



COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

SENATE

ENVIRONMENT, COMMUNICATIONS, INFORMATION
TECHNOLOGY AND THE ARTS REFERENCES COMMITTEE

Reference: Extent and economic impact of salinity

WEDNESDAY, 16 NOVEMBER 2005

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SENATE

ENVIRONMENT, COMMUNICATIONS, INFORMATION TECHNOLOGY AND THE ARTS

REFERENCES COMMITTEE

Wednesday, 16 November 2005

Members: Senator Bartlett (*Chair*), Senator Adams (*Deputy Chair*), Senators Conroy, Lundy, Ronaldson and Wortley

Substitute members: Senator Stephens for Senator Conroy

Participating members: Senators Abetz, Allison, Boswell, Bob Brown, George Campbell, Carr, Chapman, Colbeck, Conroy, Coonan, Crossin, Eggleston, Chris Evans, Faulkner, Ferguson, Ferris, Fielding, Forshaw, Humphries, Joyce, Ludwig, Mason, McGauran, Milne, Moore, Nettle, O'Brien, Payne, Robert Ray, Siewert, Stephens, Watson and Webber

Senators in attendance: Senators Adams, Bartlett, Stephens and Wortley

Terms of reference for the inquiry:

To inquire into and report on:

An assessment of the long-term success of federal programs that seek to reduce the extent of and economic impact of salinity in the Australian environment, including:

- (a) whether goals of national programs to address salinity have been attained, including those stated in the National Action Plan for Salinity and Water Quality, National Heritage Trust and National Landcare programs;
- (b) the role that regional catchment management authorities are required to play in management of salinity-affected areas, and the legislative and financial support available to assist them in achieving national goals; and
- (c) what action has been taken as a result of recommendations made by the House of Representatives' Science and Innovation Committee's inquiry 'Science overcoming salinity: Coordinating and extending the science to address the nation's salinity problem', and how those recommendations may be furthered to assist land-holders, regional managers and affected communities to address and reduce the problems presented by salinity.

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Committee met at 10.04 am

CHAIR (Senator Bartlett)—I declare open this public hearing of the Senate Environment, Communications, Information Technology and the Arts References Committee in relation to its inquiry into the extent and economic impact of salinity. The committee has been asked to inquire into the long-term success of federal programs that seek to reduce the extent and economic impact of salinity in the Australian environment. Amongst other matters, the committee has been asked to consider support available to regional catchment management authorities to achieve national goals. The full terms of reference for this inquiry and submissions are available on the committee's web site or from the secretariat.

I welcome everybody here today. For the benefit of all witnesses, I will repeat this throughout the day, but I will put it on record at the start that the committee does prefer all evidence to be given in public. If at any stage you wish your evidence, part of your evidence or answers to specific questions to be given in private, you may ask to do so and we will consider your request.

[10.06 am]

COLE, Mr Phil, Program Leader, Salinity, Department of Water, Land and Biodiversity Conservation, South Australia

GALE, Mr Glenn, Senior Project Officer, Dryland Salinity, Department of Water, Land and Biodiversity Conservation, South Australia

LEAK, Mr Michael, Upper South East Program, Department of Water, Land and Biodiversity Conservation, South Australia

WICKES, Mr Roger, Executive Director, Natural Resources Management (Policy, Information and Infrastructure), Department of Water, Land and Biodiversity Conservation, South Australia

CHAIR—I now welcome the witnesses representing the Department of Water, Land and Biodiversity. Thank you for giving us your time today. It is appreciated. The committee has received the submission from what I think was the former Department of Infrastructure, Planning and Natural Resources, which was numbered 20. Firstly, do you want to make any amendments or alterations to that submission?

Mr Wickes—No. The department put in a submission through our minister originally. That might be the one you are discussing.

CHAIR—I remind you that evidence given to the committee is protected by parliamentary privilege. The giving of false or misleading evidence to the committee may constitute a contempt of the Senate. I remind members of the committee that the Senate has resolved that departmental officers, such as we have before us at the moment, should not be asked to give opinions on matters of policy and shall be given reasonable opportunity to refer questions to superior officers or to a minister. I now invite representatives from the department to make an opening statement before we move to questions.

Mr Wickes—I have brought with me people who work in the program: Phil Cole, who is looking after salinity in the River Murray; Glenn Gale, who is working with the CRC on Plant Based Management of Dryland Salinity in Western Australia, which I understand you are going to see—we have a major role here looking at agronomy; and Michael Leak, who is working on the Upper South East Program. They are probably the major salinity programs that we have. I have a little handout with some maps in it, and I will go through it and make some comments on salinity in South Australia.

On the first page, we talk about the area of salinity as appears in the National Land and Water Resources Audit information. There are 326,000 hectares of estimated dryland salinity, which we expected was going to increase to 521,000 hectares by 2005, depending on the actions that were taken under the salinity program. We have major issues on the Eyre Peninsula. A lot of those have not been dealt with under the NAP but under NHT and under a former program we have

with the Commonwealth and state government to put drainage options in there and increase the agronomy in that area. There are still issues there.

There are dryland salinity issues on Yorke Peninsula. Kangaroo Island has major salinity issues, particularly with its water supply. We are doing work in the Adelaide-Mount Lofty Ranges area because there is salinity and it is a major catchment area. The Murray-Darling Basin is obviously an issue. If you look at the map down the bottom end, around the lakes, there is a major dryland salinity issue and of course along the river there is leakage of saline water back into the Murray itself, which the national action plan is addressing. We will not go into that at the moment.

So there is an issue with salinity in South Australia, but we do have programs that are trying to address quite a lot of that. Something we have not concentrated on is ground water salinity. In quite a number of our irrigation areas, like in the south-east—Padthaway, Tintinara and places like that—over time there is an increase in salinity of those water resources as they are being used, and there is quite a bit of work being done on the hydrogeology of those and how we might manage them.

I guess the two big programs are first of all the upper south-east program—that does appear on the agenda here quite a bit today; I want to talk about where we are at and our position on that—and also the salinity and interception schemes that are going on in the Murray River. I will start with the Murray. The issue with the Murray—and we have a section on the Murray in the submission—is obviously to stop those saline flows going back into the river. There are a number of approaches being taken. The major one is infrastructure work on putting salt interception schemes along the edge of the Murray which take the ground water that is leaking back into the Murray out to evaporation basins. There is also quite a bit of work being done on zoning that area as a high impact salinity area, deciding where new irrigation development should go and deciding how we actually sort out that salinity issue on the river itself. As you know, the Murray-Darling has a lot of targets to do with salinity and salinity action. We do have a number of programs operating there.

The other program is in the south-east. In the south-east we have a \$38 million investment program plus \$11 million in funding from the local community towards completing that program. That is a major program. It has four elements. It has a drainage element, an agronomy element, a wetlands and biodiversity element and also an adaptive management element so that we can actually manage that environment a lot better.

Looking at the detail of the goals in the programs, we believe that the National Action Plan for Salinity and Water Quality and the National Heritage Trust together with the National Landcare Program have been contributing quite extensively to tackling a lot of these issues. Along the Murray River—Phil can talk a bit more about this—the Bookpurnong and Loxton salt interception schemes are now in. Phil is working on Murtho and Pike now and he is looking at Chowilla and Waikerie. If we put those schemes in over time, that will have a major impact on the EC levels at Morgan. If you want to know more about those, we can talk about them.

The upper south-east program has been worked on for 12 years or more. Conceptually it started a longer time ago than that. It is built on the idea of working through those catchments and making sure that we can control the surface water or the ground water at the surface to try to

stop that water from evaporating off the surface. When it evaporates off, of course, it becomes very saline on the surface and kills a lot of the pastures there. We are also very keen on managing the wetlands and the wetland complex. A lot of those have disappeared from the south-east over time. Part of the program is making sure that we actually manage those wetlands for the future. Also, we are looking at water and water management into those wetlands so that we can improve those wetlands. A lot of them are significant.

Also, we are looking at salt land agronomy and how we can actually return a lot of that land to high production. It was in high production when it was first cleared. Major changes occurred as both a regional ground water system and a local system coming off the dunes started to impact on the agricultural land. A lot of work has been done on trying to manage those impacts. Also, as part of that, we put in a biodiversity trading program. Instead of the land-holders putting funding into dig drains, which is what we had originally, we have gone into a biodiversity trading program. Land-holders can offer up part of their vegetation under a permanent agreement. There is a 15-year management agreement and then a permanent agreement about keeping that land in its current state—in its biodiversity state—and in fact perhaps improving it. We have a trading regime around that which has built in dollars and cents.

So I think that has been quite a major breakthrough. In fact, it has been promoted by the land-holders themselves, in the first instance. It is up with what is happening in Victoria, where they have BushTender and those sorts of things. That has been quite innovative. In fact, much of this program is quite innovative.

We have a program board that manages the program, which has all the stakeholders on it. There are people from the departments in Canberra, people from the departments here in South Australia, land-holders and conservationists who are helping us try and get to the balance. I see that people will be presenting today. We have been listening to those land-holders and all the different arguments and listening to the scientists. Our role in the board is to try and work out the compromise in those catchments to be able to get the best outcome.

We have put in 495 kilometres of drainage with 165—which is the tail end, really—to be worked through. Six thousand five hundred hectares of remnant vegetation have been fenced; 1,250 hectares have been revegetated; we have protected more than 2,600 hectares of wetlands; and about 65 per cent of the area that is salt affected now has salt tolerant pastures. So there has been quite a return. There are some really good stories about the impact of that program. We are still trying to come to grips with the final two catchments that are part of what is a major program for the south-east.

In terms of broadacre agriculture, I talked about the River Murray schemes. They have had a lot of impact. Obviously, under the NAP we cannot fund every scheme that we would like along the river. It is an ongoing program to try and improve the river, but I think there has been significant progress so far. In the broadacre agriculture regions, we have been doing quite a bit of work and there are still programs to be done.

I suppose the most successful has been the Coorong and districts program. We put in a paragraph about the Coorong and districts program. It started in about 1995 as a local action planning program. The community down there worked out what recharge levels they would like to reduce, and they went about getting a recharge reduction of about 20 per cent by 2003, when

they last measured it. They are continuing to put in perennial vegetation and lucerne through that area, supported by the NAP and NHT program. That is quite a success story, and we are looking at rolling out that sort of program in other areas of the state. We have addressed these other areas, but we have not come up with the necessary solution.

Your next topic was the role of catchment management authorities. South Australia have embraced the idea of natural resource management. In fact, we created the integrated natural resource management groups in 1995. There are eight in this state—that is eight of the 56 that exist in Australia. People have put together their investment strategies and their business plans for their investment. I think we were one of the first states to achieve that. Victoria, with their CMAS, obviously had a good start as well. That has worked so well that in 2004 we passed the Natural Resources Management Act in this state. We consulted with the community extensively on that act. On three occasions, we went out for community consultation, and we brought together all the natural resource components of soil conservation, land care, animal and plant control and water resource management in the state into that framework.

On 1 July we commenced the natural resource management boards. Those natural resource management boards are now responsible for putting forward all the programs—the joint state-Commonwealth programs like NAP and NHT and also the state programs around animal and plant control and the regulatory issues. They are also now forming their local groups so that they have action on the ground. We have one normal resource management level. There have been catchment levies and animal and plant control levies in this state for quite a long time. They are being rolled into this one program.

We have formed the Natural Resource Management Council, which is currently drawing up a natural resource management plan. People from the Commonwealth are part of that council and sit at the table with the council. We are trying to integrate everything in natural resource management, with the state plan as the lead driver, and then each of those plans at the regional level will take their cues from that. We are trying to streamline the whole process, which was previously driven in four streams; it is now driven through one stream.

Over time, I think, we will be able to move some of the native vegetation management aspects into that program as well and streamline a lot of our natural resource management. We see that as fairly successful. It is a major policy change in Australia to have 56 regional groups together. I have been to the ministerial council meetings where they have all met and the cross-collaboration across Australia has been fantastic. There has been a lot of anxiety in getting to this point and a lot of hard work done by people to get here, but when you see what we have done over the last four or five years in Australia, I think it is quite a significant change. That is where we are at with our regional bodies and how they are operating.

The other area you are interested in is science. We are providing two components. One is our technical support to the regional boards in developing their programs. If the national action plan was about getting best science on the ground, an issue was actually connecting the scientists to the regional boards. We set about creating a centre of natural resource management. We put some of the national action plan money into that centre so they could run the projects. We then formed a committee to run that centre headed by an independent person, and it has on it some scientists from the universities, the department and the Commonwealth. It also has three natural resource management boards. We had two—and we expanded out to include NHT and we put

three natural resource management board representatives on it. We are connecting that group to the Natural Resource Management Council. The idea was to have the funds for our research and development, and then the regional boards and people from the science fraternity met and worked through their issues. They came up with a series of projects that meet the outcomes that the community want to make that connects science with the regional community. It is working fairly well.

There are quite a number of projects being put through that program but, again, it is something we have to keep developing through not only using that money but arrangements with Land and Water Australia, GRDC and the Australian Wool Innovation fund. We are trying to expand that. If we are going to get science on the ground we have to make those connections. That was the idea of the centre. We have CSIRO as a member of that as well—the Commonwealth government. I think it is working well. They have over 35 research proposals that have been developed and are on the ground now in the community. The natural resource management community are watching those outcomes. We are also a member of the Research Centre for Plant Based Management and Dryland Salinity, and Glenn is a node manager for that. We see that as a very important part of rolling out our agronomy program as well. It is very important that we make that connection, and that was South Australia's way of trying to achieve that.

CHAIR—Thank you for that comprehensive introduction. Before I go to my colleagues, I have one question to start with: can you outline a little of the administrative arrangements in the governance sense in South Australia? Your department has primary carriage of the salinity issue per se, but what is the role that other departments may play?

Mr Wickes—When this government was formed, it formed the Department of Water, Land and Biodiversity Conservation and brought together my group, which was part of Primary Industries, the water resources group and some of the biodiversity people from the Department of Environment and Heritage. That is the key coordinating department. We work very closely with all the other departments. In fact, we have a directors group, which I chair, which has directors from all the other agencies. Primary Industries has the major research capability and obviously some of the agronomists, particularly the regional agronomists. So we work very closely with Primary Industries. Having worked there, we know everybody.

It is the same with the Department of Environment and Heritage. That department, in biodiversity programs, is looking after a lot of the heritage issues and species loss. It is part of that group as well, and is represented on our boards. The Department of Environment and Heritage is very much a part of that. They are the major two departments. EPA and Planning SA are also a part of that. That directors group feeds up into a chief executives group, and that chief executives group, which has been operating for quite a while, looks at all the policy issues in natural resource management, including the salinity issue. Obviously, you cannot separate biodiversity from salinity. It is just a matter of who is taking the lead. That is how the government is focusing.

Senator ADAMS—I am from Western Australia and I am a farmer. As we are at the head of a catchment, we do not have salt on our property but down below we do. The committee has received a submission from the Western Australian Farmers Federation, and it highlights the community concern that salinity focuses on biodiversity outcomes as opposed to sustainable

farming and salinity control outcomes. They really base their submission on that. Can you comment on this within the South Australian context, to give us a comparison?

Mr Wickes—As I said, the program in the upper south-east is a balance between primary production and the biodiversity of the region. The program is designed to take all those factors into account. We listen to all those communities to try to make the matter balance. Our aim is to improve the biodiversity as well as protecting the agricultural land that is available. It has to be seen in a total catchment context; it cannot be seen as one versus the other.

Senator ADAMS—Using that area as an example, can you tell me how, on the ground, you are doing that?

Mr Leak—It is a difficult balance to find solutions on the ground that provide biodiversity and environmental outcomes and primary production outcomes as well. Roger is right: we do bring everybody to the table as part of the decision-making process to try to understand what all the issues are. The role that we have is to try to bring those into an integrated solution that meets the issues that are identified for each individual catchment. In the case of some of the drains that we are looking at, it is not just a drain running from one part of the catchment through towards the end; we are incorporating a lot of features to maintain environmental values, whilst securing something that is going to deliver a solution for flooding and salinity management—so things like weirs, drains, pipes, banks and other features to enable the environmental values to be maintained.

Senator ADAMS—Not being really familiar with the geography of the area, I am wondering how you are dealing with the upper and lower catchments?

Mr Leak—Because it is an integrated program, it is slightly different to the Western Australian situation. We have a regional drainage scheme that connects from one part of the catchment to all the way through to the Coorong. It has continuity of drainage, to start with, and then you have continuity of the wetland environments as well, which need to be integrated as part of that drainage scheme that is provided within that same catchment. So it is an integrated approach.

Senator ADAMS—As far as people on the ground are concerned, in WA we are having a lot of problems with trying to fund Landcare officers. Because rural populations are getting smaller, because of rates and because infrastructure has been damaged by salt, there are lots of problems and having people on the ground is just not happening. How are you dealing with that?

Mr Wickes—In that program, which is going for quite a while, we do have all the people required to do that management. We have the South Australian Farmers Federation. We are funding them to do a lot of the biodiversity assessment program. We have agronomists working in the area on a special program, so we are doing a lot of technical work on the ground with that community. At the moment, we do not have the issue that Western Australia is facing because, hopefully, we are turning this around and improving production in that area.

Senator ADAMS—What about recurrent funding for staff? As far as contracts are concerned, our biggest problem is very short-term contracts and the fact that you cannot keep good staff,

because they will not stay because you do not know whether you will be able to fund their position next year.

Mr Wickes—I think that is the same across the nation. I heard the chairs of all the NRM bodies raising that issue as well. That is because of the three- to five-year funding cycles, and holding good staff in three- to five-year funding cycles is an issue. In the research field, it has been an issue for a long time. It is a matter of the way we do our budgeting and fund these programs.

Senator ADAMS—Regarding airborne geophysics, I notice from reading a couple of pages here that you have used that a lot in some areas. Are you relying a lot on that?

Mr Gale—Yes. We certainly relied on that in managing the River Murray and the salt interception schemes and the zoning policy, which Phil might comment on more. Through the national action plan, we had five case study sites in South Australia. We used airborne geophysics to assist with salinity management. That was part of the National Action Plan for Salinity and Water Quality. Those studies were completed about 12 months or so ago. It involved airborne geophysics and also lots of other related work, including hydrogeology, soil chemistry, water chemistry, existing bore log data and so on, so the airborne geophysics could add additional value to our existing information. There was a multidisciplinary team involved with the program so we could take the results of that work and move it into salinity management actions for the regional groups.

Senator ADAMS—That is something we are trying to get in WA, but unfortunately we lost our funding due to a few Commonwealth-state problems. I just wanted to know because I think it is terribly important, especially in the area I come from. It is not a case of one size fits all. Everyone is running around trying to grow trees in places where it will not make any difference whatsoever. It is a shame that that is the way it has gone. I could go on for a long time.

Senator WORTLEY—I am a South Australian senator, so I do have some advantage in being able to read in our daily newspaper about a lot of the things that are going on in South Australia. The committee has received a number of submissions from land-holders in South Australia expressing significant concerns about the Upper South East Dryland Salinity and Flood Management Program. One of the concerns mentioned is the lack of adequate consultation with land-holders. In what ways are land-holders' interests incorporated into program planning and how are their concerns taken account of in program monitoring and evaluation?

Mr Wickes—We have quite a large consultation process and, for many years, we have had a regular newsletter going into that region and a lot of consultation with the land-holders. When it gets down to each catchment line, we have a process whereby we continually get the information, we take it to the land-holders in public meetings—Michael has lots of public meetings—and we work through the issues with them. We bring it back and take it to our environmental management group and the program board. We then go back with the next set of recommendations. A survey is then done so that the board ends up with information from every land-holder regarding their position before it tries to pull together a decision. It is an iterative process, whereby we continue to go back to the land-holders in that catchment to try to work it through. Some of these issues, sitting in the middle of this, are difficult to overcome. Any

catchment issue is difficult to overcome. It does not matter at the moment whether you are in the south-east or in the Gawler floodplains; the catchment issues are different as we are.

People in various parts of the catchment have different views and people want different outcomes and they can have different impacts on each other. Having worked in the south-east in the other part of the drainage system, I know there are quite a number of different views and outcomes that people have and want. It does not matter where you go; you are going to get that. The particular issue we have at the moment is that we are in two catchments that have salinity at the top end and some biodiversity and other outcomes at the bottom end that we need to protect. How you put all that together to come up with some satisfactory solution is where we are at. That is why there is a lot of discussion at the moment about those programs. I do not know whether Michael wants to add any more.

Mr Leak—I think Roger has covered it pretty well. I will just say that we have had cycles of consultation, as Roger said, with land-holders—with an environment advisory group, with the USE program board and with a technical group that we established to assist with trying to provide the right information and the right science to the decision-making process. The consultation process has gone around multiple times. Many people in the audience whom you will hear from today have been part of that process to work towards a solution that may not be everyone's ideal but is hopefully something that addresses all issues.

Senator WORTLEY—So it is certainly the department's view that there is proper consultation through the newsletter, through public meetings and through surveys and that, in the process of decisions being made, there are report-back meetings?

Mr Wickes—Yes. That is the idea of the continuous cycle, so that people know where we are at. It does not necessarily mean that the answer—because we are also basing this on the best science we can get from the CSIRO and other groups—will be one that suits everybody's personal ambition, but that is what happens in catchments. Our role is really to try and balance those up for the community. This project, over time, has gone through various stages depending on where it is in the program. We put through a special act, the Upper South East Dryland Salinity and Flood Management Act 2002, to try to manage some of these impacts. People were doing a lot of things themselves, which were impacting on other owners, so the government of the day decided that it needed to put some process in to manage that relationship.

Senator WORTLEY—We heard submissions from other people when we had a sitting in Sydney recently. One of the issues raised was the issue of funding. Given the availability of funding, at both state and federal levels, what do you think is required in South Australia to address salinity and its impact in the future, and what would be a realistic time frame for you to become aware of the availability of funding to enable forward planning for a program to address the impact of salinity, to continue the program and to initiate a new one?

Mr Wickes—That is a good question. The issue is that the national action plan funding continues for another 18 months to two years. We are addressing that through the ministerial council environment. We are looking at what the forward programs might be and we are on a committee looking at that. It would be good for the community if we had some ideas on those over the next 12 months because of the forward budgeting, particularly with the NRM group plans. But I guess that is for our political masters to decide.

Senator WORTLEY—I take that on board. Realistically, for you to continue with some of the programs that you have in place, one would expect that you would need to look at staffing and allocation of resources so that there would be an ending. You would need to know whether there was going to be an extension, whether that program was going to finish there or whether you were going to need to attract additional resources from other areas to continue with it.

Mr Wickes—Yes, we need to know that in the next calendar year some time.

CHAIR—The country Labor representative!

Senator STEPHENS—I am a New South Wales senator from a drought ravaged area. I just want to take you back to two issues. The first one is the issue in your submission on page 4, which is about the salinity accounting system. I wonder if you could give us a bit more information about that system: how it is established, what models it is based on, how it operates and how you use it. That would be helpful.

Mr Cole—I will answer that. This applies to the River Murray, and it applies for actions that may have a salinity impact on the Murray or may have a salinity benefit to the Murray. We have established a system of salinity credits and debits which we can assign to those actions. In the case of irrigation, we have developed a ground water model which we can use to estimate the salinity impact of an irrigation development on any parcel of land adjacent to the river. Its underlying engine is driven by the salinity of the ground water, the distance from the river and the nature of the aquifers on approximately—I think—a six-hectare plot size. The underlying science was undertaken by CSIRO in a very useful collaborative program and coordinated partly by the Murray-Darling Basin Commission. So this process can roll out over the whole of the Murray-Darling Basin, although it has only been developed to this extent in South Australia.

Typically, an irrigation developer will approach our licensing people and indicate an intention to develop a parcel of land, and a particular volume of water will be transferred. We will use that underlying model to calculate the salinity debit that would derive. The South Australian government then has an obligation within the Murray-Darling Basin Ministerial Council arena to offset that debit, and within the state the irrigator has an obligation to the state to offset that debit. There are a range of strategies that could be applied to that. Some of those are still developmental, but the primary pool of credits has been generated by actions such as the rehabilitation of poor infrastructure in irrigation districts, improved irrigation practice by irrigators themselves, and salt interception schemes.

The South Australian minister holds those credits and can allocate them against a development, and we run an account book—a plus and minus account book. We use that account book to validate our position with our state to the Murray-Darling Basin Ministerial Council in that arena. In fact, on Monday this week, we were audited. We have an annual audit by an independent auditor. We were audited on Monday for our 2004-05 position, and the auditor will subsequently report on South Australia to the ministerial council, as the auditor will report on the actions of all states, the Australian government and the commission itself. We need to show that we were in credit and that we are continuing to be so.

One of the issues with salinity credits and debits is that they are not a stable number. Over a long period of time, an irrigation development, for example, will have initially a very small

impact, then in 50 years time its drainage will have matured and it may have a much larger impact. So this is a rolling process, reviewed every five years, and we run the accounts out for 100 years. It is simple in concept, complex in operation, but it is actually quite neat, and we can show quite clearly where we lie with all of our risks. We can look out 100 years and show what our long-term risks are and when we may need to bring another salt interception scheme into play to offset those risks. Irrigation zoning has been mentioned. This is a strategy to reduce future risks by placing any future development in low-impact areas rather than high-impact areas so we do not generate debits on our account.

Senator STEPHENS—And you say that the models being implemented here in the accounting system are only actually in practice in South Australia?

Mr Cole—To this level of sophistication, prior to us developing this system, Victoria implemented an alternative system that I think will eventually move through to this sort of model, and New South Wales is looking at what it will do. Because this is all coordinated through the Murray-Darling Basin Commission, all the jurisdictions can look at each other. I think South Australia has taken a position of exemplary behaviour. We want to be seen to be meeting all of our obligations. In fact, I must say that—and it is through national action plan investment that we have been able to do this—we have been keen to get our accounts very transparent and onto the books and be able to track our progress. But, through the auditing process, we are able to look at each other across the basin, and the independent process gives each of the jurisdictions comment on how each is tracking.

Senator STEPHENS—I think it would probably be very useful for the committee to have a bit more information about that. If you could supply it to us, that would be very helpful.

Mr Cole—We can do that.

Senator STEPHENS—Chair, I would like to pursue one other issue. That is that I would have imagined that you would have had the opportunity to have a look at the upper south-east land-holders' submission to the inquiry and the concerns that they have expressed that the program is working with 1993 data. They suggest that perhaps the predictions are no longer relevant because the anticipated extent and severity of salinity has not been realised and that there are new advances in science research that would perhaps make it a much more complex picture of drainage and soil quality, but that is not being taken into account. Would you like to respond to those criticisms for us?

Mr Wickes—Those criticisms have been made. We continually update our science. In fact, there have been many reports produced on the upper south-east program. We have had a very long period of dry in this state, as you would know has happened in New South Wales. We have done some work on annual rainfall totals and their variability. That does show that there has been a period of dry but it is not unusual for that to happen. Our expectation is that we will go through another period of wet. In the whole of the south-east, there is a series of dunes which stop water from getting into the Coorong, and in the old days they put in a lot of stopbanks to try to dry the flats out and not get water to the Coorong. We will go through another period where the rainfall rises. In the 1980s a lot of damage was done when the bucket got full. We expect that to occur again. We have had CSIRO do that work. Michael might want to comment, because they have had some work done. So we are continually updating our information.

Mr Leak—I can add to that if you like. The question that you asked is very similar to a question that the States Environment and Resources Development committee have asked of our program. We have provided them with a written response, and we can provide you with a copy if required. Very briefly, the area that is determined to be at risk in the 1995 Environmental Impact Statement was similar to the numbers that have been presented to you in the briefing paper. I guess one of the criticisms was a report that CSIRO did in 1998 that looked at a different methodology using satellite imagery as opposed to the traditional techniques for mapping salinity, and it came up with a different number. But it was not so much that the number was different and the area had therefore reduced; it was just testing a different methodology that was emerging and potentially able to be used to map salinity across the country quite quickly, as opposed to the traditional method of using very detailed aerial photography and thruthing this assessment on the ground. So some of the criticisms were brought about by assessing the particular report and seeing the number reduced, whereas, in fact, the numbers are still the same according to the groups which were involved in mapping across the state.

Mr Gale—The information we presented in the background is from the National Land and Water Resources Audit from 2000 which South Australia undertook in preparation for the Australian government. The information we presented today is from that audit from 2000. As Michael mentioned, the remote-sensing techniques through satellite imagery tend to pick up more the severe areas of salt-affected lands than that on the margins. So the numbers can be different for those reasons.

Senator WORTLEY—This is a bit of a vested interest question, I think, being a South Australian. How big an issue is salinity for the quality of South Australia's water supply? Also, how big a contributing factor is salinity to the diminishing supply of potable water?

Mr Cole—The River Murray is the key resource we are talking about here. While if you look at the river today you will find very low salinity levels in it, paradoxically this is because of the drought and the fact that the floodplain of the River Murray has not been inundated for a decade. We are actually storing about 200,000 tonnes of salt per year—in addition, each year—in the floodplain of the River Murray. So, in this last decade, we may have put a million tonnes of salt into the floodplain, which is sitting there, ready to come out the next time we get high rivers. So, if we look at the river in the long term, we still see very significant threats.

We are managing progressively some of the underlying processes, such as the ground water seepage into the river, through better irrigation practice and the network of salt interception schemes, and they are doing an excellent job. They have drawn average river salinity down by about 200 electrical conductivity units, but on average and in the long term we still see salinity as a major threat. The lack of flow in the river is a major contributor to the inability for the river to discharge its natural salt loads out to the ocean. There is no complacency for no action.

Senator WORTLEY—So has anything been put in place, or is there forward planning in relation to what would need to occur once we do have those water levels rising?

Mr Cole—Yes. The independent auditor has said to us that, in their view, this issue is one of the most significant risks that South Australia is now facing. We are just embarking on a new program of trying to understand these processes better and to be able to calculate, for a given inundation event, what those salt loads might be. Through the Murray-Darling Basin

Commission, we have also been looking at what other strategies one might bring to bear—for example, could we hold water in reserve upstream to act as dilution flow immediately post a flood event which may be giving us a saline return flow into the river off the floodplain?

That research work is just coming to some policy position now on two directions. One is about understanding the processes and what we might do to remediate them in terms of upstream water. The other area is just understanding how the floodplain itself works and how we might manage that. The initiatives around increased flow in the river—the 500-gigalitre first step towards the Living Murray and other such initiatives to try to get water back into the system—in a sense, in some ways will help our situation. In other ways, if that is water on the floodplain, that will make it more difficult. Our program is all about understanding the river, understanding all these processes and looking at how to manage it in an integrated manner.

Senator WORTLEY—What has been the biggest contributing factor to the salinity levels on the river, then? Also, what is being done to address the impact of that—as opposed to the impact of the amount—now?

Mr Cole—Of the salt in the river in South Australia, about half comes over the border from the upper catchments. The National Action Plan for Salinity and Water Quality and Murray-Darling Basin Commission programs are trying to address salinity in the upper catchments because of the long-term risk of salinisation and salt into the river from those catchments. About half of the salt enters in South Australia, partly from natural processes—and the river is intersecting the westward-flowing natural ground water from the eastern states, from the eastern catchments—which is further exacerbated by the irrigation development that has occurred in South Australia. So the programs now in place are partly salt interception programs to intercept that ground water. They are expensive. I think they are long term. They are part of running the river in South Australia. And there is a program too for further investment into those schemes—as it were, to salt proof the river. There are programs to reduce the impact of irrigation on the river by managing drainage better and making more efficient irrigation. There are other programs, as I have mentioned, looking at flow, storage and dilution.

Senator WORTLEY—Given the importance of the Murray River and the quality of South Australian drinking water in relation to salinity, do you think enough is being done or does more funding need to be put towards that issue in South Australia?

Mr Cole—My view is that we will need continuing investment for a while to fully get on top of this issue. I think there has been very significant progress since 1988 when the Murray Darling Basin Commission really recognised salinity as a serious threat to the quality of the water in the river. At that time it was recognised primarily as a water quality effect. There has been \$100 million of commission money invested and there is another \$61 million in the current program of commission money. There is \$35 million of NAP money. If you look at the documentation we provided you with, we are looking forward to the need for some continuing investment there. The other issues of the salt in the flood plain and the quite significant environmental degradation from that are issues not fully addressed yet. I do not think we recognise the cost of some of that environmental damage that has occurred. We are only just coming to grips with that problem right now.

Senator WORTLEY—So funding would need to be allocated to address specifically the issue of the environmental damage?

Mr Cole—That is right. We are just starting in the salt interception program to design the schemes not only to manage quality of water into the river but also to try and manage those landscape and flood plain salinity issues by putting the pump bores into the flood plain itself rather than having them up on the high land. We are looking towards strategic irrigation of some parts of the flood plain to get water in, not only to irrigate the trees but also to move the salt out. If that can be integrated with salt interception schemes, we can get the salt out rather than having it go into the river.

Mr Wickes—There are other catchments too that are of interest. In the Mount Lofty Ranges there are some salinity issues. But, if we continue the catchment approach in the Mount Lofty Ranges, we should be able to protect those reservoirs. There is a whole dryland salinity program. Eyre Peninsula has water issues. There is a high level of development going on in the Eyre Peninsula. This government is now connecting a pipeline from the Murray River to that area and is also looking at desalination. Kangaroo Island desalination has already been introduced, as you would probably be aware. Looking after their catchments is an issue as well. We are continuing our landscape program of vegetation and vegetation management.

CHAIR—One question I wanted to ask flows from some evidence we got from a Commonwealth government witness who raised a query about the balance of investment and attention being paid to civic infrastructure, road and rail, urban salinity and those sorts of issues as part of looking at the overall salinity hazards and whether or not that is getting as much attention in terms of the overall investment of resources. Could you make a comment on that from a South Australian perspective? Also, what is your view of how adequately local government is acknowledging and dealing with some of the challenges of both urban salinity and salinity in general with their planning decisions?

Mr Wickes—I know that in the Murray-Darling area of South Australia local government has just done a study of salinity and salinity impacts on their infrastructure and development. But I cannot give you any more information, really, than that.

Mr Gale—You would obviously recognise that two towns were at risk of salinity—they were Tintinara and, from memory, Coomandook. They are in the Coorong district area. That is where we have this major program. There is a case study mentioned in the documentation. They have done 100,000 hectares of on-ground work to try and tackle the problem and they have already achieved their interim targets set for 2003. They are now on their longer-term target of reducing recharge by 50 per cent across that whole region. That program has very strong local government support. It is actually managed through the Coorong District Council. They have also undertaken recently an audit of the urban salinity issues in Tintinara—I am not sure about Coomandook, but certainly it was in the Tintinara area—as part of a land and water management planning process.

Mr Wickes—It is funded through the NAP.

CHAIR—Do you think the urban salinity aspects are getting an appropriate degree of recognition in the tackling of the whole salinity thing?

Mr Cole—The situation in South Australia is that urban salinity has not been at the same degree of risk as in some other states. In Western Australia, in some of the country towns, there are some very significant salinity issues and in some southern New South Wales towns like I think Dubbo—

Senator STEPHENS—Wagga?

Mr Cole—Yes, and Wagga. We looked pretty closely at this about six or seven years ago, as to what were the salinity impacts in urban regions in South Australia, and there was quite a bit of local government interaction in that. As Glenn said, the result that came out of the audit was that it is fairly limited. It appears to be in the upper south-east area, and it is being tackled partly through those other programs that we have been talking about.

Senator ADAMS—I come back to the interaction between local government and the catchment authorities and the legislative powers they have, such as being able to say: ‘We’re in control of this, so you’re not doing that,’ or ‘We want to do this but we can’t do it.’ We are running into a few problems like that in Western Australia. Do South Australia’s regional bodies hold legislative powers and, if they do, can you comment on the Australian Local Government Association’s concerns about the interaction there?

Mr Wickes—The Local Government Association helped us to draw up the legislation and actually sat here in this house the whole time it was debated to help us with it. Built into it is quite a strong relationship with local government. The issue, of course, is maintaining that relationship. Local government here have always looked after quite strongly the animal and plant control and feral side of it, and they are all very keen to get into the broader natural resources debate. As we have said, some councils have taken that on very strongly, whereas others have not. The challenge now is to get all those local governments to embrace that. The rural areas are probably more around it than the Adelaide councils. But it is on the local government agenda; it is quite regularly on the agenda of the local government forum with our minister—in fact, it is on the agenda for the next forum. So it is something that we are trying to build up. People with local government experience are members of the NRM boards, and each board can have on it a person representing local government, like a chief executive, who is not a voting member but partakes in all the meetings. We are trying to make that a stronger relationship, and there are quite a number of forums going on at the moment where the NRM, the natural resource management, chair and the executive officer are meeting with all the local governments. We have actually been doing that in the last two months, to work through those issues and to try to establish that relationship. So we are working at it.

Senator ADAMS—If there is going to be new subdivision or redevelopment going on in a bigger town like Adelaide, will they work together to work that out or will they say, ‘No, we’re doing it’?

Mr Wickes—Under the current act, the board can make a change to the development applications. Where they set it up and say, ‘This is what we’re going to do in our district,’ the boards can make a change to that. The law has not been used because, as soon as they start talking about it, they work together. We are just changing the development act so that it has to take account of those activities and put in new arrangements, so the development act and the Natural Resources Management Act will work closely together in doing what you are saying. So

we are setting the processes up. We have a planning strategy to now recognise those things, and that planning strategy then influences the planning programs of the council. We have started a process where they then have a program of what should happen. We are trying to get all those connections going at the moment with local government and the planning fraternity.

If somebody wants to put in a development, hopefully, we have set up the planning environment so that it says 'yes' or 'no' about where it can go. That is what we are trying to do because once you are at the development application stage, time is a bit short. With respect to the River Murray, the River Murray Act has been put in by this government. Any development along the River Murray is referred to our minister and our department for comment. That is fairly strong, but in the rest of the state we are trying to work it through modules that are part of the planning process—the planning strategy, the development plan for the area and the planning amendment reports, PARs, that get the criteria that allow a decision on a subdivision to be made within this framework of development.

Senator ADAMS—I have one more little question—

Mr Wickes—That is what we are trying to do. Whether we are successful, I think you—

Senator ADAMS—That is why I am asking because we have had a few projects overridden by the minister in Western Australia and local governments, so there is a bit of a war going on.

Mr Wickes—The reason we work so closely with planning is that, particularly in the rural areas, planning decisions have a major impact on natural resource management. We need to take that into account, whereas probably in the past a lot of the planning has been around the built environment, so we are trying to make that rural landcare connection. We have been doing that for the last five years.

Senator ADAMS—That is good. On compensation to farmers on your wetlands, what sort of compensation are they paid? Is it a realistic value or, as you said, are people prepared to shut land up? Are they compensated adequately for that?

Mr Wickes—We do not pay compensation. If people have a wetland and it has got some biodiversity on it then we price the value of that biodiversity through a process, which people in Michael Leak's group and in the Farmers Federation do. We put a value on that wetland and that will be part of their contribution towards the total program in that area, which is the biodiversity trading scheme. In the previous levy arrangement, anybody who had wetlands of a certain size did not pay any of the levy and, obviously, local government have considerations for those people.

The other thing we are doing is providing—I talked about the amount of fencing—subsidies to help with fencing and the management of the biodiversity. We are not compensating. We are not buying the biodiversity from people; we are just getting them to set it aside and look after it for the future, as is the case with the native vegetation heritage agreements where people are looking after it for the future, because we have cleared a lot of our biodiversity over time.

Senator ADAMS—What happens if they do not want to?

Mr Wickes—We cannot force them into it. They can pay funding towards the program, and we will invest that in other biodiversity programs.

CHAIR—Senator Wortley, I read in the paper today you are a heavyweight powerbroker locally, so seeing I am in your town I had better give you another question.

Senator WORTLEY—I have not read the paper today, or that particular paper.

CHAIR—Too busy when you are a heavyweight to worry about local papers, I am sure!

Senator WORTLEY—Kangaroo Island is one of South Australia's treasures. For those senators who have not visited it, I urge you to do so because it is one of the wonders of our side of the world. The desalination program that is currently in place there: what is the long-term impact of that going to be? Is it enough to have the program in place or are there other ways in which the cause of the salinity problem there is being addressed—not just fixing the problem but looking at what is creating it?

Mr Wickes—I think you need our water resources people, the engineering people, here to work our way through that. What we are doing is working on their catchment to improve the water run-off from there. Kangaroo Island is also developing. More people are moving down there or holidaying down there, so water supplies have become critical. There is a balance between the amount of water required for the community, given the change in community, and the catchment that is supplying them. I do not think we can really comment.

Senator WORTLEY—Is that adequately being addressed or is it something that is just being touched on at the moment and needs to be addressed?

Mr Wickes—SA Water do water budgets, and some of our people are involved in that all the time to make sure that there is potable water for communities. We have done a lot of work with SA Water on Eyre Peninsula over the last few years to make sure there is potable water. SA Water has built a desalination plant to help meet the water needs of the community.

Senator WORTLEY—What about the environmental impact?

Mr Wickes—That salinity plant is working off sea water and is only taking a small amount off the top. All of those things have been worked out—because it had to have an EIS—as to what its impact on the sea water will be. It is put into place where there is continual sea water mixing, and the amount of water they are taking out is only a small fraction of that total volume that goes through the plant, so it is not causing a high concentration of salt; it is just taking some water.

CHAIR—I have one final question. It has been drawn to my attention that, at a recent hearing of the state parliamentary environment committee here the local Department for Environment and Heritage that you mentioned earlier made a statement about how ground water drains have proven unable to deliver the quality of water required to maintain wetland habitat in areas now impacted on by drainage and that the option of not draining and the assessment of the use of other measures has not yet been seriously investigated. I think that was last month or so. Is that a view that your department shares?

Mr Wickes—Everybody has a view, and that is just one of the views that have been put on the table at the program board. We have since worked through those issues. In that particular area that you are talking about, there are other options for bringing fresh water from the south, which we are looking at. That will make those wetlands look a lot better. I think that is a statement that DEH made, but they need to work in the context of the total program, which is what we are doing. We have had a program board meeting since then. A lot of people say things. You have to sit down and work through all those issues and work out what the major issues are. Obviously, we have limits on the salinity that you put into wetlands, and we need to maintain that, otherwise they will degrade—and they are degrading slowly. We need to look at other options to make sure that these freshen up.

One thing DEH did not say was that we have actually avoided putting water through Henry Creek, where there are some endangered species, by putting another cut through a hill, and that part of the world is improving. You get all these balances in the total program. No decision has been made on drainage in that catchment. We still have a long way to go in these discussions that go around and around before we come to a conclusion. As you can see, we will report all that information quarterly and annually to the ERD committee of the SA parliament. What we are doing in the middle is trying to get it all together. We report in lots of different ways to all the different stakeholders.

CHAIR—Thank you for that. We wish you all well with your continuing work in balancing all those factors. Thank you for your time this morning.

Proceedings suspended from 11.12 am to 11.22 am

BURDEN, Mr Frank William, Private capacity

CHAIR—I welcome Mr Frank Burden of Tintinara. Thank you for giving us your time today. It is much appreciated, particularly given the distance you had to travel and the distance you still have to travel back, and the time involved with that. We have received a submission from you which we have given the label of submission No. 38. Firstly, are there any amendments or alterations you wish to make to that submission?

Mr Burden—No.

CHAIR—I remind you that evidence given to this committee is protected by parliamentary privilege. Giving of false or misleading evidence to the committee may constitute a contempt of the Senate. I also remind you that at any stage should you wish to give your evidence, part of your evidence or an answer to a specific question in private you may ask to do so and we will consider that request. I now invite you to make an opening statement, and then we can move on to questions.

Mr Burden—First of all, thanks for the opportunity to present my views this morning and also for publishing my submission. I hope that the information included in my submission which comes out in this hearing provides a useful and a different perspective on the subject of dryland salinity and its management. Importantly, I know that my views, although apparently controversial to some members—but not all—of the Upper South East Dryland Salinity and Flood Management Program, are held by many other land-holders, public servants and scientists. Support and advice given to me by the latter two groups reinforce my view that the science and management of dryland salinity is poorly understood by many key people. It also reinforced my view that the upper south-east program, and in particular the \$45 million drainage component, was not providing an optimum and cost-effective solution to problems caused by dryland salinity and flooding.

I now conclude that the most cost-effective solution for the region should have been based on shallow surface drains to relieve flooding in conjunction with salt-land agronomy and more effective recharge management using deep-rooted perennial vegetation pastures. This conclusion is not too dissimilar to those of independent expert reviews of the upper south-east program and also by the state government's own environmental impact assessment branch in late 1994. The financial and environmental costs of deep drains—and I define deep drains as anything greater than about half a metre or a metre deep—are rarely offset by the benefits, but these still remain the preferred option of the program. Recently, officers of the state's Department for Environment and Heritage referred to a project culture of drain construction and infrastructure development that permeates through to the program board making alternative management options appear untenable.

Professor David Mitchell, an internationally recognised wetland ecologist from Charles Sturt University, expressed grave concerns about the current rationale for the program and commented on the rather sparse attention paid to previous monitoring of the consequences of drainage as a basis to current planning. In an unpublished report on the performance of a trial drain

constructed in 1998 as part of the program, drain performance was noted to be less than one-fifth of that predicted, but this did not result in a review of the program or earlier predictions.

More recently, an unusual soil structure discovered in the upper south-east is expected to result in productive fresh water being preferentially drained from soils close to deep drains, leaving salts behind in clay soils just below the surface. In a very recent report, CSIRO noted several deficiencies in information that prevented accurate predictions of drain effectiveness and impacts. One of the first things I learned was that the upper south-east has experienced high watertables and dryland salinity for thousands of years, the evidence for which is all around. The vegetation that grew in the area before European settlement had evolved to live in these saline and frequently waterlogged conditions. Not surprisingly, the region has not easily adapted to agriculture, and practices such as uncoordinated construction of drains and stopbanks to prevent inundation of land and the removal of native vegetation upset the natural balance between rainfall and watertables.

When the program was conceived in 1993, predictions that watertables would continue to rise without drains were clearly wrong, because they have been generally falling in the region since then without drains. The reversal in watertable trends also failed to cause the program to be reviewed. As reported in my submission, the NAP salinity targets for the program were probably met before the current stage of drain construction commenced, and that was without drains.

Reviews of other programs indicate that drainage is rarely cost effective in curing dryland salinity. Whilst some land-holders might benefit from deep drains, the evidence suggests most will not, and in particular the environment and ephemeral wetlands are likely to suffer. Major land-holders' divisions on the subject of drainage—that is, deep drains versus surface drains—are being fuelled by misleading program publicity which suggests that saline land is being miraculously turned into highly productive land when in practice the benefits extend in some cases to less than 100 metres from newly constructed drains.

Many upper south-east land-holders view salinity as another management task, like weeds, feral pests and so on, which they address by adapting their land management practices. They have successfully turned potentially unproductive land into highly productive land using adapted plants and pastures and adopting soil management and pasture-grazing regimes that reduce dryland salinity. This has also included planting deep-rooted perennial pastures on higher ground, which has enabled land previously affected by dryland salinity to be reclaimed by reducing recharge and locally lowering watertables.

A point made by many visitors to the region is the remarkable differences that can be seen between neighbouring properties depending on the land management practices adopted. The so-called scourge of salinity for many land-holders becomes a self-fulfilling prophecy. Because they have been told that their land is saline, they have done nothing to improve it, and the cycle of salinity caused by poor soils and surface cover is perpetuated.

Dryland salinity is not the scourge many have made it out to be. Land classified as saline in the upper south-east is not saline and has been sown with non-saline crops and pastures. Land classified as unproductive and unviable because of salinity has been successfully sown with productive salt tolerant pastures. The so-called threat has been contracting since 1993 without

drains. The upper south-east program would benefit from a critical and independent external technical and economic review.

Senator WORTLEY—That was very interesting. What would you like to see happen to manage salinity in your area and what do you think it would take for it to be achieved?

Mr Burden—People are already managing salinity in the area through a number of practices. One is through the planting of deep-rooted perennial pastures on higher ground. That prevents recharge of the ground water and keeps the ground water under control. On the flats that are saline, people are using salt-land agronomy and salt tolerant pastures to generate a return. The pastures can be very highly productive, and that is how many people are doing it.

The other point to be made is that one of the things that is quite apparent to me now, having spoken to people who have recently had drains constructed on their properties, is that they talk about relief of flooding; they do not talk about problems with salinity control. It is the flooding that seems to have been the major problem in past years in the upper south-east. I see a role for shallow drains to control flooding, but I do not see the cost benefits at all justifying deep drains in many circumstances.

Senator WORTLEY—Is it enough to leave it up to individual land-holders to address the issue or is the issue big enough that there needs to be that public consultation? I think you were here earlier when they were talking about the public consultation process. How much involvement did you have in that public consultation process?

Mr Burden—We moved into the property about seven years ago, so we were not part of the initial consultation process, but what I do know is that when the original plan, the south-east Australian salinity and flood management plan, was produced in 1993 over two-thirds of submissions on the plan either had concerns about the plan or opposed the plan, primarily because of the depths of drains that were being proposed. That message from two-thirds of land-holders—and also there were some government submissions there as well—does not seem to have got through. A couple of years later, the environmental impact assessment branch, which is a state government branch, conducted a review of the plan and the supplement to the plan which was produced by the Natural Resources Council and concluded that all major decision making should be directed towards surface drains and not to ground water drains, and yet the need to drain away ground water seems to have got locked into this psyche of the managers of the program, which is unfortunate. That document forms the EIS, and it is a document that is rarely referred to. It also points out inadequacies in information—the lack of information—on the impacts of drainage as well. But, as I say, that is rarely referred to.

Senator WORTLEY—Getting back to the issue of what you would like to see happen in the area, would it be adequate just to allow individual land-holders to address it or does it need to be a coordinated approach?

Mr Burden—There are land-holders who will do it anyway. They will manage their properties in a sustainable way and maximise productivity that way—or not necessarily maximise productivity but at least achieve a balance between productivity and an income. There are others who will not do that; they will not manage the property in a sustainable way.

Senator WORTLEY—How can the issue best be addressed, in your opinion?

Mr Burden—Through incentives. But I know that the comments made by people who manage incentive schemes are that frequently the people who use the incentive scheme—and, for example, the incentive scheme for revegetating with salt tolerant pastures and deep-rooted pastures represents only a relatively small percentage of the total cost of revegetation—are probably the people who would continue to plant if the incentive scheme did not exist in the first place. So that tells me that maybe the incentives need to be greater—it needs to represent a greater proportion of the cost of revegetation or another method. I guess we might be talking about using a stick to force people to change their management practices, which would be inappropriate. But the incentive scheme does work but, it seems, only for a relatively small proportion of land-holders.

Senator ADAMS—Could you tell me about the scientific evidence for this drain. What has been explained to you and given as the reason for it?

Mr Burden—We bought our property seven years ago. At the time we knew that a drain route had been planned through our property. We have a four-kilometre drain. About three years ago some of the details started to be firmed up. There were relatively simple explanations about the performance of ground water drains: the drain just takes the water away and takes all the salts away with it. It sounded credible to me until I started to hear contradictory comments and I read a bit more about salts and drainage. Draining saline soils is not unique to the upper south-east or to Australia. It has been going on for tens of years all around the world. There is plenty of evidence that exists around the world.

When I started to look into the detail of the science I started to discover comments about an effect called sodicity, which affects organic matter and clays, where the clay structure fails and forms impermeable pans. When the salt is in the clays the clays are porous and can be drained. As soon as the salt is removed, or when the salt starts to be removed, and the fresh water reacts with the clays, the clay breaks up—it disperses—into tiny particles. They clog the pores in the clay and prevent water from percolating through.

That is one effect. Another effect is not so much associated with salinity; it is associated with soils that have been waterlogged for considerable periods of time where iron sulphides exist in the clays. There is a considerable amount of iron sulphide in the clays of the upper south-east. The presence of iron is indicated by the orange colour of the clays. We also have sulphurs in the clays. When atmospheric oxygen reacts with the iron-sulphides it produces sulphuric acid.

We also have calcium carbonate in the soils, which reacts with the sulphuric acid and effectively buffers or cancels the acidic process. So those two actions occur. I did not see any references to that in any of the original background papers for the upper south-east program. It is only relatively recently that I have started to see the topic of sodicity being referred to in program reports.

Senator ADAMS—Can you see any other way that the problem can be fixed without this drain going through?

Mr Burden—My view is that we are trying to solve a virtually unsolvable problem. Salinity has existed in the area for tens of thousands of years. It is not a new thing. It may fluctuate. It may go up and down with different weather patterns, but my view is that we should be tackling the flooding problem, living with salinity and adapting our agricultural practice to live with salinity. Maybe we should adopt other things like using perennial pastures on higher ground to reduce recharge and prevent salinity causing such a major problem on the flats.

The other thing that I am aware of, and which I have seen practised, is improving the soil structure, improving pastures and using fertiliser treatments. Just generally improving the soil structure and increasing the organic matter in the soil improves the porosity of the soil. That reduces capillary rise, and that means that fewer salts then rise and concentrate at the surface as a result of evaporation. Vegetation cover is another way of doing it—by ensuring you do not graze pastures too short during the dry months and by leaving the grazing of those areas that are potentially saline until later on in the season.

Senator ADAMS—In the upper south-east area, is there a lot of structural damage done by salinity to infrastructure in towns, such as roads, bridges and foundations, that you are aware of?

Mr Burden—I am told there is but I have not seen any. I know that the town of Tintinara, which is close to where I live, has had a problem with rising watertables, but the drains do not go anywhere near Tintinara so it would not affect that. I presume there are some areas where buildings that have been constructed on low-lying ground close to the watertable might be affected but, as I said, I am not aware of any of that.

Senator ADAMS—I have one last question. How would you describe your relationship now as a land-holder with your regional body, the South East Natural Resource Management Board?

Mr Burden—I am quite friendly with some members but I have only interacted with the body once. I think the body has only been operating for about three or four meetings. The next meeting is tomorrow. I am aware of its work but I would not say I have a close, intimate relationship with it. I am aware of it but it has not influenced or impacted at all on me with regard to my farm.

Senator ADAMS—You have been able to speak to them, though, about your concerns?

Mr Burden—Yes.

Senator ADAMS—That is good. Thank you.

Senator STEPHENS—Thank you, Mr Burden, for your submission. It makes some very serious claims. I am sorry that I was not here for the beginning of your evidence. Did the chair ask you to provide a bit of background on your expertise?

Mr Burden—No. I am now semi-retired. I still work part time for a company that does contract work for the federal government. I have an honours degree in physics and I have a master's degree in advanced systems engineering. My work experience has been a mixture of both science and engineering. In science, it was generally in electronic areas. In the last job I held in the federal government I was a senior principal research scientist working for the

Defence Science and Technology Organisation, just up the road from here, managing major projects worth tens of millions of dollars. The last project I managed was worth over \$100 million. So, because of my professional science and engineering background, I understand the project management processes. I have a reasonably good handle on the science associated with salinity as well. I would not say it is a challenging science at all. It is relatively easy. Putting all of the individual elements together complicates the issues, but the individual elements of the science are relatively straightforward to understand.

Senator STEPHENS—Thank you for that. It is obvious from your submission that you do have a science background and I wanted to make sure that that was on the record. Did you hear the department's evidence this morning when I asked them about your concerns about the 1993 science, which is the claim that you make in your submission?

Mr Burden—Yes.

Senator STEPHENS—Do you have any comment to make about their response?

Mr Burden—It is clear to me now that two key predictions were made in 1993. One was in relation to trends in watertables. At the time, the predictions were that watertables would continue to rise. It was predicted that about 7,900 hectares per year would fall to salinity in the upper south-east, starting in 1993. So there was that one prediction which was key to driving the program. When one now looks at the watertable data, it is clear that 1993 was about the peak. It followed a period of about two or three years of high rainfall. The watertables turned around and started to go down, and there has been a general downward trend since 1993. That is not my interpretation of the data; it is what the department has also published. It produced watertable maps showing downward arrows—large downward arrows and small downward arrows—showing all of these watertable trends. So 250,000 hectares were supposed to have been affected by salinity then. If watertables are going down, it is clear—or it should be clear to most people, anyway—that salinity should have contracted. So that was one prediction.

The other prediction was in relation to the effects of drains and the impacts of drains. Predictions were made about the amount of water that flows into the drains—in other words, the ability to dewater or remove ground water. A trial drain was constructed, in fact—I think completion was in 1998—and measurements of the effectiveness of that drain showed—I think it was less than a fifth—that it was underperforming by over 80 per cent. So there was quite a significant difference between the predictions and what was actually happening in practice. That trial drain was supposed to have formed the basis for future planning, but that information does not seem to have impacted at all on the drainage program.

Then, leading from those two predictions, economic analyses were conducted that predicted what would happen if no action was taken, based on the growth in salinity and what benefits would arise from drainage. That economic analysis, while it was based on flawed predictions, is still referred to today, as is the 2002 economic analysis as well. It went back to the 1993 analysis and added environmental values into the calculations. But the original data has not been corrected. It has not been reviewed in a rigorous way.

For the rest, there was very little science used, I would say, compared with the knowledge that was available at the time. There was very little science incorporated into the drainage process or

the drainage scheme. The knowledge has been gradually growing, but there was a heck of a lot of scientific knowledge outside Australia and also within Australia. In Western Australia there were some world-recognised experts in the field of salinity and drainage. Professor Jim Quirk, who used to work at the University of Western Australia, had vast knowledge and experience of sodicity, but that information was never referred to in the original background papers. Sodicity impacts on the permeability of soils and the ability of drains to be effective.

Senator STEPHENS—Thank you for those comments.

CHAIR—We are always in a difficult position in any parliamentary committee—and I know there is a state parliamentary committee looking at some of these issues as well. None of us are scientists and, for that matter, even if we were, you get competing scientific opinions, a bit like you get competing legal opinions. One of the questions that I always ask in that circumstance is: why would government agencies continue to pursue a course of action if there is a reasonably undisputed amount of evidence that it is not going to work? It costs a lot of money and, as we all know, more money can be valuably used in a range of ways. We do not want to waste the limited amounts that are available. Why do you believe that people are continuing down this path if there is a fair weight of evidence that suggests that this is not actually the right way to go, or is it just that there are competing views and they have subscribed to one view and you have subscribed to the other?

Mr Burden—I would like to be convinced either way. The most convincing evidence that I have seen points me in the direction of a particular solution, which does not happen to be the solution that the program is pursuing. If you would like my honest opinion, my feeling is that a drainage scheme was conceived in 1993 and became locked into the planning process. To change the design because of new science, new information, means restructuring the scheme quite significantly. Apart from that, I am lost for words; I really do not know why they should be pursuing this. I am not claiming to be an expert in any of the fields, but it might be that program staff lack appropriate knowledge or a lack of experience.

CHAIR—From looking at your submission, I can see that you have done a fair bit of research into it. Is it your assessment that there is overwhelming evidence in favour of the conclusion and views you have or do you accept that there is a diversity of views on the scientific evidence about which way to go? The second part of that, just to put both questions together, is that one of the factors that seems to be coming forward in the evidence we get is that there is a lot of difference from one mountain range to another. One thing will work in this part, and across the other side, just because of different soil types or whatever, that approach will not work. We have to be much more flexible because of some of those factors as well.

Mr Burden—Certainly there are a variety of factors. Deeper drains might be more effective in some landscapes. In the area where I live, which is a sand over clay area, deep drains are not effective. I have seen that after a year. We are finding that water flows in the drains, because of the clay, are considerably less than we were told would be flowing down the drains. In fact, one of the proposals to us was to have levee banks put either side of our drain because of concerns that the drain would overflow. I forget the exact figure the drain was designed for; it was something like 260 megalitres a day capacity. The peak winter flow this year was around eight megalitres a day through our property, which is about three per cent of the maximum design flow. That is in the middle of winter. In the middle of summer, there is going to be hardly any

water flowing down there. What I would say is that that particular type of drain for the landscape where I live is completely inappropriate. In other areas it might be appropriate.

I made a point about economic analysis earlier. The economic analysis is the closest that I have seen in the program that comes to a systems analysis of the program as a whole—not just focusing on a drain and the effects of the drain but looking at the impacts on wetlands, biodiversity, productivity and a whole range of things. There is an absence of economic analysis and consideration of options. It seems to be that the only option that we have is a drain, where you want the drain and how deep the drain is. That was the extent of land-holder consultation.

The options need to be a lot broader than that. We need to consider shallow drains versus deep drains, and locations of drains, and maybe the program should have looked at four, five or six options, conducted an economic analysis for each of the options, then assigned biodiversity values to the economic values and used that to inform the program, instead of being driven by this belief that drains are going to be the miraculous solution to the problems that many people perceive in the upper south east.

Yes, drains will work in some areas, but my belief is that as soon as you get below about half a metre or a metre that is when the problems start to arise—you start to tap into ground water, salt water, saline water, which is not good for wetlands. You increase the management problems associated with trying to keep saline water away from fresh water and you dewater soil so there is less freshwater run-off. It just complicates the whole process and the cost starts to escalate. That would have come out in the economic analysis. As I say, the only economic analysis that has been done so far was done in 1993, when circumstances were quite different to how they are now.

CHAIR—We will conclude things there. Thank you very much for your evidence and your participation today.

Mr Burden—I would like to hand you some photographs. My wife describes the work of the program as environmental vandalism. There are examples there of drains that were constructed about a year ago, and in our view it is destruction of the landscape. The very large one there, which is titled ‘the grand canyon’, was constructed four or five years ago. It has not been revegetated. It is an eyesore. If you fly between Melbourne and Adelaide, look out the left-hand window and that is the one you can see. Satellite imagery is really excellent. It stands out. If you want to know exactly where you are in the upper south east, look for this great big scar on the landscape. It is still there as a scar. That is one of the prices that we are having to pay for draining the land in the upper south east.

CHAIR—Can we keep those photos?

Mr Burden—Yes.

CHAIR—All right. We will accept those as tabled and peruse them as we keep going. I think the matter might be raised by one or two other witnesses as we continue through the day. Thank you again for your appearance today and for the preparation of your submission. If there is any information you want to provide to the committee in response to other evidence or whatever, feel

free to do that. We will not be pulling our report together until the early part of next year now. That applies to anyone else in the audience too.

[11.59 am]

HAYWARD, Mr William, Private capacity

PROSSER, Mr Dean Hedley, Private capacity

PROSSER, Miss Karyn, Private capacity

PROSSER, Mrs Susan Lee, Private capacity

CHAIR—I welcome witnesses from Marcollat. Thank you for giving us your time today and for the time you have taken to travel here and travel home—time away from the many important things in your lives that you would normally be doing. We have received your submissions, submissions 33 and 34. Are there any amendments or alterations you wish to make to them?

Mr Hayward—No.

CHAIR—This is just a formal reminder that evidence given to the committee is protected by parliamentary privilege, which also means that the giving of false or misleading evidence to the committee may constitute a contempt of the Senate. I also remind you that, if you should at any stage wish to give your evidence, part of your evidence or an answer to a specific question in private, you may ask to do so and we will consider your request. I now invite you to make an opening statement.

Mr Hayward—I think it was agreed that I should go first, if that is all right.

CHAIR—As long as there is not going to be a revolt amongst your fellow witnesses, you can do it in whatever order you like.

Mr Hayward—Having listened to Phil Cole and his global business about salinity, you are now coming down to a very local situation. You are coming down to the Marcollat watercourse, which has six properties on it and which stretches for about 30 kilometres. It is in the upper south-east. It is south of Keith. It is on the very limit of where the AMP scheme took up its land in its trace-element land settlement in the 1950s.

I would like to make four points and then a general point. The points I would like to make are about the characteristics of the Marcollat watercourse. Phil Cole talked about these last two watercourses. He said some of them have highly productive, non-saline areas at one side or one end of them; others have saline affected parts of watercourses at the other. The Marcollat watercourse is one of these.

The characteristics of the Marcollat watercourse include the fact that the part of it that is good is very good. It is known in the district as being highly productive and also as having excellent water. You will probably be hearing from the Prossers about the characteristics of the Marcollat watercourse. But I went and saw a fellow who lives in Keith. He was the manager of Minnamurra station, which is one of the properties in the good part, from 1953 to 1983. When I

told him—he is still alive and well in Keith; his name is Les Goetze—about the proposed deep drain down the Marcollat flat, he said: ‘That flat’s a beauty. Unless the lovely, fresh water under it has gone salty, don’t touch it.’ That is the evidence of a fellow who has lived in and worked that country for 30 years.

I see that there are five other local land-holders who are supporting the Prossers’ submission. My second point is that there has never been unanimity amongst these land-holders in the Marcollat watercourse about a deep drain. When the EIS, the environmental impact study, was produced in 1993, there were two major people who spoke against it. They are now both dead—Dean’s father, Hedley Prosser, and a man called Max Verco, who in fact owned most of that country and grazed it from the 1930s onwards, before the AMP scheme got going. I would hope that, in question time, I might just have a minute on unanimity.

There were eight options put forward as a result of the meeting. To go back a little bit, the program was in three sections. The southern section has been completed. The northern section has now been completed, in the last two years. The central section—the middle part of this flood management and salinity program—has not yet been finished, but there is this plan for a deep drain to go down the Marcollat watercourse.

At the meeting with land-holders which took place in November 2003, eight options were recognised. Seven of them had to do with digging a two-metre deep drain. There was one option there which was called the ‘do nothing’ option. This is a misnomer, because it meant ‘do nothing about digging a deep drain but do all else in your power to solve the problems in another way’.

My third point is that no real consideration was given to the option of not digging a drain. Whilst a lot has been said about consultation, in my mind there has been an absolute mindset in the program about the digging of a deep drain. I was very interested to hear Frank Burden, whom I have never seen before—here is one engineer that does not want to dig a deep drain. That was very encouraging. My fourth point is about the engineering mindset about this.

To conclude, I go back to a letter which Andrew Johnson wrote summing up the meeting about digging the drain in Marcollat: the Willalooka wetlands and the Willalooka wetlands in the southern part are significant in the context of the upper south-east. They represent an unusual clustering of wetlands supported by red gums. These red gums are dying from waterlogging or salt or a combination of both. Pasture composition is limited on Willalooka due to the high salinity levels in the soil. Ground water is highly saline on the Willalooka property.

The other part of the Marcollat watercourse, wetlands north of the Keith-Kingston Road, is in good condition. It has high biodiversity value. The agricultural land north of the Keith-Kingston Road is highly productive, as is well-known throughout the region. Ground water north of the Keith-Kingston Road is suitable for stock and irrigation purposes. Regarding land-holder opinion about the proposed Didicoolum drain, land-holders south of the Didicoolum-Keith Road are eager for the drain to proceed—that would be the McGregors and the Nitschkes; land-holders north of the Keith-Kingston Road do not want to see a drain through their property.

Dr Bob Anderson, who has written a report about the Marcollat watercourse and has also been an environmental adviser to Willalooka, recently said: Willalooka wants a drain; Kyeema—which is the top part where the Prossers live—does not. How this is going to be resolved, I do

not know. That is the balance which Phil was talking about earlier today. I would say: why the difference? If the difference is that there are parts of the southern part that never should have been developed that have always been saline and had scalds in them and they have been developed for pasture, and if that is the case and there has been drainage that has stopped the flooding across the flats which regenerates gum trees then really is a deep drain going to solve the problem? That is my question.

CHAIR—Thank you for that. Do you want to make a comment as well, Mrs Prosser?

Mrs Prosser—Thank you for giving us the opportunity to speak on our hurriedly prepared submission. You will note our disappointment with the operation of the Upper South East Program Board. On a more positive note, I would like to make four points. Point one is the uniqueness of the Marcollat Flat. It is a remarkable landscape, half of which is subject to inundation and comprises numerous ephemeral and permanent swamps ranging from fresh, brackish to saline. Attempts to convert these areas to agriculturally worthwhile land has resulted in increased salinity and a loss of native vegetation. The other half is highly productive environmentally as well as agriculturally. It owes much to the lens of fresh water on which it sits.

Point two is the importance of our management practices which are based on perennial pastures, revegetation, maintaining ground cover all year round and what others may consider low stocking rates. My husband, Dean, can answer questions on this. We believe in this fragile country that these practices could well be used as a model.

Point three is that there has been insufficient research based on experience and observations over time—in short, too many unknowns. Point four is the fact that it is more than 12 years since the EIS appeared. Much has changed since then, such as rainfall patterns and ground water levels. The uptake of lucerne has grown from 40,000 hectares in 1993 to close to 300,000 hectares, the level in 1978 when the blue-green aphid arrived. Furthermore, the DWLBC NAP proposal reported that, in a survey in 1999, over 60 per cent of the salt affected area had been sown to salt tolerant pastures and 39 per cent of the survey area of 186,461 hectares had been established to perennial pastures. The threat from dryland salinity is receding without drains. A deep drain in the Marcollat would change the flow pattern and nature of the watercourse and flat irretrievably.

Senator ADAMS—What do you envisage the effects of the Didicoolum drain will be on your property and the neighbouring properties, and what will be the environmental and financial costs?

Mrs Prosser—Three independent reports were made. The agronomist said that a reduction in soil moisture will cause the soil to dry out more quickly and will subsequently shorten the growing season. This would adversely affect the productive pasture species on this area of the farm. The perennial pasture species would then be less persistent, making way for an increased number of annual species. This would then reduce the amount of organic matter in the soil, which would in turn decline the soil structure. Topsoil would break down rapidly to fine sand particles and the subsoil structures is prone to slacking and dispersion. Therefore, structure is easily affected and could lead to topsoil erosion. This would lead to reduced infiltration rates and soil penetration by plant roots, ultimately resulting in a significant reduction in pasture crop

quantity and quality. This reduction in pasture quality and quantity would significantly reduce stocking rates and animal production potential on the property.

Dean, would you like to talk about the watercourse and how it would influence the watercourse?

Mr Prosser—I would like to lift up these pictures so that we can get an idea of what is going on and what we have been doing. These pictures were taken from a plane looking down over Marcollat Flat. This is our area; this is Willalooka. That section is the watercourse going right through the middle. These areas are all 20 metres by, say, a kilometre and a half of trees that were sown and have grown to this height in four years—over one million trees. This area here next to the bitumen has been talked about consistently by the drainage board and all those whom I call negative people, who have said that it will not grow anything because it is full of salt and everything else. We have sown it down to pasture that will not tolerate salt and clover and everything. There is the result within five months. The agronomist, Rick Jordan, stated that within five months there is a 300 per cent improvement. Over here, they cannot seem to grow anything. What is the difference? There is only a bitumen road. So that is management. Through all these trees here, this is natural regrowth, non-planted—just thousands and thousands of little trees everywhere. The whole place just grows. It is beautiful. So why can't other people adopt some of these practices too?

Senator ADAMS—Can you show us on that photograph where the proposed drain is to go?

Mr Prosser—Yes, definitely. The Rack plan was drawn by Roger Ebsary without him coming onto the property. We did not agree with the Rack plan or any other plan. We were going to tell them where to put it—or stick it, I should say. So the drainage board moved it over to the watercourse, which had followed the side of the watercourse. The area I am indicating on the map is a massive catchment area. It is like with your rainwater off the roof. All that water flows into your watercourse. Even though the watercourse did not flow last year, a lot of it still filled up with water from the catchment. All the trees are aligned so that the water flows through without too many crossed flows.

Senator ADAMS—What sorts of trees are they?

Mr Prosser—There is a mixture. They are all natives. Gum trees are the higher ones and you have the more shrubby ones underneath for the smaller birds' habitats.

Mrs Prosser—I have a list here if you want to have a look at it.

Senator ADAMS—If you could provide that later on, that would be good.

Mr Hayward—The cross-flows are very important from across at the end of the range, on the right-hand corner of the map. We have our properties further down and we have a lagoon which fills, even if the watercourse does not flow, with the cross-flows across the flat.

Senator ADAMS—Whereabouts are you in the catchment, as in upper, lower or middle, as to where the drains are going?

Mrs Prosser—We are central.

Mr Prosser—At the last meeting, when Minister Hill came to have a look at this, representatives from Padthaway irrigation and vigneron, which is a billion-dollar business, came and gave us 100 per cent support—as in all of them, obviously, because they do not want any more fresh water, which is the surface water, drained off to sea or wherever it goes. The flat is very porous. There were three inches of rain on the area so further over in other ranges the water was lying everywhere. By the time we got back here, within an hour, you could hardly see the water. There was a massive amount of fresh water going down into the aquifer.

Mrs Prosser—It is a highly intricate system all working together.

CHAIR—I think you suggested a possible question, Mr Hayward, about the unanimity. Obviously there are differing views about drains and other aspects, and it is not really our role as a committee to be a dispute resolution society. One of the questions I asked of the previous witnesses was: why do you think the different views are there? Is it just that different land has different characteristics or has a mindset developed that, ‘This is the solution and we are going to do it and everyone else just doesn’t understand,’ or is there some other aspect? You suggested better land management. I do not want to generate a disagreement about that either. What are your views about that?

Mr Hayward—About the unanimity—

CHAIR—People being people, you are never going to get unanimity on anything most of the time.

Mr Hayward—Of course you are not; everybody has a view. In 1999 a land-holder with land at the bottom end of that map put a private drain up to a property in the far distance there. The wetland management man, Matt Giraudo, then drew a plan for a proposed drain, because in all the options in the EIS there was a deep drain. We had a meeting in the Marcollat hall of all the land-holders in the district. There was no agreement (a) about the desirability of a drain and (b) about where it should go. At the following meeting of the Marcollat Watercourse Management Group we could get no agreement. It was therefore decided that what should happen was that the watercourse should be restored to a natural fill and spill characteristic and that the sill levels, which had been lowered to allow the water to get through more quickly, should be put back to the original level, which would allow the water to spread out more slowly across the flat and regenerate some of the trees et cetera which were dying.

If we go further back, the EIS came in 1993 and then the supplement to the EIS in 1994 allowed land-holders to give their view of the EIS. As I mentioned previously, two of the land-holders here were against it. One was the late Mr Hedley Prosser and the other was the late Mr Max Verco. Max Verco had been living in this district since the early thirties and his comment in the EIS Supplement about a drain was this:

Mr Verco commented that the problem of land degradation is caused by stocking rates and bad land management, and the authorities should listen to managers who have made a success of their properties.

That is the view on that side.

CHAIR—Are there any other comments?

Mr Hayward—This salinity is a 50-year business—it is a long-term business. I believe that a deep drain next to a watercourse is a contradiction; they are pulling against one another. I believe that if this could be delayed, if more time could be given, there is a possible solution that could be done here without a drain. But people would have to recognise that they cannot make 100 per cent of their property 100 per cent productive. I believe that we ought to be looking closely at people handling their own water to a greater extent than we do, rather than compressing it and shunting it off down the drain. I am thinking of people such as Peter Andrews, with his Natural Sequence Farming which you may have seen in those two sessions on the ABC in June, and Dean Prosser. I believe there are people here who can do important things without having a deep drain and I believe there is not enough work being done on the dewatering and many other problems to be associated with a deep drain. It has been said by the other south-east people that 60 per cent or more of the cross-flat flows will be able to be taken over the deep drain, which has large sides on it so that no water can come into it from the surface; that water can be taken over to the other side and still get into the watercourse. I do not think 60 per cent is enough.

Senator STEPHENS—Mr Hayward, you mentioned the notion of someone putting in a private drain in 1999. Are there many private drains?

Mr Hayward—There are a lot of private drains. Phil Cole was telling us that the government in late 2002 passed an act which in fact stopped any of these drains being dug. Up in the northern section there are a lot of private drains, which South Australians do know about.

Senator WORTLEY—You mentioned earlier the eight options that were put to the meeting and that all of them included a deep drain, except for one, which was the do-nothing option. At the time were there any other options floating around or have there been others that have been floated since that do not involve the deep drain and which would address the issue in the area?

Mr Hayward—No, I do not believe there was. There was the option, which was just the ‘do nothing’ option. But, of course, there are lots of things you can do without necessarily putting in a deep drain. The other seven options all had the deep drain in them, but it was about where it was to go—whether it was to go down as far as a particular area or go through a sand hill and join the next flat. It was more to do with the route of it.

Senator WORTLEY—I think the ‘do nothing’ option that you referred to addressed the natural land usage and so on.

Mr Hayward—Yes.

Senator WORTLEY—Has that actually been developed and submitted to the various committees?

Mr Hayward—It has not. We heard about consultation earlier today, but really there was not a great deal of consultation. That meeting developed the eight options. Land-holders did not hear again until May 2005—17 months later—that there was a preferred option. One might well ask: preferred by whom? It was preferred by the upper south-east program. When we went to the meeting to hear about it, we were presented with this. Most of the consultation that has gone on

has been about where this drain should actually go through people's properties, not whether or not it should in fact be there. I do know that the EIS did propose deep drains, but that was 13 years ago. When they presented this preferred option at the meeting, Andrew Johnson, who was the director, said, 'We have a mandate to dig a deep drain,' and that was it.

Senator ADAMS—I have a question on your stocking rates. I am a farmer from Western Australia. Tomorrow the panel will be looking at some of what is being done around Narrogin, which will be good too. From the time that you started with your perennial grasses and doing your trees and lateral drains—and you said that you are not stocking as severely as you could and probably some of your neighbours are—what has happened with all of the grasses and everything else? Have you lifted your stocking rates as the pastures have grown?

Mr Prosser—Definitely—you produce more all of the time. Probably more importantly than producing more, you produce a safer pasture which withstands climates and everything else. We carry on a permanent basis, with very little hand-feeding, the equivalent of 12 to 15 DSE. I have gone over the figures with the accountant and everybody else. We have not put out super for 15 years until this last year, because it was so dry. So there would be very little chemical. To build a property like this, you have to build a topsoil. To build a topsoil you have to have groundcover. Groundcover is like an insulated blanket, like you have in the garden for your roses and everything. That will keep the sun off and allow all of the micro-organisms to live in the topsoil. It will aerate the soil and keep it moist and in good condition.

The water will flow through all of this once it is in action. Your catchment water will filter through it all. The water will get to your watercourse in an improved state. It will not have all of the lumpy muck and stuff going in. Your cattle or other stock will grow on grass that has been improved. If you have a bare paddock, as some of the neighbours have, you grow grass by covering it with chemicals like superphosphate to produce the grass. These stock are growing on grass that has not had that. They are growing on natural pasture, so it has to be healthier for the stock to live on and eat. It is just a great cycle. It is really exciting. To think these clowns want to run a drain through the middle of it—what an insult!

Senator ADAMS—Congratulations on that. I wish we could carry that stocking rate on our place.

CHAIR—Obviously, some other people in the south-east are supportive of a drain of some sort. Certainly, some have suggested that it has actually been proven successful in other parts. Do you accept that it is successful or appropriate in some areas and you are just arguing that it is not appropriate in your area? Is that basically your view?

Mrs Prosser—I agree with that. In some areas water ponds and they need to get that off so that they can stop waterlogging and create aeration in the soils, but certainly not all deep ground water drains or surface water drains.

CHAIR—So it is more a matter that it can be appropriate in some areas.

Mrs Prosser—Yes. We have a natural drain. Not everyone has a natural drain that we have with the watercourse. The whole flat is set up to feed into the watercourse. It is natural; it is the way it is. In other areas they do not have that facility. Can I say one more thing?

CHAIR—Certainly.

Mrs Prosser—In relation to our concern about wetlands, there has been comment that there are surveys that have been compiled, but no systematic biological surveys on wetlands have been completed on the effects from drainage. The reports which have been completed were conducted at the end of summer, when wetlands were not in their most pristine condition, so the surveys were biased more towards terrestrial flora and fauna, and the equipment that was used was standard, so that was biased towards terrestrial flora and fauna as well. I think there needs to be a lot more research done into the effects of drainage. Also, a paper was sent out from the DWLBC. From their observations of what happens to wetlands, drainage has caused reduction in wetland inundation, reduced freshwater inputs, observed loss of species and observed decline in vegetation health. I do not think there is a wetland that has actually increased in health that has a drain running alongside of it. So I am really concerned about points that the program board is actually making.

Mr Hayward—There is a very prominent wetland on the Prossers' property—the Kyeema lagoon and the associated woodlands and wetlands with it are a very important part of the Marcollat watercourse with the same lagoons in Willalooka. I think it is one of the last two watercourses in the upper south-east of South Australia that does not have a drain down the side of it.

Mr Prosser—On the woodlands, something people do not seem to realise is that down through the watercourse there are 1,000 acres of old gum trees. They have a lot of hollow logs on top and underneath. There is a whole living society of bandicoots, small marsupials and all those sorts of things. There are 1,000 acres there. When these trees grow to that height and age and start dropping limbs, you will then have 3,000 acres of the same thing. It is all happening.

CHAIR—Thank you very much for your contribution, time and effort.

Mrs Prosser—I am sorry we do not have anything to submit to you.

CHAIR—No, that has been very useful. You were going to provide something extra to the secretariat as well, and if there is anything more you want to provide to us, feel free to do so.

[12.34 pm]

BRUCE, Mr Charles, Member, Coalition of Concerned Landholders

McCARTHY, Mr Donald George, Technical Consultant, Coalition of Concerned Landholders

RASHEED, Mr Peter, Member, Coalition of Concerned Landholders

RATCLIFF, Mr John Dean, Member, Coalition of Concerned Landholders

RICHARDSON, Mr Stuart, Technical Consultant, Coalition of Concerned Landholders

SYMONDS, Mr Peter, Member, Coalition of Concerned Landholders

CHAIR—Welcome. Thank you for giving us your time today. I imagine many of you have travelled a bit of a distance to get here and have taken time out from your other activities. The value that provides to the committee in our inquiry is very much appreciated. We have previously received a submission from Mr Richardson, which we have numbered 43. We have also just been provided with another submission from your group. We will accept that for the moment and give it a number shortly; it will be formally published in due course.

I need to give you a formal reminder that evidence given to the committee is protected by parliamentary privilege and that the giving of false or misleading evidence to the committee may constitute a contempt of the Senate. I also remind you that if you should at any stage wish to give some of your evidence or answer a specific question in private you can ask to do so and we will consider your request. I invite Mr Rasheed, as the coordinator for the group, to introduce the other witnesses and perhaps tell us where they are from and their expertise and background. You can then make an opening statement, after which we will ask some questions.

Mr Rasheed—Thank you. John Ratcliff is a landowner in our scheme. We would not be here without John doing the groundwork to get us here for this presentation. He has lived there for 50 or 60 years—nearly all his life. Charlie Bruce is also a landowner in the scheme. I am a landowner and have been there all my life. Don McCarthy and Stuart Richardson are consultants we are employing to help us with the science side of the issues. Peter Symonds is the manager of Keilira Station, a rather large station in the area. He is relatively new to the scheme, but he has areas that have been drained and areas that have not, so he has a fresh mind on that.

We are a deputation presenting on behalf of the Coalition of Concerned Landholders. The key points are that the overwhelming majority of landowners support ground water drains. We support the scheme and we support the science that goes with it. We are in favour of a balanced solution. We accept that you have got to look after the environmental side of it as well as the agricultural side of it. We want the whole lot fixed up. You cannot really fix up one without the other, as you probably realise.

Dryland salinity is due to rising watertables. The ground water levels are shallower now than when farming commenced. CSIRO has confirmed that the long-term trend for ground water levels is that they are rising. To give you a bit of local history, when I was a young fellow helping our father develop our flat, if we got water in a strainer hole, which was at that stage four foot two inches, it was a talking point. Now we have to hold posts down in a shallow post hole in the autumn after a very long summer or they will float up. So we do not really need convincing that we have a rising watertable—and that is after a very long, 15-year dry period. We are not opposed to bringing additional water in to assist wetlands, but we are certainly concerned that, without addressing the salinity problem, that will add to it. It is an issue we are concerned about.

Agricultural production and native vegetation are declining due to salinity. That has happened throughout the whole region—red gums are dying, very good pastures are now in some areas just brown, saline, slimy sort of country that even smells like the Coorong. Investigations by Jim Cox, CSIRO, and Michael Durkay confirm that soil salinity is an issue in both the Marcollat, Wimpinmerit and Bald Hill flats. The problems identified are even on land where the landowners deny they have a problem. That is something we have to contend with. This is the only broad-scale scheme in Australia reclaiming saline land. We consider that on the Bald Hill flats alone if nothing is done \$1.5 million will be lost per year.

Ground water drains have proven to be successful in other parts of our scheme. We know all of the landowners in the scheme and they all say that it is the best thing that has ever happened to their country. One of my good friends has probably one of the largest privately owned sections of wetlands in the area—it is 1,500 hectares. He happens to have a ground water drain that goes right around the eastern side of that, which is where the ground water is flowing from. He sees that as a protection for his wetlands as well as his agricultural land. He is not new to wetlands. He decided 40 years ago, when we were all tearing the country apart and developing it, that this was a pristine bit of country, and so he left it. He believes that.

The purpose of the ground water drain is to return the ground water levels back to where they were, improve agricultural production and improve wetland health. The other point I would make is that, with the construction of ground water drains, no surface flow will flow into those ground water drains. It will overpass them and go on to wetland. Those are our key points. If you have any questions, we would be happy to answer them.

Senator STEPHENS—Can I take you to the point where you have just finished, and that is the issue of drains themselves. We have heard an argument this morning that deep drains are appropriate in some areas but not in others and that surface drains will address the issue of salinity. Your submission actually argues against that point. I am looking at section 3 of your submission. Can you explain to us the science about surface water drains and their effectiveness in dealing with the salinity issue?

Mr McCarthy—With dryland salinity, whether it is in the upper south-east or wherever it occurs, it is generally a water balance problem—there is too much water in the system, so the watertable gets closer to the surface and salt concentrates. Anything that can get rid of water to reduce the overall amount of water in the system can help lower watertables. If you have got an underlying ground water system that is very close to the surface and you just take away surface water and do not address the underlying ground water system, that will not address the dryland

salinity problem. A number of the land-holders here could perhaps comment. A lot of land-holders have put surface water drains in down the south-east, and their land has not come back to production; it still remains saline. If you put in a deeper drain, which lowers the watertable below what they call the capillary fringe, it minimises the amount of salt accumulating at the soil surface and then you have a chance of reducing salinity and getting the land back into production.

Mr Rasheed—There is one property in our area that has actually spent half a million dollars on surface drainage and has not achieved anything. In our whole region we all put surface drains in 30 or 40 years ago. We had to because it was very wet country. The old people in the area—my father was one of them—used to say that the wetter it got, the better it was. That used to be the case, but when you get salinity—if you understand salinity at all—that is not the case. It is what happens from now on through the summer—the watertable is drawn up and the water evaporates and leaves the salts. Surface drains just do not address it. That is why we and the majority of land-holders totally support ground water drains. We can see that where they have been put in they are highly successful. We have actually got a landowner here, if you are interested, who has got both.

Senator STEPHENS—I take it you are talking about Mr Symonds. Do you want to make any comment about that situation, Mr Symonds? You have got surface drains and you have got deep drains.

Mr Symonds—I am probably in a pretty unique situation here because we have got 3,000 acres drained with the Fairview Drain, which is a three-metre drain, and we have got 5,000 acres up the Bald Hill flats—Keilira is actually cut in half by another property—that are undrained. Because of the Fairview Drain, we have been able to actually crop up to half of the area that is drained without dropping our stocking rate. You can see the salinity disappearing out of the ground. We monitor our crops from the drain out. We found that when the drain was first put in the yields were better against the drain. It is 1.3 kilometres to our boundary fence to the south, and now, as the years have gone by, the yields on that boundary fence are as good as the yields at the drain. The red gums that are in those crops are actually coming back with fresh growth where they were dying. I have only been there for eight years, so I had to be convinced that it was going to work.

Senator ADAMS—In relation to where the last presenters are living—where the Prossers' property is—can you fill me in as to where you are in that same area? Is it on the lower catchment or the upper catchment?

Mr Rasheed—The Prossers are on the Marcollat watercourse. Then there is the Bakers Range watercourse. Charlie Bruce has got country in the Bakers Range watercourse. Then there is the Wimpinmerit watercourse, which is not as big, and that eventually meanders its way through into the Avenue Range watercourse, which is the Bald Hill watercourse. Then further to the west is the Taratap Blackford watercourse, then you have the Coorong.

Senator ADAMS—Being from Western Australia, it is a little hard to follow the geography. Your drainage is a bit different to ours.

Mr Rasheed—What actually happens is that there are interdunal flats with higher ranges. Each flat as you go east is higher than the flat to the west. It is putting hydraulic pressure through under the range to the next one. The reason we are getting salinity is not just because we have cleared our area. The catchment area extends right back into Victoria to the wheat-growing belt. So it is all putting hydraulic pressure down.

Senator ADAMS—It is always a problem being down the lower end of it. Just on this Didicoolum Drain and what it aims to achieve, do you have a really good understanding of that?

Mr Richardson—The Didicoolum Drain is proposed to go along the Marcollat Flat, which the previous land-holders spoke about. The department have proposed a configuration of drainage there which varies in depth from 1.5 metres to two metres deep. They are also proposing to put a weir in the drain so that they can hold water in the drain at a high level for a period. I think you heard from a previous land-holder about concerns about the soil drying, during the spring months especially. This weir can hold water up in the drain and mitigate that problem. The other critical part of the drainage proposal from the department is within the wetlands themselves. The land-holders are quite supportive of this in that there is a commitment in principle to the restoration of the natural sill levels in the Marcollat wetland. That will allow water to be retained in those wetlands for longer periods. Also, the land-holders of the Willalooka Pastoral Company have committed to excluding further amounts of land from stocking so that there can be additional regeneration. What the land-holders on that flat are expecting is restoration of the wetlands but also restoration of their agricultural production through the proposed drainage scheme.

There are some other issues about making sure that you protect the agricultural production from water that is held in wetlands for too long a period. It is important that the drain is at an appropriate depth and location to offset any additional leakage that will occur through down to the watertable from water held in wetlands for long periods of time. But it is clear for those land-holders that they can satisfy two objectives—one is protecting agricultural production and the other is the environmental health of the wetlands.

Senator ADAMS—In your experience as a consultant working right through the whole area, are there a lot of perennial grasses, trees and other land management use activities taking place or is everyone just pinning their hopes on this drain?

Mr Bruce—Most of the area is planted with perennial salt-tolerant grasses mainly. Sustainable Grazing on Saline Lands are coming later today. We have trial sites of theirs. We start off with a hypothesis: we have this wet country; how can we make it grow more? You have the moisture so you would think you could. Anyway, we have been putting fertilisers and things on these plots and, really, three to four tonnes a hectare of dry matter pulls up these salt-tolerant grasses.

Since we started this, we have been onto a few people in the drained areas and two of them said that they have cut 10 tonnes of hay to the hectare. They must be growing double that in feed, and that is where the country was just ruined with salinity. So it is a monstrous change.

Mr Ratcliff—I have been around this program, as has Mr Rasheed, since its inception. Part and parcel of the environmental impact statement and what have you was that, once the drains

were in place, the land-holders were then going to do work to re-establish pastures and that type of thing. We have tried to do some sums on that. These are not hard and fast figures but we think that you are looking at four to five times the levy per farm is going to be required just to regenerate the interdunal flats on each farm. So if I am paying \$160,000 in levy I am looking at \$160 grand by four to five times, just to repasture my flat and/or do other things with it.

Mr McCarthy—There has been below-average rainfall for a period of time, yet CSIRO have now analysed the data to suggest that the longer term trend will be an increase with time, taking out all the humps and bumps of rainfall. If you have a shallow watertable and you have a saline problem, and you invest a lot of money to reclaim your pastures, it is really money not well spent, because you still have a salinity problem. What the drain does is to power the watertable and give the land-holders the confidence to go back and revegetate their pasture. You look at trees—all of those aspects are part of managing a dryland salinity problem. But if you have a shallow watertable and you try and regenerate pastures where that watertable is shallow, you are going to be on a hiding to nothing. In most of the investigations by CSIRO, both in the Marcollat and the Bald Hill flats, where they put in ground water wells, they took samples of soil from every ground water well, and 80 to 90 per cent of all those locations have a salinity problem, classified as from moderate to very saline. That does not mean it is all bare; it means that pasture production is being affected.

That is why, if you put the drain in it, you can do these other options and at the same time try and look after the wetlands. For instance, in the Bald Hill flats, the proposal is to put the drain more to the east to help lower the watertables on the east, then minimise impacts on the wetlands to the west. All of those issues are being considered so that you have a balance between agriculture production—so that dryland salinity does not keep on causing problems—and enhancing wetlands. If the farmers have a drain there to look after the salinity problems, then bringing more water from the south to enhance wetlands is a really good option. But if you bring more water into a system which has too much water from the salinity point of view at the moment, without protection from the drain, you could make the problem worse. That is why we are after a balanced solution.

Senator ADAMS—Just one more question to the two of you as consultants: is there much evidence of infrastructure damage as far as your roads and rail through that area are concerned? I am not familiar with what you have.

Mr Rasheed—I can answer that question. We were on the Lacepede District Council, which is now the Kingston council. That is why I have this whole thing going, because in the Marcollat area there were fairly vast areas of good, highly productive flat country which were becoming salinised, and we could see it was going to have an impact on the whole region because it has a snowballing effect. Now we have super-spreading contractors, fencing contractors and the whole thing. But we were also very concerned that it was damaging our roads. The Lacepede District Council, back in those days, when it was more of an average sort of year—we are in very dry period now, but it was more average conditions—spent a lot of money having to build roads up because the watertables had risen and either the roads were inundated or they were falling apart. We had to spend a large amount of money. So the council was very concerned about that.

Mr Ratcliff—Yes, I think the council raised the Keith-Cantara Road three times within six years because it kept on getting inundated. When you drive through a lot of those areas you go

down through the gullies and you can see the change in the white rubble that is on the road, from white rubble to where it is obviously wet right in the bottom of the gully, and then you go out the other side. When you get excessively wet years you get major problems, so a lot of work has had to be done by local government to overcome those road problems for safety reasons and everything else.

Mr Rasheed—If I can add one more comment on the previous discussion, each flat is interdunal, as we have indicated. The Bald Hill flat is quite wide—it is the widest flat—and if you use that as a flat the watertable is running in a north-westerly direction. On the western side is where the wetlands and swamps are. If you want to go back to the history of it, the eastern side is where it was initially developed. When it was developed, as development progressed across the flat people put bores down and used the bore water—which is very shallow, between two and four metres deep—for their stock water. In the last 15 to 20 years, all the water on the western side has become highly saline and it has under the wetlands too. Now, there is no-one on Avenue flat who is not piping water from the eastern side across the flat; they are not using any of the ground water there. In John's country, over on the very western side of his country, between 80 and 100 years ago there were some man-made waterholes for when the country had sheep running there in the scrub days. Rabbit trappers and people herding sheep through there could live off it. That water is now so saline that it kills stock.

We are supporting the science, which is saying: 'Put a drain over on the eastern side, where the zone of influence of the drain goes up to the edge of the range and drops the watertable down to the level it was before salinity impacted on it. But at intervals all the way along put overpasses, so that you still have the whole flat as a catchment of rainwater for the wetlands.' We are supportive of that. That way, you still get the benefit of the whole flat being a catchment through the wetlands but you eliminate the salinity process, which in the long term will kill the wetlands. If nothing is done, there is nothing surer than that.

Mr Ratcliff—With the salinity problem, along the sheep pads and what have you at certain times of the year you get a white edge along of the side of them. I do not know how some landholders cannot work out that they have a problem. When you start to see it like that it has just about reached the point of no return.

Senator ADAMS—Yes, I know what you are talking about.

Senator WORTLEY—In the last submission it was indicated that better land management practices would address the issue of salinity on your properties. Do you agree with that? How big an influence is the economic factor with regard to that?

Mr Rasheed—About 15 or 18 years ago, we developed some country, landlocked flats, in the interdunal ranges. We got pasture that good that the super-spreading contractor could not see his way around to spread the super. It was really dense. It was never stocked to the point where it was eaten down; it had cover over it five-feet high. That country is now just bare wasteland. Next to that there is an interdunal flat that we always keep as native vegetation for ducks to breed in, because in the winter time it used to get inundated with water. The ducks used to come there and breed. In dry years, sometimes it would dry out before the little ducklings could fly away, so we dug a hole there so they could stay there and get big enough to fly away. All of that country—all the native vegetation and all the trees—is all dead, in the whole region. In

addressing what we are going to do, we see that there is no point in doing anything until we address the salinity problem. We have all tried it and we lose. Don can probably explain it.

Mr McCarthy—Land management and how you manage your pastures will have a big difference from one land-holder to the next. There is no doubt about that. But if you have an underlying salinity problem, that is a problem you have to overcome before you can step onwards. Things that were spoken about earlier like sodicity and problems such as that are all related to a shallow watertable. If you can get that watertable down then you can start doing things about improving your pasture.

There is published data that says if you have soil salinity of a certain number your production might be affected by 10 per cent. That goes up. It depends on the salt tolerance of the plants you are putting in as to how much things are affected. You can put in things like tall wheatgrasses and puccinellia which will grow in saline environments. If it gets too saline the tall wheatgrass will drop out and the puccinellia will hang around but it will not do too well. So if your underlying problem is a shallow watertable you need to do something about that before you can start improving your pasture. If you overstock a saline area it will go bare. If you do not stock a saline area, you might have sea barley grass or some other plant that can tolerate that area, but it is not a productive part of the landscape.

Most farmers, it does not matter if it is south or south-east, wherever you are, always say it was the best piece of land that went out to salinity. That is because it is generally lower in the landscape with heavier soils. They are doing the same thing; it is just that over time the watertables have risen and then, all of a sudden, it gets close enough for salt to accumulate and then they have a problem. So unless you get on top of that problem first, you cannot get on top of what is growing on top.

Senator WORTLEY—Mr Rasheed, just going back to the comment you made about your property, do you attribute the fact that the vegetation is virtually non-existent to the salinity?

Mr Rasheed—No, not all. We would generally be classed as understockers. We have never really stocked our country very hard. When we developed our country we used agronomists and whatever to go through the process. We knew the worst thing you can do is bare the ground down in the summertime. We always kept a good cover. But what has happened on the Avenue flat or the Bald Hill flat—I think it is pretty similar on all of them—is that when they were developed the eastern side was developed and that was the very best country. My father was probably the first fella to develop any of that country and he just ran around with a little plough and seeded subterranean clover and stuff like that and it just grew. It was very good country. That is the country that is now becoming saline. Our wet country is not the country that is saline. It is not a flooding problem that is causing it; it is the watertable rising on the eastern side.

Senator WORTLEY—Just to clarify, what was the word you used when you spoke about 18 years ago?

Mr McCarthy—It was where you had the ducks.

Senator WORTLEY—Yes. Is that the same land that we are talking about?

Mr Rasheed—No. That was in a landlocked flat, but I was just using that as an example. On the main Bald Hill flat I remember my sisters used to play with the dandelions and make daisy chains, probably 50 years ago now. If you have a salinity problem, dandelions are one of the first things to go. Now that area is nowhere near like it used to be. All of our subterranean pastures are gone. In some areas, strawberry clover is trying to survive but, in the long term, that will die out. We have areas that are becoming bare now. On the Bald Hill flat, it is just starting to really happen. It is nothing like it was.

Mr McCarthy—When it was asked whether the problem with the tall grass and the good pastures no longer being there was due to salinity you said no. Did you mean that it was not due to salinity or that it was due to salinity?

Mr Rasheed—No, it is due to salinity.

Senator WORTLEY—That is why I asked that point of clarification.

Mr Rasheed—Sorry.

Senator WORTLEY—So you would attribute it directly to salinity.

Mr Rasheed—Yes. We have renovated our flat and put wheatgrass out there. We have got it up to five-feet high.

Senator WORTLEY—Are there any other options that would address the issue on your properties that you could put in place? Is the deep drainage the only option available to you, in your opinion?

Mr Rasheed—That is what we all consider, yes—without any doubt.

Mr McCarthy—We are in a lower rainfall period at the moment. When the cycle turns, deep drainage will help manage the watertable and then improving pasture production and planting vegetation, all of those things, will help the catchment water balance. But without the deep drains, because you have landlocked systems, to overcome and save by revegetation you would have to plant back at least half, if not more, of the landscape to overcome the problem. Then you would not have an agriculture group production system there. And that would take many years. Also, it is not a local catchment, it is a regional catchment, so if one farmer planted a lot of trees on their place that is not necessarily going to help that farmer's place because there is too big a catchment area contributing to the problem. That is where the deep drain enables everyone to do things to help move the system forward and overcome the salinity problem.

Mr Rasheed—The other thing is that the Fairview drain was put in as a trial drain, and that is highly successful. We are very envious that it has not happened on our country. It has really turned the country inside out. We will hand you some information. You will find the submissions from people in the Fairview drain area who have had their country drained. If you read them you will realise just how beneficial it has been for their agriculture land and their wetlands. It is quite significant.

Senator ADAMS—Where does the water from this deep water drain actually flow to?

Mr Rasheed—In the Coorong.

Senator ADAMS—Are the people in the Coorong right down at the lower end of the catchment happy about that water coming down?

Mr McCarthy—If it is a ground water drain all the way through and it is properly designed, that should not impact on people further down because, for the period that it is running—when you have surface flows into the ground water drain—there might be water going back into the system but, on average, water is going out of the system. As long as it is a ground water drain there is no problem. If you put in a surface drain and you run it along and that surface drain leaks then you are going to create a problem for people further down the catchment.

Senator ADAMS—I just missed the point. I am probably relating this back to Western Australia and our big fights about putting it down into a proper river catchment going hundreds of kilometres and then finally ending up in the Swan River. It is the same with another river as well. Those people with land on the side of the river are saying: ‘No way. It is not coming down here. You can keep it.’

Mr McCarthy—The final outlet for all the central and northern areas is the Coorong.

Mr Rasheed—They are actually going to use that to sweeten up the Coorong. The Coorong is very saline and this water, even though it is ground water and will be fairly saline, it is not as bad.

Mr Ratcliff—The drains in the northern catchment, the Tilley swamp drains, which the bulk of this will go into, have already been done. They are already in place to take the system once the mosaic is put on the map.

Senator ADAMS—I was really just asking how you had got on, because in Western Australia we cannot do it.

Mr McCarthy—That is why this is one of the few broad-scale systems in Australia that I am aware of where there is really an opportunity to manage dryland salinity, because most places have nowhere to put it. This scheme was designed and developed over a number of years and really has a chance of addressing salinity because there is somewhere to go.

CHAIR—Would you accept that some of the drains that has been dug to date have been too deep, in the wrong spot or badly designed?

Mr Symonds—Not in my experience.

Mr Richardson—In this part of the country—

Mr Symonds—All of the drains that have been put in that are draining ground water have provided a benefit to agriculture. We are doing a sodicity project with the University of Adelaide at the moment through our farm group and the first advice there, too, was to drain. The first step for fixing sodicity is to drain the country. The remedy for sodicity is very simple. Gypsum is the answer for sodicity, and it is very cheap. It is a lot simpler than the alternatives.

CHAIR—Any final words that are desperately urgent?

Mr Bruce—I would like to comment on the conflict between our two groups. I think the land is a little bit different. We have generally got very high watertables, whereas you are talking about another area with lower tables.

Mr Symonds—We have no sand on our clay. That is the difference.

Mr Rasheed—Just finally, the one thing we are all strongly behind is that if the drains go in two metres deep that means all the infrastructure has to be in there to handle it, like bridges, overpasses and whatever. If 20 years down the track it has fixed up the salinity problem to a degree, we can raise it very cheaply back to 1½ metres—or 1.8 or 1.2 metres. But if we see these drains go in at, say, 1.2 or a metre, just surface drains, and we find down the track that they will not address the problem we will never get them dug in and made deeper. So that is the other option that we are right behind.

CHAIR—Thank you again for your contribution today and the time you have made for the committee.

Proceedings suspended from 1.09 pm to 2.11 pm

MELDRUM, Mr Daniel, Senior Project Officer, Salinity and Water Use, River Murray Catchment Water Management Board

CHAIR—Thank you for your time today; it is much appreciated. The committee has received a submission from you, which we have numbered 45. Are there any amendments or alterations you wish to make to your submission?

Mr Meldrum—The first amendment I would like to make is to my response under section 1, where I attributed something to two main factors when there are in fact three main factors that I have highlighted. That is basically all I would like to amend.

CHAIR—Okay. The standard reminder is that evidence given to this committee is protected by parliamentary privilege—which does mean you can say what you want but it also means that giving false or misleading evidence to the committee may constitute a contempt of the Senate. If for some reason you want to give part of your evidence or any answers to specific questions in private, you may ask to do so and we will consider your request. I invite you to make an opening statement, and then we will move to questions.

Mr Meldrum—Thanks for the opportunity to provide input to the inquiry. I wanted to highlight a few of the points that I made in my submission. In response to the first term of reference, in the South Australian Murray-Darling Basin the key goals of motivating and enabling regional communities to use coordinated and targeted action to address the problems of salinity and water quality have been attained. However, this is not a *fait accompli*. The situation needs to be maintained, otherwise communities will not continue to donate their time.

The challenges faced in building the trust of the community and establishing effective working arrangements to tackle salinity and water quality problems can be attributed to three main factors. The two that I would like to highlight are that there is perceived poor consultation or engagement in previous initiatives between government and the community. There is also a perceived lack of continuity in funding streams, which can result in winding back of programs, transition of staff and disconnection with community groups. When new funding streams become available and community groups are re-engaged, there is potential for community members to feel that their previous efforts have not been recognised. They can easily be frustrated by a process that may be asking them to, in a sense, reinvent the wheel and may be reluctant to donate their time again.

Priorities highlighted in our submission for South Australia implementing the National Action Plan for Salinity and Water Quality are:

- (a) timely investment and on-ground action to reduce the impact of salinity and declining water quality on communities, industry and the environment, in particular in improving the health and productivity of the River Murray;
- (b) preventative action, including appropriate changes in land use, to reduce the prospect of future salinity and water quality problems; and

(c) building effective partnerships between community, landholders and government through sound planning and shared investment to address complex natural resource management issues.

In relation to priority (a) and, to a certain extent, priority (b), these have been tackled through the establishment of the Integrated Natural Resource Management Group and subsequent development of investment strategies.

Close links between the INRM Group, relevant state agencies and the River Murray Catchment Water Management Board have seen the development and implementation of effective investment strategies that rely on a cooperative approach, which includes significant community input through membership of reference groups.

In relation to my response to the second item in the terms of reference, there are two fundamental roles of catchment boards. These include water allocation plan development and implementation, formerly under the Water Resources Act and now under the Natural Resources Management Act; and development and implementation of catchment water management plans under the above-mentioned acts. The catchment plans are soon to be replaced with an NRM plan that will be operational under the NRM board. The plan is backed by funding collected currently via a water based levy, which in isolation is not adequate to implement the plan. When we start to tackle broader issues under the NRM plan, adjustments to the levy will be made, but we still anticipate that, in order to tackle salinity and water quality issues, we will need to enter into partnerships with state and federal agencies.

The board through its staff delivers many of the core projects under these plans. However, a significant proportion of the total budget is allocated to community grants. These grants range from small amounts of around \$20,000 to significant grants of over half a million dollars to regional community organisations and committees to undertake activities such as improving irrigation efficiency, the development of land and water management plans and, indeed, investigations and implementation of those plans.

Board staff coordinate many of these projects that require practical, on-farm action to manage salinity and water quality issues. I just want to emphasise the practicality of the approach as well. The board's connection with the community has meant that practicality is emphasised in project development and implementation. This consideration results in effective projects that the community are willing to readily participate in.

Finally, while this is not really my area of operation, I will refer to the third item in the terms of reference. Broadly, in terms of the scientific knowledge base that has been developed, the airborne geophysics and ground based electromagnetic surveys I find are very beneficial in producing some good on-ground information, while the national land use mapping undertaken by the Bureau of Rural Sciences is not at a fine enough resolution to provide useful, practical information for growers. Salt inception schemes aside, this is where the information needs to be relevant—that is, on farm—if we are to see real gains made in tackling salinity.

CHAIR—Thank you for that. Firstly, I noted in your three main factors—the challenges faced—that in the first two you talked about a perceived core consultation and a perceived lack of continuity in funding streams. I was curious about why you put in 'perceived' there—whether you think maybe that is not the case in reality or you are just saying that there is a perception of

it and it does not really matter whether it is the case in reality; if people perceive that, that really is what influences people's actions.

Mr Meldrum—I think it is a bit of both, because obviously there are a lot of people working in the industry who have an idea of how funding is likely to unfold into the future and to varying degrees as well. The perceptions can be both hearsay within the community and perceptions within organisations that are taking on-ground action. So it is the perceptions within those community organisations that are employing people to undertake action that funding may not have the same degree of certainty around it in the future that are of concern, because there is a high staff transition and a big knowledge drain on the region, basically because people are unsure as to whether they are going to have a job within the next 12 months.

CHAIR—Could I also ask about the third point there, about it not being core business for many landowners to take an active role, whether because they just have too much on their day-to-day plate or it is too big an issue. The committee has seen earlier today a range of landholders who have taken the time not only to put in submissions but to travel to give us their views, and their views have diversity. Would people of that level of commitment and dedication be in the minority? Or is it a particular type of land-holder who is less likely to engage—perhaps ones who are struggling more to make ends meet or who just do not have the land management skills?

Mr Meldrum—There are certain members of the community that are able to motivate their peers and take an active role in managing salinity, and who do have a bit of time to devote to these issues. Those people are rare. Speaking more broadly, once they have managed to motivate people within their district to be part of a project or whatever, there is a cohesive group. One of the things that happen in this industry is that we tend to place a lot of demands on those people that put their hands up to be leaders. That can leave them feeling overwhelmed from time to time. I guess it is rare, more broadly speaking, that within the community you have a large number of people willing to donate time. So when we do find a group that is prepared to donate some of their time we have to manage it quite cleverly as to how much work we push onto them. It is tricky.

Senator ADAMS—I would like to come back to the Australian Local Government Association, who have put a submission in. They feel that many of the regional bodies do not understand the issues for or the roles of councils in relation to salinity management, particularly the local government regulatory role in terms of land use planning. How do you feel about that?

Mr Meldrum—I would say that within our organisation there is a reasonable level of understanding. We have trained planners and environmental engineers working closely with local government associations, so I think we have a reasonable level of understanding. I do not think that within our organisation it is part of our core responsibility to be dealing with councils on those types of issues. It is more a participation role that we need to be playing in the discussions between councils and agencies, such as Planning SA and the Department of Water, Land and Biodiversity Conservation, in making sure that the policies that are implemented, for instance, through changes to zoning, are receiving a community voice to some degree.

Senator ADAMS—So in your relationship with local government you are obviously communicating and working together?

Mr Meldrum—Yes. It is not my core business to be doing that, but as an organisation we try to be part of the debate. They have specifically addressed the regional bodies, so maybe it is something we need to look a bit more closely at.

Senator ADAMS—This seems to be an issue that is coming up as we go through all the submissions. There seems to be a bit of a blockage somewhere. The resource management groups do not talk to one another, so I was wondering how your body—

Mr Meldrum—Our staff are fully aware that in implementing on-ground action we have to make sure that we are aligned with proper procedures, whether that relates to zoning issues or whatever. That sort of thing is tackled in project planning.

Senator ADAMS—When we were doing the New South Wales submissions, we got one that stated that there was a need to focus on developing regional partnerships, particularly with agribusiness, in order to achieve on-ground change. Is that an observation that you agree with from a South Australian perspective?

Mr Meldrum—Definitely.

Senator ADAMS—What is needed to ensure that those kinds of partnerships are developed?

Mr Meldrum—I think effective communication networks are the key. We seem to be going down that path at the moment. We are in the process of establishing a resource information centre for the South Australian Murray-Darling that Minister Maywald will be launching next week. Basically, that initiative is to share information between natural resource management agencies and industry groups to have multiple use of the same information so that they are sort of managing issues jointly. Regional development boards and the Department of Trade and Economic Development are part of that as well. So I think we are going along the right path.

Senator ADAMS—Is the general public brought into this through consultation, information and meetings in some of the areas?

Mr Meldrum—I guess that, in the design of our program activities we implement, to this point, we have dealt more with individuals on farm. Broadly speaking, we try to make our initiatives relevant for farm business as well as for tackling salinity so that they have an extra carrot to pick up a soil water monitoring program or some software we have developed for monitoring water use or things like that. We are only really beginning to approach that through industry groups as well. One of the initiatives under way at the moment is developing guidelines for an irrigation code of practice. We have started consulting with industry on that, but we will be consulting with them more and more. To get back to your question, we have a series of land and water management planning committees in the Riverland that will be actively involved in that process as well.

Senator ADAMS—Do you put any publications out so that the general public can get information?

Mr Meldrum—Yes. We fund community groups to produce a monthly newsletter about these initiatives. We are in the process of putting together a regular article once a month in the regional newspapers as well.

Senator ADAMS—I think that is important because often people are so busy or they are not involved with the committee but they still can really be major players in spreading the message as they find out about things.

Senator STEPHENS—Thank you, Mr Meldrum, for your submission. I would like to pursue a little more what Senator Adams was just asking you about. You have made some fairly significant but, I guess, in some ways predictable points in your concerns about the challenges that you face. Would you like to, for the record, elaborate a little more on some of the community capacity-building activities of the NAP? Could you perhaps elaborate for the committee on some of the training programs that have been offered and, for example, how the soil moisture monitoring trials and surveys are undertaken and the extent to which they engage the land-holders that you are trying to bring in?

Mr Meldrum—The board offers a program of irrigation management courses every year which are free for growers to attend. These are widely promoted through television adverts on WIN TV, newspaper adverts and through the various local action planning groups' regular newsletters. I think in this past year we have run just over 30 courses varying from basic soils workshops right through to irrigation scheduling workshops and drip irrigation management. They have been fairly well attended. We have gone from previous attendances of about 14.5 per course to about 18 people per course this year. We are looking at working with the national irrigation association to get those courses accredited and to basically enable irrigators to use them as modules in obtaining certificate level qualifications, so they are quite highly regarded. Yalumba wines have said that all of their growers should attend the courses that we offer, so that is a bit of a feather in the cap for the guys that run those.

We sort of link that program with soil moisture monitoring device trials that we provide, so basically you get a group of four or five irrigators together in a district and they will share a soil moisture monitoring device at multiple sites within their properties and be given some support to interpret that information and use it for irrigation scheduling and hopefully reduce the drainage as a result.

We are also in the process of establishing an automatic weather station network to provide ready access for growers to evapotranspiration or evaporation information and rainfall information to improve scheduling. The whole program is basically about providing enough information to as many people as we can to get some good decisions made.

Senator STEPHENS—The committee received a copy of the National Dryland Salinity Program CD of resources. Are you familiar with that?

Mr Meldrum—No, I am not.

Senator STEPHENS—Okay. I was going to ask, 'How useful do you find it?' It has a resource directory, an action manual for catchment managers and a guide for producers and advisers. Obviously if you are not aware of it you cannot tell us whether or not it is useful—but

it is telling that you are not aware of it. That in itself is something. We were very impressed with it, so you might like to pursue it.

Mr Meldrum—Sure.

Senator WORTLEY—From your submission, it is quite clear that there are a large number of stakeholders and interest groups in the region that present major challenges for natural resource management in the area. Would you like to elaborate on some of the challenges that you have faced?

Mr Meldrum—In relation to the priorities of different community groups and that sort of thing?

Senator WORTLEY—And how you deal with them or how they are addressed.

Mr Meldrum—I guess it comes back to catchment plan development, investment strategy development and ensuring that you have got community groups engaged in the plan development process. Through the reference groups that we run for the investment strategies we try to make sure that there is adequate representation from the broad range of groups that have a keen interest in taking action on the ground. Basically it is a democratic process where we discuss and prioritise.

Senator WORTLEY—Are individuals invited to participate, or are there groups?

Mr Meldrum—Individuals or groups are invited to nominate people.

Senator WORTLEY—You also state:

District committees of irrigators have been formed under the Land and Water Management Planning banner that are now beginning to understand salinity processes in more depth and are coming up with practical solutions that are workable in their district.

That indicates that there are different ways of dealing with it from one district to another. Would you like to elaborate on that?

Mr Meldrum—There are some quite complex intricacies in the way that the ground water systems work—and I do not know how much detail you want me to go into. For instance, you have got sections of the river that are basically bordered by a small floodplain and irrigation on the high land. It is quite a simple process to determine the ground water interactions there. There is another committee that we are dealing with that is looking after the Pike River area. You have got some quite complex situations there. It is an anabranch of the Murray and one of the key things for them is getting good quality water for irrigation and being able to manage the Pike system well at the same time. Basically they are all piping water out of the Pike at this point in time.

One of the options that has been discussed is to have a look at whether we can change the irrigation supply infrastructure so that they can get access to better quality water and then manage the Pike as a unit itself without necessarily worrying too much about irrigation

extraction. These are some of the complexities that vary quite significantly from one area to the next.

CHAIR—Going back to one of the initial points you raised, I questioned you about the perceived uncertainty about continuity of funding streams. People are always saying ‘We should have more money’ and those sorts of things, but do we need to do more to lock in place some more certainty in that sort of area?

Mr Meldrum—I do not necessarily think we need more money. I think that in the SAMDB we are quite adequately funded at this point in time. The way the national action plan has unfolded is that we had quite high investment in the early years. In the last few months we have developed the draft investment strategies for 2006-08, and the investment is dropping off quite significantly. One of the consequences of that is that the community involvement that built up in the first few years of having access to the funding is now under threat. As the funding drops off, the ability to continue the same degree of support with those community groups is diminished. I think we need some degree of consistency over a period of time. We are talking about a long-term problem that needs to be managed well over a number of years, not just in fits and starts.

Senator WORTLEY—It is not additional money but ongoing funding that is required?

Mr Meldrum—It is ongoing funding.

Senator WORTLEY—So you still need the funding, ongoing; it is not a higher amount with every submission that you put in?

Mr Meldrum—No. Basically, each year from 2004-05 through to 2007-08 we have cut the number of national action plan dollars in the investment strategy by 30 per cent. That is just the way it has been implemented. I am not sure why those decisions were made; I was not involved then. But a consistent level of funding, to enable community engagement to occur and then be maintained over time, is key.

Senator WORTLEY—So you need ongoing funding?

Mr Meldrum—Yes.

CHAIR—There being no further questions, I thank you for your evidence and your succinct and precise answers. If there is any further information you want to provide, or if you want to find out any more about the CD or whatever, feel free to contact the secretariat. We will not be finalising our report until early next year, so if there is anything you suddenly wake up in the middle of the night and wish you had said, feel free to provide that to us.

Mr Meldrum—Thanks very much.

[2.38 pm]

MUNDAY, Dr Bruce, Private capacity

CHAIR—I welcome Dr Bruce Munday to the hearing. I have you listed as a commentator on salinity issues. Thank you for your time today. It is appreciated. I remind you that evidence given to the committee is protected by parliamentary privilege and the giving of false or misleading evidence to the committee may constitute a contempt of the Senate. If you should wish to give part of your evidence or answers to specific questions in private, you may ask to do so and we will consider that request. I now invite you to make an opening statement and we will move to questions after that.

Dr Munday—Thank you for the invitation to appear before you today. I did not present a submission because I work across a very wide canvas and know a little bit about a lot of things. I should point out at the start that my qualifications are not in hydrogeology or saltland agronomy but in physics, so I have an understanding of the research environment but I am not necessarily a scientific expert in salinity. I do think I have a good understanding across the field. I work as a communications consultant, mainly in natural resource management and largely in the field of salinity. I work primarily with R&D corporations, so I see the research end of salinity and I get a lot of exposure to the sentiments that come out of that area. But my job is very largely to engage the research community with the wider community who are going to be responsible for implementing or taking up the research and implementing the actions that will follow from that. The research that I am involved in is not only scientific research but also economic and policy research, so it tends to be very broad from that point of view.

My other interest, which is probably relevant, particularly having listened to Dan's submission and response to questions, is that I have had a very active role in Landcare, mainly in leadership roles, for a considerable length of time. As a result, I am very interested in community engagement, what switches it on and what the obstacles are. That is the broad field from which I come. I am hoping that Senator Stephens will ask me about the NDSP CD, because I produced it, and, needless to say, my jaw dropped when Dan said he had not seen it. It just goes to show that it is one thing to produce it and another to distribute it.

CHAIR—We will not ask you whether or not you think it is a good product!

Dr Munday—It is the best I have seen, anyway!

CHAIR—Have you completed your opening statement?

Dr Munday—Yes. If I can help by answering some questions, that might be the most useful thing.

CHAIR—On the issue of communication, as an area you do have a lot of involvement in, are there any barriers to communication or ways that communicating information could be improved that might help in some of the tasks we are focusing on?

Dr Munday—There are certainly huge barriers. Perhaps I should elaborate a little bit more. I worked for the National Dryland Salinity Program in communications. I now work as a consultant to the Cooperative Research Centre for Dryland Salinity, but also for the Department of Water, Land and Biodiversity Conservation and sometimes for the environment department. These jobs come and go, but I have a five-year contract with the cooperative research centre.

One of the barriers, which I am sure you would be aware of, is not that people are short of information but that they are short of effective ways of providing that information. Most of us are deluged with information. The challenge for us is to understand what the researchers are doing, interpret that and put it into a language and form which is suitable and useful for the end users, who may be local government, farmers, farm advisers, government agencies and so forth. One of the things which I thought was compelling about the CD, for example, was that it made a lot of information very accessible. I think that is one of the challenges to overcome—to somehow get the information deluge that most of us are subjected to onto the end users' screens, because what we have to say is important. That is an obstacle, but it is obviously something that we have to deal with. I do not think it is a policy issue.

CHAIR—When the CD was presented to us in a brief form at one of our hearings in Canberra a few months ago, one of my reactions was that there was a fabulous amount of information but another was that there was so much information that after five minutes of looking at it I would want to shut it and never look at it again because I would feel too daunted by it all. That is possibly because I do not work on the land. Most people who work on and with the land are enthused and immersed in it and would be drawn into it.

Dr Munday—Of course, it is a resource rather than something you read from cover to cover. It is like a library—you go into it when you want something.

CHAIR—Yes, that is true. It does enable you to follow the path that suits you. I guess the issue that I have become more aware of throughout this inquiry is that there is so much variation in different regions and areas and, as we heard earlier today, even from one side of the road to the other, and there is an issue about what might work for different soil types in different areas. Do we have enough information and knowledge yet about that variation to be confident that we are tailoring what is required to the specifics of each local land-holder?

Dr Munday—I guess my answer would be no, but we will probably never know it all. One of the key findings of the National Dryland Salinity Program was the very point that you have raised—that it is different from region to region. I came from Snowtown just this morning. The situation there is totally different to the situation in the upper south-east, for example, yet they still call it dryland salinity. It is still rising ground water but the soil types, the climate, the terrain and the farming enterprises are different. Everything about it is different except for the common factor of saline ground water.

The economic importance of it is quite interesting. It is essentially cropping country and up there you could look at the land and say, 'Where is the salinity?' One land-holder has 500 acres of saltbush and it looks pretty good. You might ask why he has it under saltbush. The land next door is sown with a barley crop, which the farmer cannot possibly be making any money from. So there is no economic advantage. The people I was speaking to said that they stopped cropping in 1985 because they realised that all they were doing was getting the seed back so they were

just going through the exercise. Now they have adopted something different. That solution worked for them. It has not worked for the man next door, or he has not picked it up anyway. You could not apply it in the south-east because you will not go and plant saltbush, for example. The regional differences are enormous but so too are the enterprise differences. What these people have done fitted into their mix of enterprise, which was grain and sheep. There is an interesting story in each one of those and to generalise is very difficult. There are some things that you can generalise and some that you cannot.

CHAIR—We have had witnesses today with varying views—you could say opposing views, perhaps—on deep drainage in the upper south-east. I imagine that you would be aware of that controversy. Have you got any views you want to put to us about that?

Dr Munday—I feel for them all. It is very difficult to dig a drain. If you dig a deep drain everyone has got to commit to a deep drain and, if you dig a shallow one, you cannot have the drain changing from deep to shallow when the terrain is dead flat. So it is very difficult. I admire all the participants in this for the homework that they have done, the intensity with which they have investigated, the exposure they have given themselves to the science, and yet they still differ. That is human nature to some extent because people have different priorities. The landscape also changes as you go from one catchment to another or one property to another and this makes it very difficult.

I think that it highlights the peril of looking for one silver bullet to solve this. I am not suggesting that the drain was the silver bullet but to some extent it was in the upper south-east. That was where everyone pinned their hopes: the drain would get rid of the floodwater and halt the rising ground water. That was the big ticket item and that is what people got really interested in. But we have known for a long time that it is never as simple as that.

CHAIR—One question that comes to my mind from all of that is whether for projects like that, which are fairly major not just in costs but once done they cannot be undone terribly well, we need to be more certain about the consequences beforehand. You cannot wait forever and you cannot study forever—

Dr Munday—No, you cannot, and yet 10 years ago the people who made the decisions felt pretty certain. But things change. The climate changes and that has been alluded to, I know, in the submissions. People have experienced a period of very dry years. Those people who are not in favour of the deep drain would probably say, ‘In this period of lower rainfall and so forth, if this continues, why do we need the drain?’

On the other hand, if you look at the long-term rainfall figures you would say that we have gone back to about 1900. It is no drier now than it was in 1900 and maybe this cycle will repeat itself over 50 to a hundred years. We do not know and so how do you make decisions about what you are going to do? Do you wait until you are absolutely certain about every possible outcome or do you say that with the best possible science available to us this is the decision I think we should make? I have been witness to the deliberations of the Department of Water, Land and Biodiversity Conservation, because I facilitated four of their technical workshops at the end of last year and early this year, where they basically brought in all the scientists who are involved in that project and got them to put the science on the table so that the decision could be made to inform the board. I would have to say that the process was impeccable. But with all the experts

they got a diversity of opinions because the experts themselves come from their own sectors. They are agronomists, hydrologists, wetlands experts and so forth, and they have different perspectives. Whilst they might be objective about the science, they are still driven by some ideology so it is very difficult to finish up with a clear-cut answer. But I thought the department did an impeccable job in terms of exposing itself to the arguments. Ultimately, someone has got to bite the bullet and make a decision.

Senator STEPHENS—On that issue, you are actually in a very advantageous position for us to make some observations in the policy sphere. We have had a theme running through many submissions that there needs to be improved coordination and communication of the salinity science from the research to the on-the-ground applications. One of the recommendations from the House of Representatives Standing Committee on Science and Innovation in its inquiry into salinity was the creation of a national coordinating or brokerage body which would oversee these things, and in fact many of the recommendations rely on the existence of one. What is your take on that?

Dr Munday—I think it would be an excellent idea. The National Dryland Salinity Program coordinated the science. It was a 10-year program in two five-year segments. To its credit, after four years they set up the communication program. That was when I became involved with them, very much on a part-time basis. It was quite rare, I think, among those major research programs to think of communication before the end. Most of them wait until it is all over and then say, 'We'd better communicate some of this.' But they decided when they were going into phase 2 that they were going to have ongoing communication, which they did, and I think they did it very effectively. I say that with all modesty, because I was just part of the team.

At the end of the program, there was no national coordination of the research. The cooperative research centre for salinity is probably the nearest thing, but it really deals only with plant based solutions. It does not deal with hydrogeology, it does not deal with engineering solutions and it does not deal with airborne geophysics. It has a peripheral interest in those things but it is not actively involved in them. Therefore the national research is not being coordinated. Obviously, the knowledge brokerage is not being coordinated nationally either.

I manage the communication program for the cooperative research centre and we try as part of that to draw in information from other bodies. Our national newsletter, for example, has submissions from the Murray-Darling Basin Commission, from CRC LEME, the Bureau of Rural Sciences and so forth. But we have to go and chase all that stuff and bring it in. If we decided to turn the tap off because our budget would not fund it then it would all end. So there is no national body doing that, other than the almost voluntary work that the CRC is doing.

Senator STEPHENS—And in relation to the wonderful CD—

Dr Munday—I was hoping you would ask!

Senator STEPHENS—I embarrassed our previous witness about that.

Dr Munday—He is very hard to embarrass, I am sure.

Senator STEPHENS—I did not mean to. He, of course, was not dealing with dryland salinity. Do you have any sense of what feedback from, response to or level of usage of that package there has been?

Dr Munday—I think it is a tragedy that it has never been evaluated, but I believe it will be. I think Land & Water Australia is going to do that. I think it was the one missing link. To some extent this relates to the issue that Dan Meldrum raised, which is that programs come to an end and sometimes a whole heap of things fall over with them. In retrospect, we should have built evaluation into the final product. We should have had a budget item set aside to do an evaluation of it. The anecdotal feedback that I get is extremely positive. A lot of people have said that it was really great. Other bodies, Greening Australia and so forth, have tried to replicate it or the model because they think it was very effective. I think that is a good sign, but you would not say it was hard-nosed evaluation. There has been a suggestion that a second edition should be produced because when that CD came out some of the material was still in press. The references at the end are really why it is important, because of the access they give you to all that information. Some of that was still in draft or in press and therefore is not available on the CD. At the very least, that could be brought up to date. But better still, the research that has been done since then, principally but not only by the CRC—also by BRS with airborne geophysics, by CRC LEME and other state agencies—could be brought onto it. I think that would be a phenomenal investment—irresistible—if someone were looking for something to invest in.

Senator STEPHENS—Finally, Dr Munday, if you were suggesting the recommendations that this committee should be making in its report, what would be the key recommendation that you would make?

Dr Munday—Rather than me suggest a recommendation, I will just note a couple of things. I do believe there is a grave risk that we are thinking that salinity is all over because we have had a series of dry years, particularly on the east, but not only there. One of the things that we know from the National Dryland Salinity Program is that some of these ground water systems are very sluggish. They respond very slowly. Some of them, the local ones, respond quite quickly but the regional and intermediate ones take a long time to respond. So if we go into a wet period, and none of us can predict whether we will or not, particularly if it is dominated by episodic events—floods—we may well find that it all comes back to bite us again. We will just repeat it all and people will trawl out statements that people made 10 years ago and say, ‘Why didn’t we listen?’ We are having a bit of a honeymoon or spell from dryland salinity at the moment. I would have to be honest and say that is a gut feeling, but one based on having read a lot of stuff. That would be one point.

The second point is that sometimes I am concerned about the recommendations to target investment. Clearly, investment must be targeted, but the derisory reference to the ‘vegemite approach’ to public investment and so forth concerns me—and it comes from the CRC that I work for. I shudder when I think of their reading the transcript of what I have said today—but I have said it to them. I think it is very short-sighted to put all your eggs in that basket. If we funded sport or the arts in that way, we would fund only elite sports people or elite artists. We need to change the culture so that the whole community accepts the responsibility for managing our natural resources, of which managing salinity and ground water is just one. So there does need to be encouragement for local groups to become involved.

The emphasis should not just be on the money part; it is the capacity building that was alluded to before—all those sorts of things. If they miss out because they are not in the target, we will all miss out. Changing the culture is more important than anything in terms of the way in which the nation manages its natural resources. That is ideology for you, not science.

Senator ADAMS—I am from Western Australia and a farmer from the great Sutherland region. The WA Farmers Federation has put in a submission which I want to ask you a couple of questions about. They note that the community is very concerned about the salinity management focus of our state being on biodiversity outcomes as opposed to sustainable farming and salinity control outcomes. What is the context of that in South Australia? Is there more focus on biodiversity there?

Dr Munday—Again, it will vary from region to region. If you take, for example, the eastern Mount Lofty Ranges, which is where I come from, salinity along the watercourses is an issue. That water flows into the Murray and gets pumped back to Adelaide. So the issue there is the water resource. The amount of productive land which is taken out is minimal and therefore it is just not an issue. A lot of the biodiversity is along watercourses and, therefore, if the watercourses are degraded, the biodiversity is devalued. If you go to the upper south-east, the impact on productivity is the prime issue. If you try and deal with that by way of a drainage program, you bring the wetlands into the equation, including the Coorong. These things tend to mesh.

There is variation between upper and lower Eyre Peninsula. It has a significant impact on not only productivity but also biodiversity, wetlands and estuaries. The estuaries are the home for a lot of the aquaculture over there and are vulnerable to the salinity issues further up stream because of acid sulphate soils. I think we are yet to see the worst of it on Yorke Peninsula. I do not want to be a prophet of doom, but I think salinity will be a problem on Yorke Peninsula, and productivity will be the great loss on Yorke Peninsula. Kangaroo Island is a bit of both. I have not given you a very good answer. I suppose it comes back to the point that I made right at the start: it is different everywhere. It is a shame to separate them. I can understand the Farmers Federation saying that the emphasis is wrong—and that needs to be part of the public debate, region by region.

Senator ADAMS—Our state has gone very much on the environmental side of it and it feels that it is being left out. We have to fix that in Western Australia—

Dr Munday—I would have thought that there was still a very keen interest in the productivity aspects in Western Australia.

Senator ADAMS—There is a huge interest.

Dr Munday—You have organisations like the Saltland Pastures Association and so forth, which are active.

Senator ADAMS—They are not on the radar; that is the problem at the moment. Have you been sitting here all morning?

Dr Munday—No, I have not. I have been up at Snowtown looking at saltbush this morning.

Senator ADAMS—We have had a number of submissions from land-holders and have heard different views about the Upper South East Dryland Salinity and Flood Management Program. Many expressed deep concerns about the program, and it is clearly an issue that has divided the community. Are you familiar with that program?

Dr Munday—Yes.

Senator WORTLEY—What are your views about the proposed Didicoolum drain? Can you offer any comments about the way in which the program has been administered and the community consultation side of it?

Dr Munday—I can only go back to what I said before. I do not think I am in a position to actually judge the decisions, but my impression of the process is that it has been bulletproof. It has sought input from all quarters and taken notice of that input. When the final decision was made, I suspect that some people felt aggrieved and felt that their view had not been fully taken into account. As I said, I was the unbiased facilitator of four technical workshops at the end of last year and the start of this year. I was there, to some extent, to keep the peace between warring parties and to try to progress the development of these ideas so that advice could be given to the board, and the board could then make a recommendation to the state minister.

I honestly thought the process was as good as you could get. Everyone had a chance to say what they wanted to say. The science was out there for everyone to evaluate. In the end, because of the polarisation, some people would not have liked the decision that was made. We also have to bear in mind what Senator Bartlett said before: the other program is now well progressed. It is going to be very hard to fill in all the drains. If you just focus on, say, Didicoolum and Bald Hill, I guess in the end you have to make a decision which suits everybody's needs, including the needs of the environment and the community. I cannot say whether the decision was right, but I think I can say, in my view, that the process was right.

Senator WORTLEY—Continuing with the upper south-east, if the drainage program goes ahead, as indicated, what impact will that have on the wetlands, in your opinion?

Dr Munday—The program has developed a very sophisticated way of accommodating the needs of the wetlands. For me, it is very good that the wetlands has become a priority issue, because it could easily have been neglected and could have become a victim of the drainage program. If you deny wetlands of water, they are no longer wetlands. It requires quite sophisticated engineering to accommodate those needs. Sometimes I look at the problem and I cringe and think it has become more engineering focused but, to their credit, they have come up with what seems to be a viable solution. I think if they go through with what is, as I understand it, an informal proposal to take drainage water from the lower south-east up through the wetlands then that will be a huge advantage for the wetlands. There is fresh water down there which at the moment goes out to sea. That is a historic drainage program which opened up a lot of the lower south-east to productivity.

That water could be diverted north, which is where it used to flow before the drainage program. It will require more money and I do not think it is money that they have in this budget, but I am now out of my territory a little bit. I think, ultimately, that could be the case. Then of course you will finish up with fresh water flowing into the Coorong, and there may be an issue

there because the Coorong is hypersaline. But then some people will say that it was not always hypersaline. There are people in the room here today who know more about the upper south-east than I do, but the Coorong has not been taken for granted by the program. But the program—and you probably heard this this morning; I do not know because I have not read the submission from DWLBC—has taken the Coorong issue very seriously. It is required of them, because it is a Ramsar site, and they are very conscious of the amount and the quality of water that will go into it. But the problem with the Coorong at the moment is that it is starved of relatively fresh water because there is very little water coming over the barrages. So, if they can get fresh water from the upper south-east that will be an advantage. But, of course, if you get increased environmental flows down the Murray so the Coorong gets flushed then you might find you have an embarrassment, which is too much fresh water coming from the upper south-east. I have now probably exhausted my knowledge on the subject.

Senator WORTLEY—This morning, one of the submissions referred to the issue of good land management practices, including being able in some cases to reverse the impact of salinity and flooding on land. What is your view on that?

Dr Munday—There were good land management practices there and up until the late seventies there was a lot of lucerne. I think there was something like 250,000 hectares of lucerne. Do not quote me on that number, but it was a lot of lucerne. That lucerne being perennial, deep-rooted and so forth had effectively taken over the hydrologic task of the natural vegetation which preceded it. So, where you had the ti-tree and the mallee and so forth controlling the recharge and when that was cleared, it was pretty quickly replaced by lucerne. So you had an equilibrium situation. But of course all the eggs were in one basket. When the aphid came in and wiped out the lucerne—boom!—problems emerged. The ground water just went up like that. You can look at the hydrographs and they go up like that.

The fundamental weakness of the agronomic solution was that it all depended on one split pin, and when that sheared the whole thing fell apart. It took a long time to get lucerne back into the ground because there were non-wetting sands and so forth, and they had to come up with aphid-resistant varieties. But a lot of that has been overcome. The cooperative research centre for whom I do a lot of work is a very strong advocate of lucerne and they have developed a lot of better varieties—acid-tolerant varieties and so forth. So there is an opportunity to get more lucerne onto the land but, despite all that, there is much less lucerne there now than there was back in the 1970s. Despite everything, despite all the public funding and so forth, there is a lot less lucerne than there was. So it is going to be a big ask to get perennial vegetation back on that sort of scale, which is not to say it is impossible. It is a solution that I would favour as a complement to all the other programs.

Senator WORTLEY—As a complement to the deepwater drain?

Dr Munday—That is right, and also the retention of native vegetation. The native vegetation that we have there is really probably the most important resource of all. The Biodiversity Offset Scheme, which you would have heard about, is an attempt to try and sustain that. Despite the fact that they have had a revegetation program in the upper south-east as part of the program, the amount of vegetation now is less than there was at the start of the program, despite the fact that public money has been invested in revegetating. It has been overtaken by the amount that was lost by clearance and just natural degradation of scrub which was unprotected. So if there is an

opportunity to protect that scrub by valuing it, then I think that is a wonderful initiative and one that I think is commendable, and I think other regions would probably try and model it. But it has not been well accepted. By some, it has, but my impression is that there is a lot of resistance to it. I think a lot of that resistance is part of the history, the baggage, that comes with the program. It would not matter what the program came up with, some people would say, 'This sucks.'

Senator WORTLEY—Earlier you commented on whether we had enough information now to actually be in a position to put forward the solutions to the programs we are putting forward. In your view, would we be better off, in some of those cases, continuing the research before implementation?

Dr Munday—Are we talking about the upper south-east drains?

Senator WORTLEY—Yes.

Dr Munday—There are certainly still some unanswered questions. There is the question about sodicity. Obviously the soil is sodic. That soil has always been sodic. It was under the sea and it is has had aeolian salt brought in for hundreds of thousands of years. Inevitably, if you drain the water from the soil profile, you are left with sodic soil. But it does not matter how you drain it, whether you drain it with a deep drain or you drain it with vegetation, if you remove the ground water you are left with sodic soil. I think it is clearly in everybody's interest to get that saline ground water down. You can do more with sodic soil than you can with salty soil.

There are still questions to be answered in terms of the stability of the drains themselves. As the drains erode, as sodic soil does, it causes siltation in the drain. I think our understanding of that is less than complete—dangerously less than complete. But it is not universal; it is significant in some areas and less significant in others. There are certainly a lot of unanswered questions there. I am reluctant to stick my neck out and say, 'Let's put it on hold for 10 years and do more research', just as I am reluctant to say: 'Just go for it. We can live with whatever collateral damage occurs.' It is very difficult, and it is part of the reason that there is the conflict which exists at the moment, because there are no absolute certainties, I do not think.

CHAIR—I understand that you are involved with the Sustainable Grazing on Saline Land Producers Network. Could you give us a bit of an outline of that?

Dr Munday—This is an initiative of Australian Wool Innovation who decided—this is my interpretation; I think AWI would use somewhat different words—that they needed to clean up their environmental image and present a greener image. They sought advice from Land & Water Australia on what would be appropriate programs for them—the people who pay a levy—to be involved in. They came up with a portfolio, the biggest component of which was managing dryland salinity. There are two components: a research component, which the CRC manages, and a producer network.

The producer network involves groups of farmers who are involved in setting their own research agenda. They ask things like: 'I have a property which has salinity on it. I would like to know how to manage it sustainably and productively. What can I grow on it? How do I get the best production out of it? What is the incentive for me to do it?' The agenda varies from group to

group across the nation. These little groups have all been set up with what you can really only call seed funding to run their own little research agendas. There are 120 groups across Australia. I am probably telling you things that you know. In South Australia there are 14 groups. I chair the committee which manages that. The committee is made up entirely of community members who are all farmers who have saltland and some experience with saltland agronomy. They manage the program.

It has been a phenomenal success because it has ‘empowered’—to use the cliché—a lot of land-holders to have an interest in research, to seek answers to questions, and to share the answers, because the network enables the sharing of the information. It has helped develop that culture that I was talking about before. We have a resource which is damaged and we have a responsibility to look after it. We also have an imperative to try and make it productive. The two things can be done.

I think it has been phenomenally successful, partly because it has been extremely well run. I take no credit for that. The national coordinator has done a phenomenal job. Morale within the group and across the network of groups is good. They feel as if they have achieved something and are continuing to achieve something. I hope it continues a lot longer. I think it is an outstanding model of community involvement and success.

CHAIR—Is that funded through AWI?

Dr Munday—AWI. It is managed by Land & Water Australia.

CHAIR—I must say as a side comment that that sounds like a better use of AWI funds than giving them to lawyers. That was a purely individual comment, not representing the views of the committee. I want to talk about some of the issues you just raised and the broader issue of salinity management. You mentioned a couple of times the variation between regions and suggested that regional bodies, at as local a level as possible, were good ways of managing the issue of catchment scale projects. Are we doing well enough in ensuring that regional bodies—even down to individual land-holders—can keep pace with the continuing national and international research? Is that working sufficiently well at the moment? I guess what I am getting at is that we are doing things at that local and individual level, which I think is ideal, but there is large-scale research and changes to things. Are you able to get that research down to the individual level?

Dr Munday—I think it does. The virtue of a national program—be it a national dryland salinity program or a cooperative research centre—is that it obviously harnesses the resources from a number of different institutions. Something which can get CSIRO talking to the universities and government agencies has got to be good. There are transaction costs involved; nonetheless, it is a bit like the Senate—if you bring all these people together you have to benefit from the hybrid vigour that comes from it, plus the fact that they bring with them a lot of historical IP, which I think has been very good. Also, they share the infrastructure resources—the Waite Institute and things like that. That idea of having national research is commendable.

A priority of the CRC’s communication program has been to engage with these regional groups. We see the regional groups as essentially prime targets, partly because they have got money. I thought I would never be game enough to say that in public, but you know how it goes.

But they have. They have the responsibility and they make the investment decisions. So clearly we need to be in bed with them, and I think we have made a big effort to do that. The difficulty has been that the regional groups, except for in Victoria, have been largely in set-up stage, so they have been very largely preoccupied with the human resources issues, the legislative requirements, getting to know the ropes, appointing good initial boards and so forth. I am acutely aware of that because I was on the interim NRM council in South Australia, so I had an insider's view of the agony that many of these regional groups, at least in South Australia, went through in the set-up process.

For us as researchers to get in the door and talk to these people about salinity is very hard, because they say, 'We are not ready for that yet. We are not ready to do anything on the ground, other than the priority issues like ground water interception. We are far too busy doing procedural stuff at this stage. Victoria, of course, is far further advanced and the catchment management authorities are far more mature. Therefore you can get some reasonable traction with them. It is a bit harder here. Nonetheless it is an issue for us. We—the cooperative research centre—are certainly taking the catchment management authorities very seriously. We want to make sure that the research we do for them is regionally relevant. Then the challenge for them is to make sure that what they are doing regionally is relevant to their local constituencies—the individual land-holders, the Landcare groups, production groups or whatever they might be.

The other key players in this are the industry R&D corporations. They are the ones who, I think, must also be brought in, because a lot of land-holders will take at least as much notice of their industry group as they will of the catchment management authority. If I am a wheat grower, I want to know what GRDC thinks about this.

CHAIR—Thank you very much for your attendance and input today.

[3.17 pm]

ROSS, Mr Patrick, Private capacity

CHAIR—Mr Ross, I understand you have indicated that you want to make a brief presentation to us and give us some of your views. I imagine you have heard me say this a number of times, but I do need to say it with each witness. Evidence given to the committee is protected by parliamentary privilege, and the giving of false or misleading evidence to the committee may constitute a contempt of the Senate. If for some reason you want to give the answer to a question in private, you may ask to do so and we will consider your request.

Mr Ross—Thank you. I am a land-holder in the Lucindale district in the Bakers Range Watercourse. I have a thousand hectares and my associated extended family has another 10,000 hectares, also in the Bakers Range Watercourse. I am also a director and shareholder in a company called Parrakie Wetlands Pty Ltd, which has 720 hectares and is adjacent to a contiguous wetland and remnant native vegetation area, making up a total of 5,000 hectares in the upper south-east, within the West Avenue watercourse or the Bald Hill drain alignment.

I would like to discuss drainage, primary production and wetland management. In regard to primary production, I have been in the area since 1979 and was most probably a subsistence farmer running an unsustainable agricultural pursuit for the first 10 or 15 years in the south-east. In 1981 we had a flood, which flooded my entire property, and again in 1988. I was repasturing at the time.

Since that time of running what would have been called a district average of three DSE, I, like the Prossers, am now running between 12 and 15 DSE per hectare winter-stocking average. My property is entirely revegetated with perennial grass and annual clover species. I imagine that dry matter production would be in that 10 to 12 tonne per hectare or better category.

In 1988, I put a very large 20-metre wide shallow drain in the floor of the Bakers Range Watercourse. Imagine this table being the Bakers Range Watercourse on the western side. It is about 200 millimetres deep and 20 metres wide with a 10-metre adjacent area. All those are levelled. We did this in conjunction with land-holders to the north or upstream and downstream from me. Now when we have rainfall, the ground water rises from 1.5 metres to a couple of hundred millimetres above the surface and the whole watercourse starts to move. Of course, I have put loads of little shallow laser drains that go into the main drain and the water goes off into the countryside and I am able to carry out what would be considered in the district as highly productive agronomic practice. The Bakers Range Watercourse is the main artery of the south-eastern system. It has the freshest water. It goes up through Charlie Bruce's country, which is about 15 or 20 kilometres north of mine. It is the absolute artery of the whole system. If that water could be used in wetlands, it would be a great benefit.

With regard to watercourses, wetlands and drainage, nowhere in the upper south-east system has it been demonstrated by the program board or any of the technical people that a drain will benefit wetlands. The wetland that I am involved with has a capacity of 26,000 megalitres of water, and the water comes in at between 1,000 milligrams and 4,000 milligrams per litre at the

end of the season, which gives it an average water quality in the wetlands of 2,600 milligrams per litre.

The Cortina Lakes, which you may know about, is a very large wetland complex further north of me. It is owned by the Brinkworth family. Fifteen years ago, the Cortina Lakes area had an average water quality of 2,600 milligrams per litre. Since private drainage and scheme draining and Mr Brinkworth having a very strong desire to have a lot of water—he was putting the ground water into that—it has increased from 2,600 milligrams per litre to now 31,000 milligrams per litre. That measurement was taken a couple of weeks ago. I have it on very good authority. Their estimate is that, by 2010, it will be at 56,000 milligrams per litre. That water is no good for anything. The Cortina Lakes used to be one of the great inland refuges of the Coorong. Cortina Lakes sustains very little wild fowl population. It used to be a rookery for the glossy ibis. There are no glossy ibis rookeries there anymore. Briefly, on the Coorong, everyone talks about it being hypersaline. I know part of the whole scheme with the Murray-Darling Basin and also the drainage scheme is to put some water into the Coorong.

The amount of water that would be yielded from the upper south-east scheme is very low. In fact, if there was a real need and a desire to do something with the Coorong—and that is an engineering solution—I think you could mostly use tidal influence and put seawater at 35,000 milligrams per litre into the southern end of the Coorong. The Coorong is running at 110,000 milligrams per litre, so it is hypersaline, but it used to have a huge population of Aborigines living along that coastline, which it does not today. You talk to the fisherman and they will fill you in. I am not an expert on that, but that is a little thought. The amount of water that would be yielded from the south-east scheme into the Coorong and having a desired freshening effect would quite literally be like a teaspoon in a swimming pool.

On the Kyeema situation, which we had a lovely photograph of, they talked about local catchments and surface water flows going into wetlands. That is absolutely critical. Our Parrakie Wetlands has utilised very successfully—here is a gong for the federal government—the Wetlands Waterlink funding we were given. We have used that money to help manage water flows within our wetland complex. I have personally utilised Salt to Success money for revegetation work for the 50-metre wide areas on my property, which are two kilometres long in each tranche. I recognise that the south-east was overcleared. That money has also been a huge benefit for me in livestock production.

The freshwater flows that come across are very local and very powerful in influencing the health of any wetland complex. Unfortunately, they do not yield enough water from the east-west flow to fill up the entire wetland complex. They need water from the south. That water from the south was cut off by the drain M system in the sixties, and the Wilmott and Blackford drains would have taken a certain amount of water. They outflow to the ocean. They run basically east to west and cut the flows to the north. The Fairview drain has had the same effect, and that flows into the Blackford drain. It is further north and cuts back into the Blackford drain, and it has the same dewatering effect. Water flows from the south do not happen any more.

Roger Wickes said *prima facie* what is needed is water from the south. Remember the south-east is so flat you could stick a matchbox under one end and that would be it. If it was the Hume Dam, we could manage water. If someone puts a sill or a block a foot high anywhere in the south-east, that has ramifications for 15 kilometres. If we have a year when we have average

rainfall or the rainfall events happen at a time of the year that we can get water to move and flow, Bool Lagoon fills and we can have access to water coming down drain M, the flow can go one of two ways: it can go straight into the ocean or it can come up the Bakers Range Watercourse. To come up the Bakers Range Watercourse it needs head pressure. That is the driver. It will come up the watercourse when all the farmers and graziers on the watercourse already have a certain amount of water on their property. They talk about 60 cusecs of water. I think that means 60 cubic metres per second of water. If they put up an extra 60 cubic metres per second of water over the countryside, it will cook our land—it will build up, warm up and ruin our agriculture completely.

The south-east is a naturally saline environment, and it has been forever. I live in a saline environment. Water goes to about 8,000 milligrams per litre of salt. It is certainly not serious salt but it is salty enough. I have a very good soil profile, bearing in mind that my soil is not very deep before I hit solid calcrete, which is like cement. I have a bit of humus and the rest of it is grey, calcareous clays. You could make pots out of it. It is terrible stuff. I have salt underlying my property and every year I have a freshwater flow over it. I farm in the bit of stuff in between, and I do it well. I think the capacity for a lot of people to do it well is there. Some people walk the walk and others just talk the talk. That is just how it is.

I did have a bit of a blast in my submission about the Biodiversity Offset Scheme, and I will not step back from that. I mentioned that the Biodiversity Offset Scheme was basically buying trees that already existed. That is exactly what it did. Since the Biodiversity Offset Scheme was proposed, the wetland water link and also the salt success schemes were actually stopped—they were the revegetation schemes. What they did was just put fences around remnant vegetation. They should have offered to put the fences around the remnant vegetation anyway and not offset the levies as a bit of a sweetener for someone to want to dig a drain. It is an accounting deal that I think the government should be held accountable for. It is great for those people who can take part in it, but it is not very good for those people who cannot take part in it. It was not fair and equitable.

I have one last point. The people who wanted the drains, of course, have paid the levies. I am paying the levy and I do not want a drain. I do not want a drain near my wetland. I do not want a deep drain on my property. They want a drain. If you pay \$2 to the guy in the deli you want your can of Coke, and I think they want their can of Coke. If you a question, I am happy to answer it.

Senator STEPHENS—Thank you very much for your submission. It has been very interesting to hear what you have had to say. I do not know if you have been here all day.

Mr Ross—Yes.

Senator STEPHENS—So you have heard both points of view about this drain. You make the point, of course, that, whether or not you want the drain, you are paying for it. Are you able to give us some clues as to the extent of the levies that people are paying?

Mr Ross—It is per hectare and it is zoned. This is the absolute centre of zone A. The potential high beneficiaries are generally in the bottom of the watercourse—they are getting wet anyway. The first lot of levies was something like \$8 per hectare spread over six years. Then we had the next lot of levies, which was \$29 per hectare for zone A spread over X years. That very first levy

of \$8, when it was first instituted 10 years ago, let us say, was quite an impost. There was not a farmer around who had any money. So this extra levy was just a burden.

I also noted the idea that redeveloping your land and making it more productive was going to cost six times whatever the cost of the levy was. To be quite frank, it is a drop in the ocean. If the levy is \$29 per hectare in zone A, to develop a hectare to full production at say 10 to 12 DSEs to the hectare, I can do that for about \$120 a hectare. That is a good investment to go from three to 10 or 12 DSEs. It costs you 10 bucks a DSE. That is as cheap as chips. If you are talking per hectare rates, forget about the \$150,000 that I am paying multiplied by six equals \$680,000. That is semantics. The real issue is per hectare—get real.

Senator STEPHENS—Sure. Thank you.

CHAIR—Thank you. If there are any other matters that you want to put to us—if you have supplementary submissions or comments based on things that other people have said during the day—please feel free to do that. That applies to anyone who has been participating or listening. Thank you.

Committee adjourned at 3.33 pm