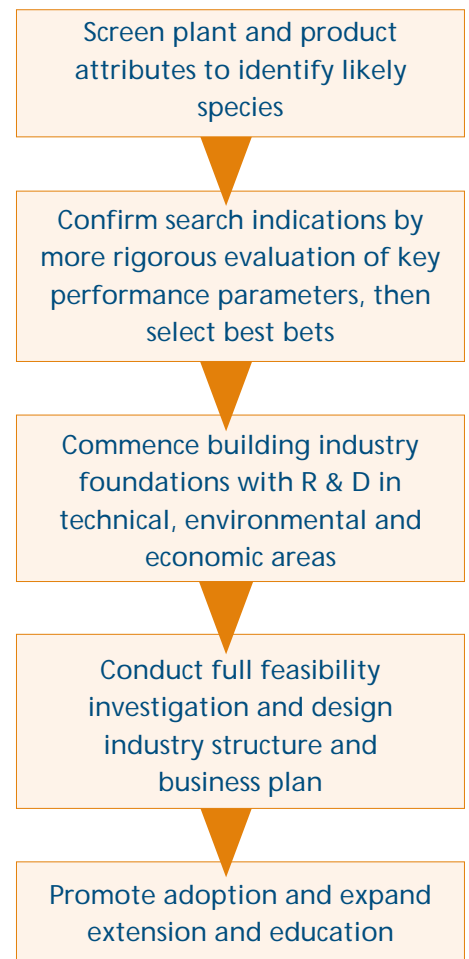
CALM has evolved a development process for perennial woody plant crop industries (right).

Picking a winner

There are several woody perennials that could be viable but which will need initial government investment in industry development. One of the most interesting of these is oil mallee which is being supported by WA and Commonwealth Government programs and the Rural Industries Research and Development Corporation through the Joint Venture Agroforestry Program.

Up to this winter, some 17 million oil mallee seedlings have been planted in the wheatbelt of WA. However this commitment came only after its attributes had been assessed under the following headings:

- **Market size** — looking at not only extractable oil, but also reconstituted



wood products, carbon products, energy (eg liquid fuels) and chemicals, and recognising the impact of large scale production on existing markets.

Getting a handle on the cost of salinity



By Bruce Munday

- **Amenability to extensive production systems** — integrating with the highly mechanised, large-scale production systems of the wheatbelt.
- **Transport horizon or local processing** — recognising that low value products cannot bear high transport costs.
- **Short rotation** — ensuring cash flow, the lack of which often impedes adoption.
- **Residue use options** — greatly enhanced if biomass fuels become financially attractive.
- **Compatibility with current agricultural enterprises** — requiring deep rooted plants dispersed across the landscape to optimise recharge control but with minimal competition to crops; absence of palatability or toxicity to obviate the need for fencing from livestock.
- **Minimal weed risk** — potentially a problem with any non-palatable species selected to thrive in the given environment.

Commercial prospects

The commercial feasibility of an Integrated Tree Processing Plant (ITP) has now been validated, without accounting for possible revenue from carbon credits or the benefits associated with groundwater control. Regional ITPs could be established in each growing area, servicing about 8,000 hectares of planting and with obvious benefits to regional development.

Oil mallee is not yet a proven commercial success, nor is it applicable to all landscapes. However, the prospects for woody perennials in recharge management have been greatly enhanced by the development model applied here.

Landcare is at the implementation end of salinity management and John Bartle's message has struck a chord with this constituency.

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An interim report was recently produced as part of the NDSP project *Determining the Full Nature and Costs of Dryland Salinity across the Murray-Darling Basin*.

The report presents preliminary estimates of the current nature and impact costs of dryland salinity to local governments, households and businesses, agricultural landholders, state government agencies and utilities, and the environment in eight priority catchments located within the boundaries of the Murray-Darling Basin. These catchments, selected by the Murray-Darling Basin Commission, are the Macquarie-Bogan, Castlereagh, Namoi, Murrumbidgee and Lachlan River catchments in New South Wales, and the Goulburn-Broken, Avoca and Loddon-Campaspe River catchments in Victoria.

The impacts of dryland salinity in both urban and rural areas fall into two main classes. Those caused by saline water supplies include damage to household water appliances, commercial water appliances and increased production costs for landholders. Those costs caused by high watertables include reduced agricultural production, structural damage to buildings, deterioration of parks and gardens, and

damage to other infrastructure such as roads & sewerage systems.

The table below presents a summary of the interim costs that have been quantified for the priority catchments.

The study does not attempt to quantify the cost of environmental damage. However, it draws on the available information and outlines, in general terms, how salinity may adversely affect the quality of the natural environment. It also presents a description of the specific adverse environmental impacts of salinity that have been recorded for the priority surface water catchments being investigated in this study.

The total current annual cost of dryland salinity and saline water supplies in the priority catchments is just over \$250 million, suggesting that the widely quoted national cost of '\$270 million' is grossly underestimated and that this national figure may in fact be closer to \$1 billion. The actual cost is likely to be even greater when environmental, cultural heritage and social impacts are taken into account.

This project is funded by the MDBC and LWRDC.

Copies of the report are available on the NDSP website: www.ndsp.gov.au under Publications-Guidelines and Manuals

Total equivalent annual costs (m\$/yr) to all stakeholders in priority catchments

	Lower estimate	Upper estimate	Best estimate	
Local government	—	—	15.48	6%
Households	39.81	136.56	88.18	35%
Businesses	8.95	9.47	9.21	4%
State government agencies and utilities	—	—	16.31	6%
Agricultural producers	—	—	121.80	48%
Total	202.35	299.62	250.98	

Local governments recognise salinity and save on road maintenance costs



Houses and their foundations are cracking, roads and pavements are crumbling, backyard lawns are dying, and parks and sports fields are under threat as soil salinity moves from the bush into towns and cities across the country.

By Mal Brown,
Scarlet Consulting Australasia

The number of salt-affected towns in Australia continues to increase. In NSW the list includes Wagga Wagga, Griffith, Forbes, Parkes, Yass, Western Sydney and Dubbo. Western Australia's list includes Merredin, Katanning and Wagin. Victoria's salt-affected towns include Bendigo, Castlemaine, Maldon, Pyramid Hill, Kyabram, Tatura, Tongala and Stanhope. South Australia adds Tintinara, Coomandook, Murray Bridge, Renmark, Tumby Bay and Minlaton to its growing list. Even Launceston, in Tasmania, has salinity on its golf course.

Not only do towns suffer from the effects of salinity, but studies in New South Wales show that the urban dwellers can undermine the efforts of nearby farmers to tackle dryland salinity. Maintaining rose gardens, manicured lawns and emerald sports ovals can involve excessive watering that lifts the watertable.

Salinity has gone urban and towns must be increasingly innovative to counter it.

Trevor Budge, leader of the NDSP project *Capacity of Local Government to Contribute to the Management of Dryland Salinity*, says "our study suggests that there are seven stages

of Local Government awareness and action on dryland salinity:

- 1 Lack of recognition — even denial
- 2 Realisation of significance and implications
- 3 The quick fix
- 4 Uncertainty and even confusion
- 5 The need for a planned approach
- 6 Preparation of a strategy
- 7 Implementation.

"We find that up to 50 per cent of councils are at Stage 2; many councils (in known salt-affected areas) have failed to even recognise there is a problem, or are in denial at Stage 1," Trevor says.

"Many councils are limited in their capacity to act because of financial and resource constraints, and many councils consider salinity is a natural resource management issue that is not their primary responsibility.

"We have found that the leading municipalities dealing with urban salinity are Wagga Wagga Council in New South Wales, Coorong District Council in South Australia and participants in Western Australia's Rural Towns Program. These councils can offer valuable lessons to other municipalities and fast track their progress through the seven stages," says Trevor.



Damage to church property at Mullewa, WA

Photo: P. Maloney

Urban salinity in Wagga Wagga

Elizabeth Madden, who heads an innovative community education program with Wagga Wagga Council, estimates that 10–15 houses in Wagga Wagga have been treated for salinity related problems at \$20,000 per dwelling with no beneficial environmental or structural outcomes. There are potentially 600 residential houses affected by salinity. Up to 100 of these currently require some form of remedial work.

Wagga Wagga is susceptible to salinity due to its combination of heavy clay soils and small catchment discharge area. Nevertheless the problem is exacerbated by human activity. Without a change in current behaviour, the cost of salinity to the region could be \$3.2 million per year.

An action plan launched in 1994 has resulted in the development of an urban landcare group, a salinity awareness and education program and the Wagga Wagga Natural Resource Management Plan. The plan has been developed by the Wagga Wagga Urban Landcare Group in consultation with Wagga Wagga City Council and the Department of Land and Water Conservation.

Western Australia's Rural Towns Program

Agriculture Western Australia runs the Rural Towns Program, an initiative of the Western Australian Salinity Action Plan to combat salinity in regional Western Australia by providing incentives and funding for coordinating community effort to overcome salinity.

Mark Pridham, Manager, Rural Towns Program, says this program currently involves 27 shires and 28 towns. "The Program promotes awareness of salinity and provides technical and financial assistance to Local Government and their communities to develop salinity management strategies for controlling salinity and rising ground water. State Government provides up to 50 per cent of the cost of a project. Money is available for preparing salinity management strategies, as well as detailed geophysical investigations, field surveys, and on-ground work," says Mark.

Merredin — a case study

It takes an estimated 3,000 years for groundwater to move from the top of the Merredin catchment to Merredin town in Western Australia's wheatbelt. Clearly, the only land that has contributed groundwater directly to the Merredin town in the 100 years since the region was developed is land in or close to the town.

Usually the most effective treatment for preventing urban salinity damage is reducing recharge within the town site and enhancing discharge in and around the town by engineering treatments, such as pumping. In most cases, benefits from revegetation of surrounding farm land will be insufficient to prevent major damage to town infrastructure.

For towns such as Merredin, which have fresh water piped to them for domestic use, the problem is exacerbated by release of this imported water into the ground from garden irrigation systems or septic tanks.

ACF's salinity campaigner

Paola Parigi is a qualified agricultural scientist and economist who has been appointed as the Salinity Campaigner for the Australian Conservation Foundation. Paola and has held positions with Agriculture Victoria, Parliament of Victoria and the Department of Natural Resources and Environment.

During the past decade, Paola has formulated Government policy on salinity management in Victoria and led programs assessing the impact of sustainable agricultural practice in Australia and overseas. She has published numerous papers on natural resource issues including salinity, vegetation, integrated pest management, and weeds.

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Roads and salinity

At Yallagundry, in New South Wales, the Road Traffic Authority (RTA) has taken a holistic approach to road maintenance. Once constructed, the Sturt Highway outside of town slowed the drainage of a rural catchment, creating severe waterlogging and salinisation of land nearby. Trees and grasses were dying and the rising salt damaged both road and culvert.

The RTA worked with the landholder fencing off land nearby and planting salt-tolerant grasses to absorb excess water. Eucalypts, acacias and casuarinas were planted on mounds to keep them above the salty water. Further up the catchment, another area was fenced off and planted with trees to intercept water. Now, six years later, the land is dry and a suite of new grasses and trees are thriving

despite residual salt. No new damage is evident in the road.

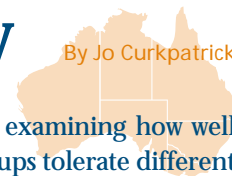
A 1999 study on road assets in Western Australia assessed the feasibility and cost of intervention strategies to prevent or repair problem roads suffering the effects of waterlogging and salinity. Options included road based rehabilitation, drainage, groundwater pumping and revegetation. Success depends on the behaviour of groundwater in the aquifers and soils at each site. The study also suggests that successful partnerships with local community catchment groups will underpin progress in tackling the salinity problem.

The NDSP project *Capacity of Local Government to Contribute to the Management of Dryland Salinity* is funded by LWRRDC and MDBC.

For information contact Trevor Budge, RPD Group Bendigo; (03) 5441 6552, rpdgroup@netcon.net.au or visit the NDSP website at <http://www.ndsp.gov.au>

Environmental spotlight on salinity

By Jo Curkpatrick



The environmental impacts of dryland salinity are to be put under the spotlight in several new NDSP projects.

The new projects will investigate the potential loss of aquatic biodiversity, the influence of catchment management programs and the effects of increasing salinity on the structure and future use of soils for productive purposes.

“We are expanding our focus and taking a good look at the environmental impacts of dryland salinity as distinct from solely looking at its impacts on productivity in the agricultural sector,” says NDSP Program Manager Richard Price.

New projects approved are:

Assessment of a System to Predict the Loss of Aquatic Biodiversity from Changes in Salinity

DNRE Victoria (Phil Papas) and RMIT University (Dr Dayanthi Nugegoda and Ben Kefford)

Based at the Arthur Rylah Institute for Environmental Research, the project will evaluate the response of common stream-dwelling macro-invertebrates, such as mayflies, to varying levels of salinity. A mathematical model will be developed to help natural resource managers, catchment management authorities and researchers prioritise salinity remediation and stream restoration works, with the aim of preserving in-stream biodiversity.

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Predicting the Combined Environmental Impact of Catchment Management Regimes on Dryland Salinity

CSIRO Land and Water (Dr Lu Zhang)

The project aims to improve understanding of the cumulative environmental impacts of dryland salinity on salt loads, water yield and flooding at the catchment scale.

Relationships between vegetation cover and long-term average water yield will be refined and a GIS version of the model

developed for practical application. The project will also investigate the response of flooding to elevated watertables and establish relationships between ground-water discharge and salt loads.

The project will help predict how changes in management will affect catchment water yield and develop methods for evaluating the effects of dryland salinity on stream salt loads and flooding.

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Generation and Delivery of Salt and Water to Streams

CSIRO Land and Water (Dr Hamish Cresswell)

The project will use quantitative land resource survey, groundwater characterisation and modelling to improve the understanding of the patterns and processes of recharge and salt movement across the riverine plains and adjacent slopes.

The project will resolve mechanisms controlling generation and delivery of salt to streams and develop innovative methods for mapping and characterising the functional attributes of soil and regolith so that remediation (and the correct siting of plantings) can be accurately targeted.

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Risk and Restoration Potential for Remnant Vegetation in Salinising Landscapes

Murdoch University (Dr Richard Hobbs)

This project aims to identify effective management priorities and strategies for native vegetation and revegetation in the lower portions of landscapes, in relation to risk from rising groundwater and salinisation. Identification of important areas for biodiversity conservation will be based on the relative risk to, and values of, the vegetation types present.

Management options will be developed, based on the likelihood of different types of intervention being successful. The potential for restoration of salinised areas

will be assessed by examining how well different plant groups tolerate different hydrological conditions. If groups of plant species can be recognised which can persist in the altered hydrological conditions predicted by current modelling, these can be used as a basis for restoration programs.

Contact: Richard Hobbs; (08) 9360 2462,
rhobbs@essun1.murdoch.edu.au

Prograze/NDSP — Linking Production and Sustainability

SGS (Dr Warren Mason)

A sustainability segment to improve water management will be incorporated into PROGRAZE™. The information aims to help producers in the high rainfall zone of southern Australia more effectively manage their grazing enterprises for production and sustainability.

Contact: Warren Mason; (02) 6363 1249,
warren_mason@optusnet.com.au

Biogeochemical and Physical Processes in Saline Soils and Potential Reversibility

CSIRO Land and Water (Dr Rob Fitzpatrick)

The project aims to improve understanding of the chemical, physical and biological changes in soil when it becomes salinised, and the potential for reversing the processes in 11 regions across Australia.

The information will assist in making informed decisions on how to manage these areas and predict their response to disturbance or drainage.

Contact: Rob Fitzpatrick; (08) 8303 8511,
rob.fitzpatrick@adl.clw.csiro.au

The NDSP now has over 40 projects across Australia. These seek information on a wide range of biophysical, hydrogeological, institutional, agronomic and economic issues concerning salinity and its implications for Australia's natural resource base.

Contact: Nicholas Newland; (08) 8204 9153,
nnewland@deh.sa.gov.au

STATE ROUND-UP a round-up of happenings in each of the States supporting NDSP. If you have any information you would like included here, please contact your State NDSP Communication Coordinator listed on the back page.

Victoria

By Jo Curkpatrick

Salinity dinner and forum

The North Central Catchment Management Authority has been busy raising the profile of salinity in Victoria with a successful dinner and forum held in Bendigo during June and July.

The 'Counting the Cost of a Grain of Salt' dinner and the 'Crystals and Solutions' forum addressed how different sectors of the community can become involved in managing salinity for a sustainable future.

Both events were held with assistance from local planners, the Department of Infrastructure, LaTrobe University, Department of Human Services, City of Greater Bendigo, Centre for Land Protection Research and the Department of Natural Resources and Environment (DNRE).

Key outcomes from the dinner and forum include raised awareness of the effects of salinity on the wider community, establishment of new salinity networks and identification of practical initiatives and actions to enable community, industry and government sectors to deal with this growing problem.

The Organising Committee is now assisting the NDSP to arrange the National Salinity Conference: 'Salinity Stocktake — Present and Future' to be held in Bendigo (see page 3).

Groundwater levels

A briefing on the National Land and Water Resources Audit project — *Extent and Impact of Dryland Salinity in Victoria* — encouraged plenty of debate among the 150 people present.



Photo: C Henschke

The study was undertaken by Sinclair Knight Merz in conjunction with DNRE's Centre for Land Protection Research to estimate the land at risk of developing shallow watertables within the next 50 years, based on what has happened over the past 10 years in parts of southern Victoria and the Wimmera.

The study utilised data from more than 2,000 groundwater bores throughout Victoria. Recent dry weather has resulted in dropping groundwater levels over the last 5 years. This suggests a downward trend for watertables that is not believed to be sustained in the long term. Long term trends indicate rising groundwater and these upward trends were used in the study. The study also showed that if no further action is taken to keep watertables low, agricultural losses could increase five-fold, with 20,000km of roads affected and up to eight per cent of plants and animals threatened.

The broad estimates will be refined using a more detailed data set, more precise digital elevation models and detailed modelling approaches, using the Goulburn-Broken catchment as a trial area.

The audit report component of the work will be published on the Audit website: www.nlwra.gov.au

New salinity website

Victorian students and teachers can benefit from a new salinity website. The site, www.sheppstc.org.au/srco, was developed at the Shepparton Science and Technology Centre. According to Louise Duncan the site aims to provide a resource for the Victorian educational community, promote Saltwatch programs, raise awareness of regional problems and encourage people to become involved.

The website includes excursion ideas, classroom activities, information on Saltwatch programs and community salinity grants, as well as a wide range of valuable research material with links to other resources. It provides technical information about salinity and the measures underway in Victoria to combat the problem. There are watertable maps accessible online so the change in groundwater levels in the past can be studied.

Contact: Louise Duncan; (03) 5831 8000, srco@sheppstc.org.au

continued ►

STATE ROUND-UP

from previous page

Old Salts

The inaugural 'Old Salts' meeting in May was a great success and has begun the process of building a network of people interested in communication and dryland salinity in Victoria. The next meeting will be held at the end of August to discuss communication/extension and dryland salinity issues, share ideas and discuss opportunities for cooperative communication activities.

Anyone interested in joining the network can contact Jo Curkpatrick on (03) 9328 5301; jocurk@enternet.com.au

New address

Victorian NDSP Communication Coordinators Jo Curkpatrick and Diana Wolfe have a new office at 736 Queensberry Street, North Melbourne 3051. Telephone (03) 9328 5301, fax (03) 9328 5302; email jocurk@enternet.com.au

South Australia

By Bruce Munday

Biodiversity at risk

The project *Biodiversity Risk Assessment from Dryland Salinity in South Australia* recently reported to the National Land and Water Resources Audit. Hydrogeological and biological data has been collected to analyse the relationship between the groundwater resource and the health of biological systems.

Initial assessments of the biodiversity risk assessment re-iterates the high risk to natural ecosystem viability in the Mid and Upper South East, Kangaroo Island, Lower and Western Eyre Peninsula and Coorong districts.

Landscape units particularly vulnerable to rising saline groundwaters include fresh/brackish wetland ecosystems, tea-tree shrublands, red gum woodlands and native grasslands low in the landscape.

Contact: Brenton Gear; (08) 8735 1118, bgear@deh.sa.gov.au

SA share of 'Million hectares...'

Ross Britton has been appointed to lead the SA component of the *Million Hectares for the Future* project. The project, supported by the GRDC, aims to work alongside grain growers to raise their confidence to make management decisions that will reduce recharge.

Farmers and technical people will work together to develop practical indicators and benchmarks. Grain growers can then evaluate the environmental performance of their business and the potential benefits from management changes, particularly with respect to salinity.

Contact: Ross Britton; 0418 896 168, britton.ross@saugov.sa.gov.au

Strategic approach

The State Salinity Committee (comprising the Chief Executives of the seven State agencies with responsibilities for salinity management), with the associated agencies, has drafted for Government consideration three documents: an overarching Directions for Salinity Management; and specific River Murray Salinity and Dryland Salinity Strategies.

Firm targets for protection of natural resources from salinity impacts are being proposed, along with stronger policies and programs to implement action. The Premier, Mr Olsen, released the 'Directions' and the draft River Murray Salinity Strategy on August 24th, with the Dryland Strategy soon to follow.

The strategies provide the SA response to the MDB Salinity Audit and the Basin Salinity Management Strategy.

Contact: Phil Cole; (08) 8303 9528, cole.phil@saugov.sa.gov.au

Still bringing catchments back into balance

The CSAWS team has almost completed mapping salinity on Eyre Peninsula and Kangaroo Island for the NL&WR Audit.

They have also participated in the formation of the Inland Aquaculture Association of SA and have held or are about to conduct community-based salinity workshops for Kangaroo Island, Eyre Peninsula and the Mount Lofty Ranges.

Contact: Trevor Dooley; (08) 8568 6418, dooley.trevor@saugov.sa.gov.au

Saltland agronomy

The NHT funded project *Reclaiming the Productive Potential of the Upper South East* has reported the results of trials investigating:

- response of puccinellia to nitrogen and phosphorus fertiliser
- herbicide tolerance of puccinellia
- puccinellia feed quality analysis
- tall wheat grass varieties.

The trials were undertaken in collaboration with several landholders in the Upper South East.

Contact: Kate Morris; (08) 8755 3166, morris.kate@saugov.sa.gov.au



Photo: B. Munday

Murray-Darling Basin — resource or lifeline

This Murray-Darling Association (MDA) seminar brought the salinity message to metropolitan Adelaide and to urban communities in general.

In a keynote address, Don Blackmore (CEO, Murray-Darling Basin Commission) outlined the challenges facing the (then) soon to be released MDB Salinity Strategy. The significance of a coordinated national approach to research and development was presented by Nicholas Newland (NDSP), whilst the Hon Neil Andrew MP (Member for Wakefield and Speaker of the House of Representatives) assured the audience that there is a genuine bi-partisan approach to the salinity problem and that the Parliament understands that a long term commitment is imperative.

Leon Broster (General Manager, MDA) announced that the MDA will develop risk assessment reports for local governments in the Basin. It will also assist local governments to recognise salinity and to develop simple models for zoning land so that urban salinity can be properly managed.

Contact: Leon Broster; (08) 8226 0582,
lbroster@chariot.net.au

New South Wales

By Peter Barker

“Tales from the Reapers” — Central West DLWC Salt Team

Cowra activities

- Upper Tyagong Creek Landcare Groups (LGs), representing 75 individual properties covering approximately 35,000 hectares.
- Planning workshops have been held with Cranbury LG with future events planned with Milburn Creek. The Cowra team have nearly finished a large group-based EM 31 survey for the Brundah, Grogan and Thudungera LGs.
- Landholders from the Wellington district toured farms in the Upper

Lachlan in late June to see how local landholders are changing land management to deal with salinity problems.

- Cowra hosted the Sydney University Landcare Group in early August in a targeted stream water quality survey and with visits to properties in the area to learn about salinity identification and management.
- Science teachers taking part in a post graduate study program at the University of Canberra will also visit and be briefed on salinity issues.

Contact: Andrew Wooldridge, Rob Muller,
Nik Henry; (02) 6341 1600

Wellington/Dubbo activities

- Geological assessments and EM surveys were recently completed for Barneys Gully and Camboon LGs, whilst workshops were held with landholders from Condumbul and Comabella LGs.
- Helen Wheeler recently presented a training workshop at the Environmental and Zoo Education Centres Conference held at Gulgong.
- The Central West Salt Team will provide input at the Mudgee Small Farm Field Days & GRDC Grain Expos at Parkes, Warren and Harden

Contact: Allan Nicholson, Helen Wheeler,
Russel Millard (Wellington); (02) 6845 2488
or Anne Smithson (Dubbo); (02) 6884 2560

Changing roles and responsibilities

Elita Humphries has taken up a salinity planning position in Albury and Andrew Briggs our Native Grasses project officer has also followed new horizons. Nicole Gammie is now NSW Agriculture Salinity Advisory officer based at Condobolin.

A preventative approach — the Eastern Murray story

The community of the Eastern Murray region (south-east NSW) recently participated in a groundwater monitoring study, providing a ‘snapshot’ of

groundwater characteristics for three years. Alongside some longer term monitoring results, this was used to identify trends and highlight areas at risk of being affected by rising groundwater and salinity. It is now estimated that some 8–10,000 hectares of land has watertables less than 3 metres from the surface.

The landcare community and the Department of Land and Water Conservation, supported by the NHT and Salt Action, have combined in a three year program of salinity monitoring, planning and extension.

A steering committee will now develop an Eastern Murray Dryland Salinity Prevention Strategy.

Contact: Elita Humphries; (02) 6041 6777

New salinity resources released

The enormously popular *Salt Bags* salinity monitoring kits have been updated, and are now available from Salinity Advisory Officers stationed at NSW Agriculture offices in Condobolin, Dareton, Deniliquin, Forbes, Griffith and Yanco.

A number of resources have been re-released, including the handy *Soil & Water Salinity Calculator*, *Salinity Calculator for Horticulture*, and the introductory salinity booklet *Salinity: Our Problem*.

Updated Salinity Notes are available: *What is Salt Action?*, *Understanding Salinity Meters* and *How do I test Water Salinity?* Two new Salinity Notes have been published: *Texturing Soils and Testing for Salinity* and *Soil Pit Surveys*.

Three new Irrigation Salinity Facts booklets have been released: *Irrigation Salinity & Waterlogging*, *Basic Principles of Flood Irrigation*, and *Draining and Reusing Irrigation Water*.

Contact: Simon Gibbs (02) 6850 2922

NSW Dryland Salinity Strategy

The recently released documents can be downloaded from the internet at www.dlwc.nsw.gov.au/care/salinity/index.html

continued ►

Western Australia

By Georgina Wilson

Community boreholes

Twenty three towns over a wide swathe of the south-west of WA have seen major action in the last few months as more than 350 boreholes were dug to assess the impact of rising watertables and salinity.

Under the Community Boreholes Project of the Rural Towns Program a grid of about 10 to 15 holes was drilled in each town to study watertable dynamics and aquifers. This will allow monitoring of changes in groundwater levels to assist modelling on which to base recommendations for action.

The modelling phase has now begun, based at CSIRO and should be completed by the end of the year. Full reporting on results for each town will not be available until the first half of 2001.

Project manager Mark Pridham said the drilling revealed sufficient groundwater under most towns to warrant future pumping to lower it. Disposal might then be possible using evaporation ponds or even using the water for desalination in some areas.

Contact: Mark Pridham; (08) 9368 3919, mpridham@agric.wa.gov.au

CRC for plant-based management of dryland salinity

Application for a new Cooperative Research Centre was lodged in July and the outcome will be known by Christmas, for a July 2001 start. The application involved months of planning from nine different institutions in five States. If successful it will be based at the University of Western Australia with nodes in South Australia, Victoria and New South Wales.

Those involved, including Professor Phil Cocks from the University of Western Australia who will be its inaugural

director, believe timing is on their side in the tough competition for CRC funding.

Contact: Phil Cocks; (08) 9380 2555, pcocks@agric.uwa.edu.au

Deep drainage

Engineering solutions to salinity problems are attracting close interest in Western Australia, following acceptance of recommendations of a Deep Drainage Taskforce report released in April, at the same time as the new State Salinity Strategy.

Many believe that plant-based solutions alone have been proven insufficient, but a two-pronged attack has more chance of success.

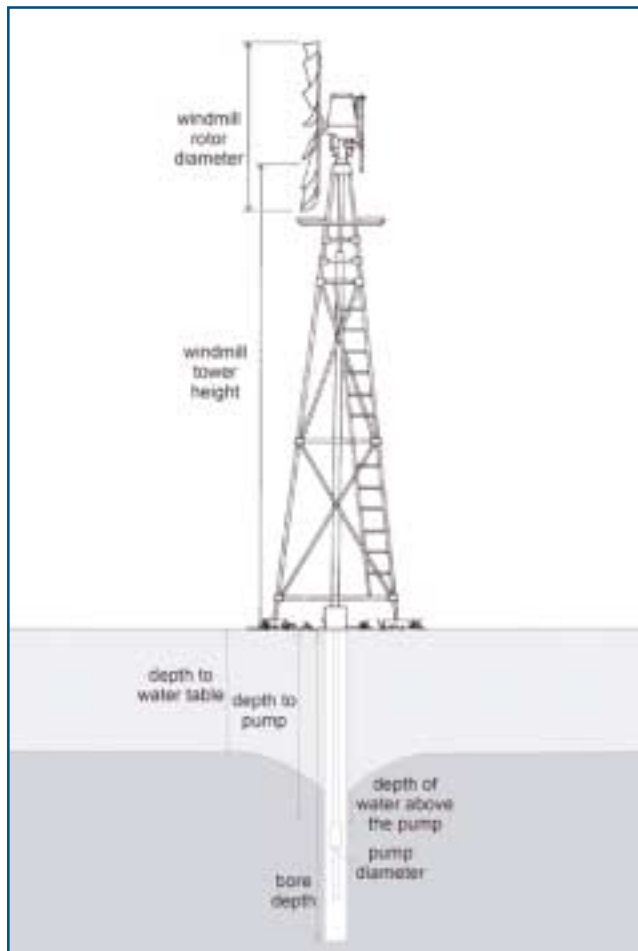
Minister for Primary Industry, Monty House, said deep drainage could be integrated with other salinity management options such as pumping saline groundwater, relief wells and other surface management tools.

Agriculture Western Australia has appointed a drainage manager (Allan Johns from the Narrogin office) to head a new advisory

service for both landholders and contractors.

Government agencies are working on a memorandum of understanding to provide a one-stop-shop approach to the drainage process, but this is expected to take at least a year. Meanwhile, work is also beginning on industry codes of practice and development of best practice models.

Contact: Allan Johns; (08) 9881 0222, ajohns@agric.wa.gov.au



News from the MDBC

Two new initiatives to tackle salinity and other major degradation issues in the Murray-Darling Basin were released on 5 September by Warren Truss, Chairman of the Murray-Darling Basin Ministerial Council and Federal Minister for Agriculture, Fisheries and Forestry.

The initiatives, the draft Integrated Catchment Management Policy Statement and draft Basin Salinity Management Strategy, will be open for public comment until 5 December 2000.

“The Integrated Catchment Management Policy Statement proposes that valley targets be set for water quality, biodiversity, water sharing and the health of the Basin’s river eco-systems,” Mr Truss said. “The aim is to protect key assets such as farm irrigation areas, wetlands of international significance, rural and regional towns infrastructure and water supply systems. The Basin Salinity Management Strategy represents the first real test of this new approach.”



For further information call MDBC on (02) 6279 0100 or visit www.mdbc.gov.au

Phase farming with trees

By Bruce Munday

A scoping study has examined the economic and biophysical feasibility of phase farming with trees (PFT) in medium to low (300–600 mm) rainfall areas of southern Australia.

The study was supported by the RIRDC/LWRRDC/FWPRDC Joint Venture Agroforestry Program.

Termed “kamikaze forestry”, PFT is designed to use trees at high planting densities in very short rotations (3–5 years). These would rapidly de-water farming catchments at risk of salinity, by depleting soil water while producing useable products such as wood fibre and biomass.

The tree phase is followed by an agricultural phase determined by the duration of the hydrological buffer to recharge, created by the trees drying out the soil profile to depth. Other potential benefits of this approach include improved soil structure and provision of a disease and weed break.

The bio-physical feasibility of the system has been modelled using WAVES. The analysis suggests that the PFT system (viz. depletion of sub-soil moisture reserves under trees and subsequent recharge under agriculture) is realistic for many of the soil and hydrological conditions encountered across southern Australia.

Gross margin analysis using the whole farm economic model MIDAS indicates

that profitability, particularly in the < 400 mm rainfall zones, would require tree crops to yield multiple products (eg cineole, tannins, wood fibre, bio-energy) and land conservation benefits would need to be taken into account.

In areas with a deep, root penetrable regolith, PFT may reduce overall recharge and provide storage for out-of-growing season rainfall while allowing the continuation of farming. This analysis also suggests different tree planting strategies are needed according to broad differences in soil and hydrological conditions. For example, although sites with deep soil profiles could be treated with PFT, other sites may be less suitable.

The scoping study recommends several areas where research is needed to validate modelled outputs for PFT, including determining actual de-watering rates, optimising establishment and management techniques and comparison of performance with other phase farming regimes. Field trials of PFT will commence in WA next year.

The paper describing the project, by Richard Harper, Tom Hatton and Stuart Crombie, can be downloaded from the RIRDC website (<http://www.rircd.gov.au/reports> under ‘Agroforestry & Farm Trees’).

Contact: Richard Harper WA Department of Conservation & Land Management; (08) 9334 0306, richardh@calm.wa.gov.au

STOP PRESS

National salinity conference for Australia's NDSP

Bendigo,
14–17 November 2000

Salinity Stocktake — Present and Future

Progress and directions nationally for dryland salinity biophysical, sociological and legal research, development and extension.

- Exchange information emerging from NDSP projects addressing Australia's dryland salinity.
- Discuss and collate priorities for dryland salinity research and development under the NDSP partnership.
- Identify the legal implications of increasing local, regional and cross-border effects of salinity in regional and urban areas.
- Identify the critical research messages to be communicated to urban and regional Australia over the next 12 months.

Registration brochures are being distributed widely. However, to get in early contact the conference manager on (03) 5449 3825 or email gturner@netcon.net.au or check out the NDSP website at www.ndsp.gov.au

Waves on the Web

CSIRO Land and Water has recently posted documentation for the WAVES model on the CSIRO web site (www.clw.csiro.au/waves).

WAVES, a one-dimensional model for deep drainage under various land uses, was the first attempt to strike a balance between soil, vegetation and evaporative processes. Along with APSIM and PERFECT, it is one of a

few complex models now available and is essentially a part of the TOPOG catchment model.

WAVES can be used on PCs and can include sub-surface lateral movement, as well as the normal one-dimensional soil and plant processes. Documentation on the CSIRO web site includes a detailed description of the model, worked examples and executable code.

Like all complex models, there are issues of parameterisation and confidence in using the model for estimates of deep drainage. Preferably, it should be used as a tool for analysis.

A volume in the *The Basics of Recharge and Discharge* series, edited by Drs Lu Zhang and Glen Walker, describes issues associated with plot-scale modelling of deep drainage. This will also be placed on the website.

Contact: Dr Lu Zhang; (02) 6246 5802, lu.zhang@cbr.clw.csiro.au

PURSL 2001

The 7th National Conference on the
Productive Use and Rehabilitation of Saline Land
will be held in Launceston from 20–23 March.

Check the conference website: <http://www.cdesign.com.au/pursl>

Another communication tool

SALTLIST is a communication tool that currently links 130 subscribers (researchers, extension providers, landholders, policy advisers, etc) with an interest in dryland salinity and its management in Australia.

SALTLIST is an email listserv enabling subscribers to

- announce events (field days, seminars, conferences, etc)
- alert others to new research, developments or discoveries
- raise questions (eg "anyone got info on fertiliser response of saltbush?")

- contribute answers or references to these questions

This is a moderated list, which means that participants are protected from viruses, email avalanches and irrelevant, tedious or unwanted messages.

To subscribe, send to
<majordomo@senet.com.au> the following message only <subscribe saltlist>

Contact: Bruce Munday; (08) 8538 7075,
bcmunday@senet.com.au

About Focus

Focus is produced for Australia's National Dryland Salinity Program by the Land and Water Resources R&D Corporation (LWRRDC).

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Further information about NDSP can be found at the program's website, www.ndsp.gov.au.

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Readers should contact the authors or contacts provided and conduct their own enquires before making use of the information contained in *Focus*.

For further information about *Focus* or to be added to the mailing list contact the editor on (02) 6257 3379, info@ndsp.gov.au, or fax (02) 6257 3420.

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CSIRO

National Land & Water Resources Audit
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