

# FOCUS

A Newsletter of the National Dryland Salinity Research, Development and Extension Program

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## INTO THE PLAINS AT THE PUR\$L CONFERENCE

The 1998 PUR\$L conference in March was held at Tamworth in northwest NSW but a field trip out into the Liverpool Plains paddocks enabled attendees to see the real thing.

The field trip went to the heart of the NSW focus catchment and was organised by Plains landowners David Cudmore and Ian Carter (pictured below). They are pioneering a new age in local salinity farming, with tree planting in key areas, salt bush and lucerne pasture plantings, and zero till opportunity crop flexible rotation systems. They have even set up their own tree nursery and developed a tree planter.

Over the course of the conference there were more than 20 papers presented, as well as some specific state reports, a fair bit of 'wildcard' opinions, some exciting poster presentations, and windup discussion groups.

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Pictured at the PUR\$L Conference were Liverpool Plains landowners and field trip coordinators David Cudmore (left) and Ian Carter (right).

## NDSP: Phase 1 Review and Phase 2 Development



Many of you will not have seen the review report on the NDSP (LWRRDC Occasional Paper No. 16/97 which is available for \$20 from the DPIE shopfront on freecall 1-800-020 157), nor the options paper prepared by John Fargher to stimulate discussion and input to the development of a second phase of the Program. Both are essential reading for those wishing to keep abreast of progress in the NDSP, and possible directions for the second phase.

### Phase 1 – Where from?

The first phase of the National Dryland Salinity Program (NDSP) commenced in 1993 and is due for completion in June 1998. In the final year of the first phase, a major emphasis has been placed on communication activities that will help ensure that the lessons learnt from focus catchment and national level projects are widely disseminated. Communication Coordinators have been appointed in NSW, WA, Victoria, SA and Queensland to assist in this process. Other communication activities, such as

development of recommended approaches to aspects of salinity management, are also underway.

A review of the first phase of the Program, undertaken by Greg Hayes of the Virtual Consulting Group, was completed in 1997. In the foreword to the report, Alex Campbell (Chairman of LWRRDC and Chairman of the NDSP Management Committee) makes the point that *“the views and statements made in the report should be widely debated among the general scientific, government and business communities as they have been presented, and not following any filtering process that LWRRDC or others may inadvertently impose...”*

The review suggested that while much of the Program's research focus has been particularly useful in developing methods for investigating and managing

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## LWRRDC Support

Focus is supported by the Land and Water Resources R&D Corporation under the National Dryland Salinity R&D Program.

The Corporation's mission is to provide national leadership in utilising R&D to improve the long-term productive capacity, sustainable use, management and conservation of Australia's land, water and vegetation resources. The Corporation will establish directed, integrated and focused research and development programs where there is clear justification for additional public funding to expand or enhance the contribution of R&D to sustainable management of natural resources.



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salinity, much more effort is required to improve the operating environment of those making decisions about managing salinity either at the farm scale or the catchment scale.

This warrants, according to the review, a second phase of the Program which should concentrate more on social, economic, institutional and policy aspects

## Basics of Recharge and Discharge

Lu Zhang, Editor of this series of papers for CSIRO Land & Water, has sent a progress report on the publication of these papers. They represent a very significant contribution from CSIRO to the natural resources management toolkit in Australia, particularly for dryland salinity.

- 1 Physical and Chemical Techniques for Discharge Studies (published in 1996) *Salama, R.B., Editor*
- 2 Groundwater Chemical Methods (published) *Cook, P.G. and Herczeg, A.L.*
- 3 Using Soil Water Traces to Estimate Recharge (will be published before the end of April 1998) *Walker, G.R., Editor*
- 4 Electromagnetic Induction Techniques for Recharge and Discharge (will be published before the end of April 1998) *Cook, P.G. and Williams, B.G.*
- 5 Soil Physical Methods for Estimating Recharge (published) *Bond, W.*
- 6 Groundwater Processes and Models (published) *Armstrong, D., Narayan, K.*
- 7 Use of Groundwater Responses to Infer Recharge (will be published before the end of April 1998) *Armstrong, D., Narayan, K.*
- 8 Catchment Scale Modelling (published) *Hatton, T.J.*
- 9 Surface Water Balance (drafted) *Fleming, M.*
- 10 Modelling the Impacts of Landuse Changes on Recharge (drafted) *Walker, G.R., Cresswell, H., Zhang, L., Vervurg, K.*

affecting the decision making environment.

Stakeholders in NDSP have identified a number of successes to date, including:

- greater levels of collaboration resulting from the consortium approach, which has created a model for other programs;
- establishing catchment stakeholder committees as the client has enabled various providers to work together to provide the outputs that landholders need to manage dryland salinity;
- more sophisticated methods of utilising remotely sensed data to map and monitor the risk of dryland salinity;
- increased understanding of the costs of dryland salinity, including non-market and non-biological costs;
- increased understanding of technical, social and institutional aspects of integrated resource management at a catchment scale;
- development of sufficient understanding to produce guidelines for approaches to the management of dryland salinity in a variety of catchment types; and
- recognition of institutional and market failures as a major cause of dryland salinity to complement what is already known about technical failures and how to manage them.

Stakeholders also identified a number of weaknesses and opportunities, including:

- a knowledge gap concerning the changes in the operating environment needed to ensure effective adoption of practices to manage dryland salinity at a catchment or landscape scale;
- lack of confidence in the tools available to manage rising watertables and dryland salinity in most regions;
- limited awareness of how to productively use saline land and water resources;
- continued expansion of area affected by dryland salinity, despite growing recognition of biophysical causes of dryland salinity, because land managers are not making the land management changes that are needed to reduce the rate of salinisation;
- a perception that the first phase concentrates on recharge rather than also dealing with discharge;
- not all participants fully appreciated the consortium concept or took advantage of the opportunities it presents;
- little adaptation and extension of focus catchment results to non-focus catchments;

- the lack of objective information to assess the national significance of dryland salinity as a resource management issue, as a cost to the nation, or to assess the rate of salinisation;
- incomplete and inadequate understanding of the cost of dryland salinity to support rational setting of investment priorities by land managers, regional communities and governments;
- incomplete and inadequate understanding of the cost of dryland salinity to support development of cost sharing arrangements for on-ground works;
- ongoing emphasis on social response approaches to dryland salinity management, even though dryland salinity is a problem which is unlikely to respond to this approach; and
- neglecting development of economic instruments to deal with dryland salinity.

### Phase 2 – Where to?

John Fargher of the consulting firm AACM International has been appointed by a consortium of partners involved in the first phase to help in the design and implementation of a second phase. The process for designing the new phase falls into three stages, the first two of which will involve AACM. These stages are:

*1. Program framework including goals, objectives and principles for investment and action – January to April 1998.*

This stage will involve a highly consultative process including interviews and meetings across Australia with those dealing with and/or affected by dryland salinity, including farmers, catchment groups, research agencies, technical support agencies, local government, and rural and infrastructure industries. The result of this stage will be a program prospectus.

*2. Commitment to ensure the program is adequately resourced and effective – April to August 1998.*

This stage will involve using the program prospectus to attract investment into the program. Investment will be sought through negotiation with State and Commonwealth Governments at the ministerial level, and with industry leaders, industry research and marketing groups, shire councillors, senior agency bureaucrats and heads of major research

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As part of the NDSP communications plan, four documents are currently being produced by Econnect (Lin Martin, Jenni Metcalfe and Miranda Free) to answer the questions commonly asked by catchment groups about dryland salinity.

- 1 What are the options for mapping the current extent of dryland salinity in my catchment?
- 2 Where is my underground water coming from?
- 3 What are the land use options for managing my groundwater?
- 4 What are the costs of dryland salinity in my catchment, and who bear them?

The documents are being designed to fit in with a comprehensive framework being developed by Ian Gordon of Queensland Department of Natural Resources as part of a jointly funded MDBC and LWRRDC project.

Econnect has already consulted with key dryland salinity experts in Western Australia, Queensland and Canberra to collect relevant critical information for these documents. The documents are expected to be ready for printing and distribution by the end of June. **F**

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institutions. Management arrangements, involving funding and non-funding partnerships, will be finalised during this stage.

### *3. Identification of specific research and implementation activities for funding – July to December 1998.*

This stage will involve workshops to identify which specific activities should be supported under the auspices of the program, where they should be undertaken, and under what management arrangements. It is expected that all activities supported by the program will involve industry and community groups in both their management and implementation. This stage will be finalised in time for program activities to commence early in 1999.

For information contact Richard Price at LWRRDC on (02) 6257 3379 or email <richard@lwrrdc.gov.au>. **F**

## **Bouquets and Brickbats on Socioeconomic R&D Achievements**



One of the sub-programs in the NDSP was reviewed last year by Greg Hayes of Virtual Consulting to evaluate our achievements and provide some re-focussing in these activities. Greg has provided a comprehensive analysis of the sub-program and its contribution to the overall goal of the NDSP.

His summary of progress in socioeconomic R&D activities in relation to the NDSP Management Strategy indicates that it is making good progress in addressing a previously neglected area but that there are still several aspects that warrant greater attention.

The findings are summarised below against the R&D activities listed in the Management Strategy.

1 There has been limited progress towards the specification of approaches to enable economic assessment of management options but there is no clear methodology that could be recommended to clients at this stage.

2 The sub-program has concentrated on efforts to determine the full costs of dryland salinity and there has been substantial progress in this area. As a result, there is much better information available on most of the costs of dryland salinity than was the case three years ago.

Despite the progress, information on non-market values is still extremely limited and this represents a major knowledge gap that has implications for cost sharing and institutional arrangements.

3 Compared with other aspects, the sub-program has done relatively little to improve the understanding of social and institutional factors influencing the adoption of dryland salinity management practices.

There seems to have been almost no effort directed towards social or psychological research into adoption of dryland salinity management practices as part of the NDSP and it is not clear whether efforts are being made to collaborate with others working in this field outside the NDSP.

Similarly, little if any work has been directed to understanding the institutional factors influencing

adoption, even though there seems to be increasing support for such work amongst many of the clients of the NDSP.

4 The sub-program has made good progress in developing and testing an integrated catchment approach built around community participation in several focus catchments.

While the progress has not advanced to the stage where a particular approach could be recommended, it has highlighted the enormous challenge associated with integrated resource management and the insights that are now emerging warrant careful analysis as a basis for recommending further action.

*Thanks Greg, I think our score might be about 7/10 – Adrian Webb* **F**

### **Some Interesting Websites**

<[www.infoscan.com.au](http://www.infoscan.com.au)>

Welcome to the Infoscan web site, the home of Streamline (natural resources bibliographic database) on the Web. This site has the full list of NDSP project activities.

<[www.cbr.soils.csiro.au/research/drysal/drysal.htm](http://www.cbr.soils.csiro.au/research/drysal/drysal.htm)>

CSIRO dryland salinity research at the Butler Laboratory in Canberra.

<[www.clw.csiro.au](http://www.clw.csiro.au)>

CSIRO Land & Water home page.

<[www.agso.gov.au/geohazards/landwatr.html](http://www.agso.gov.au/geohazards/landwatr.html)>

AGSO geohazards, Land & Water activities (very good).

<[www.cmis.csiro.au/rsm/research/flyers/mapsal/mapsal.html](http://www.cmis.csiro.au/rsm/research/flyers/mapsal/mapsal.html)>

Mapping and monitoring of dryland salinity.

<[www.dnr.qld.gov.au/fact\\_sheets/pdf\\_files/LC5.pdf](http://www.dnr.qld.gov.au/fact_sheets/pdf_files/LC5.pdf)>

Salt seepages in South Burnett and red soils.

<[www.environment.gov.au/newsletter/newsletter.html](http://www.environment.gov.au/newsletter/newsletter.html)>

Linkages (formerly ERINYES), the Newsletter from the Environmental Resources Information Network. **F**

# Queensland Salinity Management Handbook launched

A Salinity Management Handbook has been produced in Queensland to address land managers' and advisers' questions about understanding, investigating and managing salinity.

The handbook was compiled from information gathered through a series of regional salinity workshops and investigations by Queensland research and extension officers.

Roger Shaw and Ian Gordon of the Department of Natural Resources played a key role in providing information and technical expertise for the production of the handbook. The handbook aims to give a complete set of information to land managers and advisers, ranging from process to management options. In particular, it is a very practical document providing direct advice to answer the most commonly asked questions about salinity, including:

- Why is salinity occurring in this area and not in others?
- What factors have contributed to this salinity problem?
- How 'bad' is this salinity problem?
- Can I look for particular plants that indicate salinity?
- Can the effect of salinity on plant production be predicted?

- How much will it cost to manage salinity?
- How long will it take for salinity management strategies to work?
- How do I know that the salinity management strategies are working?

The handbook is divided into three main sections: Understanding salinity, Investigating salinity and Managing salinity. In 'Understanding salinity', the three major types of salting are described from a Queensland perspective. In 'Investigating salinity', practical information for planning and carrying out salinity investigations is provided. In 'Managing salinity', the major management aspects of vegetation, irrigation and engineering applications are discussed individually and in relation to each other.

The appendices contain tables and charts of useful information such as:

- Tree and pasture species suitable for saline soils;
- Salt tolerance data for 130 plant species;



- A diagnostic chart for identifying landscape features at risk of salinity;
- Sources of salinity information for further research and reference; and
- Salinity investigations carried out in Queensland since the early 1970s.

The handbook is expected to be available before June this year.

For information contact Ian Gordon, Queensland Department of Natural Resources, on phone (07) 3896 9471, fax (07) 3896 9591 or email <Ian.J.Gordon@dnr.qld.gov.au>. **F**

## TWO KITS FOR OLD TROUBLES

Two useful kits for farmers have been developed in Western Australia. The first is an on-farm monitoring kit launched by the Land Management Society in 1996. The kit has been met with great success. Farm-level monitoring is a useful complement to catchment scale hydrological research.

During 1997, the kit won the BHP State Landcare Research Award, and more than 70 kits were distributed to farms in the south-west of Western Australia.

The kit has a 'homestead box' and a 'field box'. It enables farmers, in only one or two hours per month, to carry out a series of simple, standardised land monitoring tests. Some of the tools are:

- water repellency test kit
- acidity/alkalinity test kit
- pH meter
- salinity meter
- well sampling kit

- penetrometer
- wind meter
- infiltration ring
- electronic scales

*The Farm Monitoring Handbook* (Gilkes and Hunt, 1992) is included as a guide to interpret the tests and decide on appropriate management options. This handbook will be completely updated during 1998-99.

National Landcare subsidised kits are available to eligible farmers at the cost of \$272 in 1998, but will go up to \$328 in 1999. A one-day training workshop is also included in the price of the kit.

For more information on the *Farm Monitoring Kit* phone (08) 9450 6862, fax (08) 9450 1763 or email <davidlms@space.net.au>.

### Growing Jojoba

The other kit is a recent release from the Revegetation Series put out by the

Sustainable Rural Development Program of Agriculture Western Australia, which contributes to the State Salinity Action Plan.

This series documents tree and shrub diversification options for the less than 600mm rainfall agricultural zone of W.A. The information kit gives you all the facts and contacts you need to grow Jojoba successfully in Western Australia.

Although it was developed for Western Australian conditions, much of the information is applicable to similar soil and climate conditions elsewhere in Australia. It is available from the publications section of Agriculture, Western Australia, for \$10, plus postage.

To purchase the *Growing Jojoba* kit phone (08) 9368 3333. For information contact David Bicknell on phone (08) 9881 1950, fax (08) 9881 2613 or email <narrogen@agric.wa.gov.au>. **F**

## Jo Curkpatrick Communication Coordinator Victoria



NDSP Communication Coordinators have now been in place in Victoria, Western Australia, South Australia, New South Wales and Queensland for six months. During the remainder of 1997-98 our role is to build a series of communications resources on dryland salinity. These resources will include lists of research outcomes, expertise in dryland salinity and useful publications.

The aim is to put in place a framework that can assist in the transfer of information from NDSP research projects to those individuals and groups who can apply the results, who can actually get things happening on the ground. The framework will consist of processes for transferring information, but perhaps more importantly *a network through which we can work*.

In Victoria, I have begun to sort through the tremendous amount of dryland salinity research underway in this state. The first task has been to identify research in progress through DNRE, CSIRO and universities in Victoria.

The information we collect about the outputs from NDSP projects in each state will be put into a language and format everyone can understand, and distributed through community groups and technical people.

Another task has been to identify the experts and specialists we have available in a range of dryland salinity topics. By sharing information across state borders we will have a national resource of expertise in dryland salinity.

We also want to know what publications work for the landholder. What are the top 10 dryland salinity publications you find most useful?

There are certainly plenty of challenges and just getting together a list of research in progress is proving to be a daunting task.

But there are also opportunities. With a good knowledge of what is happening in

research and who our experts are in dryland salinity, we can improve our sharing of information, both within the state and nationally. We can add value to the money spent on research by helping to ensure the results are applied wherever appropriate.

Most of us can relate to being annoyed about not knowing what is happening in a neighbouring catchment, especially when the information and outputs can just as easily be applied in your area.

The NDSP's Communication Coordinators across Australia are keen to help overcome these problems and would welcome any input you might have.

*Jo Curkpatrick can be contacted on phone (03) 9329 7380 or email <jocurk@enternet.com.au>.*

## Bruce Munday Communication Coordinator South Australia



This is your communicator speaking - anyone out there listening?

When I saw this job advertised I applied because I was worried that the wrong sort of person might win it! (After such an arrogant opening line I will be crucified if I don't come up with the goods).

Over the years my office floor has experienced the phenomenon of 'rising information table'. My mail box has been recharged with more and more information than I can possibly absorb. It has accumulated on the office floor until I find time to read it — which will probably never happen.

However, if someone I trusted said "Bruce, this article is really good, you should read it," I would. Because my time would be well spent and rewarded.

We are told that information is power. It is, but there is too much of it. And some of it is second rate, some duplicative, some irrelevant to a particular audience, some plain wrong and some unintelligible.

The trick is to know what a client wants and identify the material that will satisfy

him or her. That is how I see my job as Communication Coordinator for the NDSP in South Australia.

So far the reception to my stated philosophy has been positive. Worryingly so. Having raised expectations that I will make everyone's life more pleasant and rewarding, I now have to deliver.

My starting point is to ask 'the clients' what they need. But it is not as simple as that. Ask an extension officer if they would like a paper on, let's say, 'Flownets for the Ytinilas Catchment', they will probably say "yes". Partly because convention compels us to accept gifts and because it could possibly be interesting and one day when I have nothing to do I might read it. No, you won't!

I need to discover what you really need. By observing what you do; what interests you; what your current imperatives are; what your own clients are demanding of you.

Let's say I have identified your needs. How do you want them satisfied? My own primitive research tells me you do not want research papers — haven't got time to read and digest them. But you would like a summary to whet your appetite and an address if you do indeed want more and the name of the local expert.

And you like the Web where you can quickly cover a lot of ground and go straight to the source of that paper which is just so compelling. Except those of you not on the Net and who cannot imagine what all the fuss is about. Take a look in <<http://www.senet.com.au/~bcmunday/1home.htm>>.

So far I have been overwhelmed by the amount of interest in the NDSP in South Australia and the opportunities a communicator might offer. Perhaps because I had assumed most people would find it pretty boring. Having now poked my head up out of the trench, I am there to be shot at. Of course I will be monitoring the flak.

*Bruce Munday can be contacted on phone (08) 8538 7075 or email <bcmunday@senet.com.au>.*



# Farm Forestry and Dryland Salinity

## Issue

Dryland salinity management plans from throughout Victoria strongly assert a role for perennial pastures. The adoption of deep-rooted perennial pastures is recommended in the hope that they will use rain where it falls—converting rain into commercial yield and at the same time reducing watertable recharge.

However, the farming community has not adopted the approach in great numbers, even when the recommended practices are potentially more profitable. There is also growing concern that perennial pastures are unable to reduce groundwater recharge to a marked extent. Recent evidence indicates that cool season perennial pastures, such as those based on Phalaris and clovers, may only marginally improve the water balance of agricultural landscapes, particularly in medium to high rainfall environments (>600mm average annual rainfall).

Another concern is the continuing rise in groundwater pressures in regional aquifer systems that threaten dryland agriculture across large areas of riverine plain landscapes.

These concerns, the more favourable economic outlook for forest products and the success of farm forestry programs in Western Australia, have encouraged a reappraisal of the role of trees and farm forestry in dryland salinity management in Victoria.

## Response

It was recognised that more information was required on how evaporation and deep drainage of a range of tree plantations varied with climate, position in the landscape and the hydrogeological setting. This was pursued using computer-modeling techniques to model the water balance of a group of representative tree plantations under a variety of conditions.

Weather records from five Bureau of Meteorology stations in northern Victoria and southern NSW were used in the simulations. Average annual rainfall over the simulation period (1971-1990) ranged between 556mm at St Arnaud and 1,023mm at Beechworth. An irrigation regime was also developed to simulate the water balance of plantations irrigated with groundwater pumped from

## Focus Catchment Stakeholders' Workshop Balfes Creek

This year's focus catchment stakeholders' workshop will be held in the Balfes Creek catchment outside Charters Towers in north Queensland.

The Balfes Creek Catchment Group (BCCG) has planned the three day event already. Their theme is "*prevention is better than cure*".

They are looking forward to showing people their catchment, their land use systems and how they are approaching their major land and water management issues. The contrast with the other focus catchments will be striking for many who are not familiar with the north.

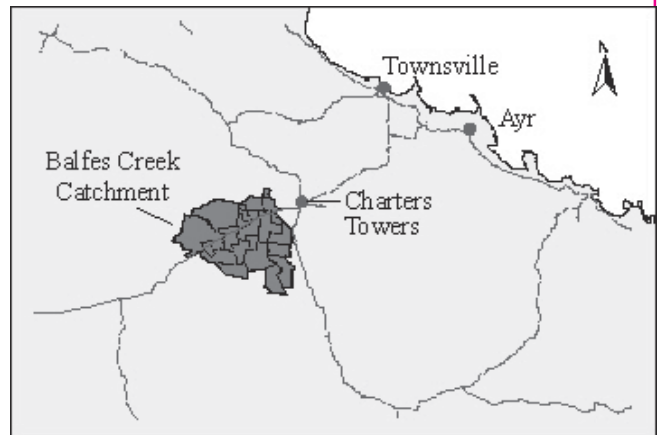
*Bookmark this date!! – 11-13 August, 1998*

The cost will be \$110. This will cover meals and accommodation from the night of the 10 August to the 13 August. Transport will be available for those flying in (10 August) and out (13 August) of Townsville. LWRRDC will sponsor up to three community members from each of the focus catchments to attend the workshop.

Participants will be offered the unique experience of tropical tent camping on one station or shed bunking on another. A limited number of billets will be offered to focus catchment landholders. These properties run regular cattle station experience camps for overseas students. It is a very interesting and attractive part of Australia, and it still has plenty of trees!!

The details of the program will be sent to other Focus catchment groups in the near future, and will be placed on the new NDSP website, which is close to being launched. It will be able to be accessed through the LWRRDC website at <[www.lwrrdc.gov.au](http://www.lwrrdc.gov.au)> under Commissioned Programs.

*In the meantime if you want more information give Roger Landsberg a call on (07) 4787 6677 or email <[trafalgar@ultra.net.au](mailto:trafalgar@ultra.net.au)>.*



deep leads. Adding 25mm of "rainfall" every five days from November to March each year simulated irrigation.

Three sets of soil parameters were used in the modeling:

- 1 Slopes of a rocky ridge in sedimentary hill country;
- 2 Break of slope position in a granite landscape; and
- 3 Alluvial or riverine plain environments.

Two plantation types were simulated:

- 1 Agroforestry - a traditional, slow growing medium density (2-400 trees/ha) plantation with a grassy understorey; and
- 2 Plantation - a dense (>1,000 trees/ha) and fast growing plantation (eg. Blue Gum).

## Research Results

### *Dense plantations versus agroforestry*

The computer modelling showed that

dense plantations used more water than agroforests and were able to reduce deep drainage to much lower levels. The potential for plantations to remove water from the landscape was much greater in low to medium rainfall environments (<650mm) than in wetter areas. However, dense plantations, even where annual rainfall exceeds 1,000mm, would appear to be more vulnerable to drought where additional ground or surface water is not available.

The modelling showed that evaporation from plantations could be improved if additional water was available from shallow groundwater or irrigation. Thinning of plantations, once they reach canopy closure, should help to reduce the risk of droughts in rainfed situations.

### *Rocky ridge settings*

Plantations in rocky ridge settings in low to medium rainfall environments were

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the most vulnerable to drought stress. Their soils store the least water, and because of their position in the landscape, they cannot get additional water from run-off or by intercepting groundwater. Establishment of medium density agroforests in these settings may be more effective in the long-term in summer drought environments. Deep drainage was a persistent feature of both agroforests and plantations in rocky ridge settings.

### **Riverine plains**

Irrigated plantations in riverine plain settings offer opportunities to dispose of large volumes of water from the environment. Average annual evaporation from such plantations was predicted to be in the order of 1,100mm at all locations. On this basis, a 100ha plantation on the Victorian riverine plain could dispose of 550-680Mlitres per year of groundwater pumped from a deep lead. Such rates of pumping would have the potential to stabilise rising watertables in deep lead systems in the Campaspe River basin.

### **Break of slope**

Opportunities for trees to draw on shallow watertables at the break of slope in granite landscapes or across alluvial plains are less than for irrigated plantations on the riverine plains, but may still be in the order of several hundred megalitres per 100ha of plantation. The success of commercial plantations planted at the break-of-slope will rely on careful site selection and consideration of planting design.

Landholders should consider:

- Depth to the watertable – the watertable must be within 5-10m of the surface to be accessible to tree roots;
- Depth of the aquifer – to reduce salinity risk at the catchment scale, the trees need to be able to intercept as much of the water passing through the aquifer at the break-of-slope as possible; and
- Upslope contribution area – the area of land upslope and the rate of water table recharge will determine the amount of water entering the aquifer and passing through the break-of-slope.

The width of the plantation will need to be varied to ensure that the trees are effectively intercepting groundwater and also have access to enough groundwater to sustain their growth.

For information contact Dr. Phil Dyson on (03) 5444 6777 at the Centre for Land Protection Research, Bendigo. **F**

## **Salt Action News from Gunnedah**

The NSW Salt Action strategy for the next 12 months has been finalised, after a two day working conference at Gunnedah (in the heart of the Liverpool Plains focus catchment) in December 1997. Ann Newling attended the meeting for the NSW NDSP communications team, and provided a snapshot of some of the points discussed.

Lawrie Kirk, the Program Manager for Salinity within the Department of Land & Water Conservation (DLWC), emphasised that technical support for salinity management must be integrated with other aspects of land and water management, and this underlined the importance of having a cohesive program across departments.

Small working groups discussed the current salinity strategies, examined funding issues for Salt Action funds, and reported on specific projects funded under SaltAction and the NDSP. Better communication was identified as an important need by the groups (“keeping in the public’s face”), although there was a general agreement that the communication brief is made even harder by the fact that many landholders “don’t know what they don’t know”. (Applies to many of us!!)

Ross Beasley outlined the state of play in the current Liverpool Plains Airborne Geophysics survey research, which is part of the national project funded by the Commonwealth Government and collaborating states. A report on the Liverpool Plains survey should be released publicly about the end of the year, after widespread community consultation and scientific scrutiny. **F**

## **Recharge Estimations in the Liverpool Plains**

Readers of Focus will already be aware that dryland salinity, caused by rising watertables, is a potential major land degradation issue on the Liverpool Plains.

As part of the NDSP, a team of CSIRO Land & Water scientists (Lu Zhang, Mirko Stauffacher, Glen Walker, Peter Dyce) have recently reported the procedures that led to the water balance estimates used in the modelling of the groundwater system. This modelling was undertaken as part of an MDBC and LWRDC supported project involving AGSO, CSIRO Land & Water, NSW-DLWC and ABARE.

It was initiated to provide integrated modelling tools to support decision-making on the control options at a catchment scale. As recharge is the driving force to much of the salinity, it is a key variable to this modelling exercise. The focus of the study was in the catchment scale input of water into the groundwater system rather than in the detailed land management impact on recharge.

This study provides recharge estimates for the modelling of the Tertiary/Quaternary alluvial groundwater system, believed to be the origin of the surface salinisation problem in the Liverpool Plains. In particular, it

indicates the relativity of different sources of recharge; these are localised recharge derived from runoff-interflow from the ranges and hillslopes, and diffuse recharge on the low lying alluvial flats.

The salinity control options depend on which recharge component is predominant. This recent report details the methodology used to get recharge estimates for the groundwater modelling.

The runoff and interflow is estimated, using a relationship between rainfall and evapotranspiration developed by Holmes and Sinclair in 1986. This relationship relies on field data at a catchment scale, such as mean annual rainfall and percent of catchment forested. Various checks were made to assess the transferability of this relationship from 13 Victorian catchments to the Liverpool Plains.

The research team has concluded that unless the fraction of runoff-interflow that becomes recharge to the alluvial system is less than about 10%, it is expected that the localised recharge dominates the diffuse recharge processes. Full reforestation would not reduce the current amount of runoff by more than 38% on average. **F**

## Coordinator's Comments

### Adrian Webb

#### The Bedford Groundwater Interception Project

Graham Gates, the Local Action Plan Project Officer with the Coorong and District Council, took a few of us recently to this innovative project at Cooke Plains in the Upper South East of South Australia. The project is another example of the leadership taken by the Coorong and District Council in its program to tackle land and water management issues, in addition to the other more traditional services of local government.

The project, funded by the Coorong District Council and the Rural Industries R&D Corporation, has demonstrated that shallow groundwater of seawater quality can be used as a resource instead of a problem. The groundwater is inoculated with *Dunaliella saline* culture, an algae which produces beta carotene when it is subject to a stress such as concentration of the salt water. Beta carotene is used in food colouring and can fetch up to \$800 per kilogram.

This concentration process is carried out in poly tunnels where salt and distilled water are also produced as by-products. Following this the concentrated solution is evaporated to produce 'bitterns' which is used in road stabilisation. In the large holding ponds on site, shrimps are also produced for fish feed.

Fin fish such as bream, snapper or King George whiting are being grown in tanks in the temperature controlled tunnels using the distilled fresh water and salt water. Hence at each stage after pumping, there is an output or product which has a commercial value.

The other beneficial result of the project is that groundwater levels may be stabilised or reduced. Whilst the project is not set up to be a commercial venture, it has identified some of the potential problems associated with design and construction of a complex plant/factory, and demonstrated that the processes can be linked and made to work.



*Inspecting the shrimp tanks at the Bedford site were (from left to right) Richard Price (LWRRDC), Mick Poole (Cooperative Centre for Mediterranean Agricultural Research), Gwenda White (Coorong District Council) and Graham Gates (Project Officer with the Coorong District Council). The structure to the left is one of the poly tunnels for salt concentration and beta carotene production.*

The challenge now is to work out the specifications for a commercially viable system. It is a good example of "living with salt", or looking at the natural resources as assets rather than constraints.

*For more details of this very interesting project contact Clarry Fisher, the Environmental Health and Development Officer with the Coorong District Council, on (08) 8572 3611.*

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