



COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

**HOUSE OF  
REPRESENTATIVES**

STANDING COMMITTEE ON SCIENCE AND INNOVATION

**Reference: Coordination of the science to combat the nation's salinity problem**

FRIDAY, 31 OCTOBER 2003

SHEPPARTON

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**HOUSE OF REPRESENTATIVES**  
**STANDING COMMITTEE ON SCIENCE AND INNOVATION**

**Friday, 31 October 2003**

**Members:** Mr Nairn (*Chair*), Ms Corcoran, Mr Evans, Mr Forrest, Ms Grierson, Mr Hatton, Mr Lindsay, Mr Tony Smith, Mr Ticehurst and Dr Washer

**Members in attendance:** Ms Corcoran, Mr Nairn

**Terms of reference for the inquiry:**

To inquire into and report on:

The Commonwealth's role in managing and coordinating the application of the best science in relation to Australia's salinity programs.

In conducting its inquiry, the Committee will give particular consideration to the:

- a) use of salinity science base and research data (including the development of new scientific, technical and engineering knowledge) in the management, coordination and implementation of salinity programs;
- b) linkages between those conducting research and those implementing salinity solutions, including the coordination and dissemination of research and data across jurisdictions and agencies, and to all relevant decision makers (including catchment management bodies and land-holders); and
- c) adequacy of technical and scientific support in applying salinity management options.

**WITNESSES**

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**Committee met at 8.32 a.m.****DYSON, Mr Philip Ronald, Director, Phil Dyson and Associates Pty Ltd**

**CHAIR**—I am pleased to declare open this third public hearing by the House of Representatives Standing Committee on Science and Innovation for its inquiry into the coordination of science to combat the nation's salinity problem. On 13 August the committee was asked by the Minister for Science, Peter McGauran, to inquire into this issue. It was advertised nationally and written submissions were sought from interested departments, organisations and individuals. Our focus is on managing and coordinating the application of the best science in relation to Australia's salinity problems. We are pleased to have the opportunity to follow this up here in Shepparton. We have lost a couple of our colleagues from the committee since yesterday, but I am sure they will be reading the *Hansard* of today's proceedings, when it is available, to make sure they catch up on what they miss today. I welcome our first witness, Mr Dyson. Do you have any comments to make on the capacity in which you appear?

**Mr Dyson**—I am now a freelance consultant. I have worked in salinity research and salinity related 'extension of knowledge' activities relating to salinity issues for some 27 years now, across both private and public sector organisations.

**CHAIR**—Although the committee does not require you to give evidence under oath, I should advise you that the hearing is a formal proceeding of the parliament. I remind you, as I remind all witnesses, that the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. I also remind you that the committee prefers all evidence to be given in public. However, at any stage, you may request that your evidence be given in camera and the committee will then consider your request. We have your submission, No. 46, which has been authorised for publication. That submission is now on the public record, as part of the inquiry. Would you like to make some opening comments, before we ask questions?

**Mr Dyson** —Yes, thank you. My comments would be that the terms of reference and the issues addressed by the terms of reference have been near and dear to my heart in the last three to five years. Working between the knowledge generators—the researchers—the catchment communities and all that lie between is something that I have done quite a lot of and, as I have said to a number of people, I see that as probably the area in which we can potentially make the biggest gain. It is on that basis that I am here.

**CHAIR**—Mr Dyson, perhaps, to start off, you could fill us in on some of the specific projects that you have been involved in, and perhaps you could give us the history of how you have seen the science getting through to an actual project on the ground and provide any advice as to how we can ensure that that flow of information does not get diverted or blocked in some way on the way through. As you would appreciate, part of the rationale behind this inquiry is that there have been some concerns that maybe some of the projects that are being implemented on the ground may not have the most up-to-date knowledge and may still be based on research from a decade ago. I am not saying that is necessarily the case, but I think there is sometimes that perception. Also, people raise the issue of whether the farmers and land-holders et cetera who recognise that various things need to be done can easily access the type of information that they actually need to proceed in a positive way.

**Mr Dyson** —Okay. This is a very big subject, as I am sure you would appreciate. There are two significant projects that I have worked on in the last five years that are entirely relevant to what you are doing here. The first is the one that I have mentioned in my submission, the Murray-Darling Basin Tools project. The Tools project came into being for all the reasons that you have just outlined—the need to look at taking the knowledge base out into the community, recognising that there had been a major transition in the last decade or so in terms of the way that knowledge was once delivered under natural resource management compared to the way it is now delivered.

Largely, I am talking about institutional reforms—the ways that governments do things and a change in the sorts of people that are working in communities and providing information. We generally do not have people out there that are necessarily trained and experienced in the way that people were in the past. We often have people out there who are very young and very new to the situation and who are on short-term funding in a lot of cases. As well, in many instances they do not have tertiary qualifications in the area that they are actually working in. We need to also recognise that a lot of those people do not hang around for very long; they are often there for two or three years before they move on to the next position. Against that background, there was a need to look at how we did pull information together for catchment communities, and the Tools project did a couple of things in that regard. It certainly developed a web based information package that consisted of quite a number of simple fact sheets on salinity, so that people had a reference guide to go to. They had an area that they could look up in order to chase down further information. They also had some people that they could contact.

The other thing that the Tools project did was actually go out to the regions. Having assembled an overview of the knowledge base, it went out and workshopped the knowledge base with the regions. So the concept of researching nationally but finding local applications was one that, after some initial hiccups, certainly took off and worked very well. It worked well because, at the same time, another concept that I am sure you will hear about, if you have not already—the ground water flow systems concept of catchment classification—was starting to gain currency. That is something that I was intimately involved in. Coming out of the National Land and Water Resources Audit we developed a 1:5,000,000 map of the whole of Australia, showing the different ground water systems, the different problems in different parts of the nation and how each of those had a different suite of issues that required different forms of management. We went on a few years ago to develop the same concept at 1:2,000,000 scale for the Murray-Darling Basin program, and in the last three years we have been workshopping that concept down at the regional scale, the 1:250,000 scale, for all the tributary catchments of the Murray-Darling Basin, and now almost everybody in eastern Australia is working through that sort of framework.

I use the word ‘framework’—and I underline it in there—because regional catchments communities need to have some order in their knowledge base, basically. One of the problems we have is that knowledge is often thrown at them randomly and it is not in context. You can take any one of these catchments—the Goulburn Broken catchment, which we are in now, or the Campaspe, the Loddon, the Avoca, the Murrumbidgee or the Murray—and you do not have one salinity problem in those areas; you have 15 to 20 different salinity problems because the processes vary according to scale, in sympathy with the geology and the geomorphology of the landforms and the climate and the land use.

To be able to provide a framework based on ground water systems that are disaggregated at a catchment scale according to geology, geomorphology and land use, and to do that in a process that involves regional communities, whether it is agencies or a mix of agencies and communities, is something that has, together with the Tools project, been particularly successful in at least attempting to do what you are talking about here. In terms of the dryland salinity issue, we have pretty well everybody up and down the east coast—from South Australia through to Queensland—working their way through that framework now. If you go into the regions, they tend to talk about very technical terms now—about deeply weathered fractured rock ground-water flow systems, regional alluvial ground-water flow systems or a range of others. To that extent, that has given what a number of our extension providers—I hate that phrase—or knowledge providers now call common currency in the language that we actually use.

So we can go to one catchment and talk about a fractured rock ground-water system and then go to the next one and find the same system. That is why we are trying to line up our research now to say: ‘What can we do about this particular system? How will it respond to this form of land use as opposed to that form of land use?’ At the moment, I guess where we are trying to go is to also line up our monitoring and evaluation programs so that the learning that is coming out of our research and development programs fits within the same framework. It is probably going to take us three to five years to actually do that.

If I can backtrack a little bit, the Tools project provided us with the vehicle to put information together and to take that information out to the regional communities, and the catchment classification process allowed us to go to each of those regions and to talk about what they could do. More than that, we actually used a workshopping process over a three- to five-day period to break those catchments up into their component parts, using the local people’s knowledge. That is the key to a lot of what we are trying to do, I think—to take the national research out into the regions where it has some relevance and then use the catchment planning tool and that understanding to take that down to the community level.

**CHAIR**—How involved were farmers and land-holders in the workshops you were talking about? Or did they more involve members of various levels of government?

**Mr Dyson**—It varied enormously from region to region. Largely, that aspect was worked through with the regional coordinators—the salinity coordinators in each of the catchments. Most of them chose to involve land-holders, either through representatives of catchment management boards or catchment management authorities—there are farmers sitting on those things—or directly as individuals. In most instances where they were not involved we ran separate workshops to demonstrate the processes that we were talking about. The big issue is that it is very hard to get to catchment communities unless you have the land care coordinators, the salinity coordinators and the information providers in each of the regions tuned up to deliver the information. It is at that level that we need to provide knowledge, information and, above all, mentorship to look after those people. A lot of them are very isolated. At the end of the day, after working a long day, coming in and trying to look up information on a computer or read the fantastic reports that we produce is something that they would all like to do. But, having worked with them throughout eastern Australia, I know they are very limited in their capacity to take on information in a written form and in web form.

**Ms CORCORAN**—The Tools project seems to be a mix of networks, workshops and things like that. Is it a permanent thing?

**Mr Dyson**—No, that is the problem.

**Ms CORCORAN**—That probably explains my question. I am still not clear. If I own a block of land here and have a question, is there a permanent place I can come to to get information through the Tools project?

**Mr Dyson**—The Tools project would ask: whereabouts is your block of land in relation to the salinity processes that are going on?

**Ms CORCORAN**—But, before I even get to that point, who do I contact? Is there a place I can go, or do I have to wait for the next workshop?

**Mr Dyson**—If you had a block of land down the road and it was in a dryland situation, there are one or two people that you would go to. They coordinate the dryland salinity program in the Goulburn Broken catchment, and they would be able to provide you with access to the sort of information that we have talked about. Therein lies another problem, because I can tell you from having worked around the Murray-Darling Basin in the last three to five years that there are really only about 10 or 12 such people across the whole of the basin, coordinating the whole effort.

**Ms CORCORAN**—Are these people associated with government departments?

**Mr Dyson**—Some are with government departments and some are with catchment management authorities. There tends to be a mix of them. A lot of what we try to do through our salinity program we achieve because those people are actually there, and that is the level at which we should be providing a little support. I can name the people around the basin. They are very much part of the network. They are the people who are actually trained to sustain the knowledge base in their own staff, who are dealing directly with land-holders. I suppose I should get back to your issue about the block of land.

**Ms CORCORAN**—I am trying to get a feel for how accessible the information is. The point of this inquiry is the mix, or the marrying up, of the body of knowledge that exists in the scientist's world and what the landowner needs or wants—how the two come together. You talked about officers who come and go. They each have a three-year term and then they are gone again, so they have limited value. Putting all those problems to one side, do the landowners or land users around here, generally speaking, have a good relationship with extension officers? We have heard evidence that sometimes farmers do not place a lot of value on their knowledge, thinking, 'They're young kids out of uni, so what would they know?' et cetera.

**Mr Dyson**—I think that varies from place to place. It would be fair to say that the farmers around here do have a pretty good relationship with their extension officers, although there are very few of those people around any more—compared to what I would have called extension officers 10 or 15 years ago. A lot of the people you are talking about are now land care coordinators and those kinds of people.



**CHAIR**—In New South Wales over the last couple of days we heard that within the state government operation there are things called salt teams, which bring together expertise from the old Department of Land and Water Conservation—now called the Department of Infrastructure, Planning and Natural Resources—and the Department of Agriculture. There might be a hydrogeologist out of one area and an agronomist out of another area, and they form a salt team. Those teams are working very closely with the catchment management boards—which will become authorities as of next year—landowners et cetera. Is there a similar thing occurring here in Victoria?

**Mr Dyson**—There are very similar models operating in Victoria, but Victoria has been undergoing institutional reform for a little longer. There is probably a greater involvement here in the private sector, through consultants such as me or through other organisations that are involved in that process. The catchment and management authorities in Victoria now manage their own activities. They manage money and they can buy in the resources they need to do certain things. We do have those sorts of teams, but they are made up largely by each of the catchment management authorities purchasing that level of expertise from wherever they can, whereas in New South Wales there are three catchment coordinators across the state who tend to manage agency or cross-agency resources. But they also buy in resources.

**CHAIR**—It will probably change from January in New South Wales with the establishment of the catchment management authorities. I think they will then get on to a fairly standard national model. How long have the catchment management authorities been in place in Victoria in that sort of way?

**Mr Dyson**—I am guessing, but I would say it is three to five years that they have been operating in that sort of sense. The catchment management authority model, in my opinion, has been a big step forward, in the sense that regional organisations are able to manage their own activities and develop their own levels of priorities. The real problem we have—and I would be surprised if you do not hear this a few times—is that we seem to have put all of our resources into regional catchment communities. I do not think we have the balance right in providing a level of central support for those kinds of organisations.

**Ms CORCORAN**—Do you mean in that sense that there is not a central pool of information?

**Mr Dyson**—I could be accused of being parochial here, I suppose—we all could—but I will try to explain what I meant. When I got to the end of that Tools project, the team that I was involved in had certainly worked really hard to make that work and we had built up all our networks. But, as with a lot of the programs that have operated over the years, the program had a limited life. With such programs, at the end of the three years you basically come to the end of that lot of funding and the level of activity drops off. So all the work that you have done in terms of developing networks and that sort of stuff is reliant on a legacy that comes out of that project rather than being reliant on an ongoing commitment to supporting those 10 or 12 regions that we are talking about. I guess what I am saying is that we have a bunch of national resources and we have a bunch of people throughout Australia who have a good deal of experience and knowledge of the salinity issue and I think we should be using those people and those resources to provide a level of support across the nation, rather than allowing this thing to operate on a market base. At the moment the catchment community that can afford and has the vision to see that it needs knowledge based support will go out and buy it. The one next door may not: it may not have the

dollars or it may not have recognised the need. So we need to achieve a balance between what happens at a regional catchment community level and what happens at a national level. We seem to oscillate between the two.

**Ms CORCORAN**—On a different matter, I think, it has been put to us that academic rivalry is actually limiting some of the research that is being done on salinity issues. Do you have any comment to make on that statement?

**Mr Dyson**—Sure, that is a really big issue. I guess that is in part what I mean when I say that we are operating in a market now. Salinity has become an industry and there is competition within that industry for resources. So right now you could go out and find probably five to 10 different groups that each have their own numerical model, for instance, for how salinity works and how salinity might be managed—I am talking about computer based models. To literally stay in business within that industry, those people have to promote their models. Sometimes you do see that promotion going beyond the application of the model. The scale at which the model is applicable and the things that it can do are sometimes over-marketed. Similarly we have the same sort of issue with the geophysics industry in Australia at the moment. It has recognised the salinity issue, quite rightly. There are a number of techniques for what I would call remote sensing which are adding information to what we already know. Again, there are rivalries between geophysics organisations.

There is also an issue in that some of these technologies come in and want to re-invent everything from the ground up. What we really want a lot of these applications to come in and do is to fit within the framework that we have established and built and add value to our existing understanding. That does not always occur, and I guess that is what I am saying when I talk about needing the resources to manage this thing centrally to some extent. The National Dryland Salinity Program did that probably for the first decade of salinity research in Australia, but it seems to have subsided in the last year or two.

**Ms CORCORAN**—With all those things in place or not in place, is there evidence to suggest what is actually happening on the land is based on this science?

**Mr Dyson** —Not to the extent yet that I think the investment probably demands. There are obviously other things that influence farming communities when it comes to changing land management.

**Ms CORCORAN**—I am sorry; my question should have been clearer. I am not asking about what actually happens, but if Farmer Joe recognises he has a problem and wants to address it is the action that he then takes based on the science that surrounds it or does he somehow come to his conclusions and his actions in another way?

**Mr Dyson** —Certainly in Victoria we have just gone through another round of revisiting our catchment strategies, and this time around we have tended to build in the concept of ground water systems, ground water flow systems and catchments. Within each of the catchment management authorities in Victoria and those salt teams in New South Wales that you were talking about, the concept now of what any particular farmer can do on his or her place is becoming a lot clearer.

We tend to have introduced, within this ground water flow system concept, a thing called the triage approach. The triage approach is just a simple thing that says that there are some places where farmers are going to be able to take action on the salinity problem that they already have and they might be able to fix that problem over a number of years, there are other places where they might be able to take some action now and head off an emerging problem, and there are other systems where the problem is so intractable and has so much momentum that it makes sense to actually live with that problem by finding more salt tolerant farming systems or new saline industries within them. So when it comes to individual farmers that have an emerging problem or an existing problem, it is that level of analysis that we have to go through: in the first instance, is this a problem that can be fixed or is this a problem that we are going to have to live with? That may well govern the decision about whether they go ultimately for a change from annual pastures to lucerne or perennial pastures or something else or whether their best option is to invest in saltbush or something like that.

**Ms CORCORAN**—Are you satisfied that, when the land user is making those judgments and deciding whether the problem can be fixed or has to be lived with, the information that he is using to come to those decisions is up to date and based on scientific evidence rather than on something else?

**Mr Dyson** —I think that where you find us right now is right in the middle of having crystallised these concepts over the last year or two and still being in the process of working those through, right down to the level of individual farmers. You will still find people in particular communities that are in the middle of a problem that is so big, in the context of the basin, and yet still believe that they can change the issue by managing their cropping systems or doing something else.

It is only when you sit down with those communities and are very honest with them by taking the knowledge that you actually have to them that they move on. A lot of people are afraid of doing that. The ability to be able to communicate those things is very much tied up with the experience, confidence and knowledge base of the people who are delivering that message. When you go to a catchment community with information on complex ground water systems and ground water soil interactions and rainfall interactions and those kinds of things they want to know everything, basically. They want to know how you arrived at that understanding.

I also find that, as you are explaining the processes that are occurring in catchment communities and the reasons why they can do some things and not others, more often than not the whole issue of understanding landscapes is something they pick up on. Part of the thing that entuses them is understanding their own area and what they can do. Rather than trying to impart simple prescription type knowledge, we should be trying to impart landscape type knowledge—particularly landscape and ground water interaction type information—in simple concepts that people understand so that we do not have to go through this business of providing every manager who has a saline paddock with information for that paddock. We probably need to be providing information at a subcatchment scale and allowing the information providers to work through that knowledge with their catchment communities.

**CHAIR**—We might come back to that in a second. Coming back to your comments about the conflict in some of the science, you mentioned the geophysical area. What can we do at a federal level to assist that? The Bureau of Resource Sciences, for instance, seem to be very supportive of

a lot of the airborne geophysical work that is being done. I know it is expensive and they have been targeting different areas. But I picked up yesterday in some evidence in New South Wales some scepticism—I will use that word but probably it is not really the right word—or some caution about whether that sort of technology and the results of that technology are something that ought to be adopted.

If there are these differing views within the science community, what can we do federally to try and bring those views together? Could we present it in such a way that the right bit of technology would be used for the right area? It could be a horses for courses situation. Do you have any comments or recommendations for what the committee might be able to recommend in terms of things that are not being done at the moment?

**Mr Dyson**—The answer to that is yes, I do. I have been trying to say this again and again for quite some time. The geophysics world understands that we have put together the ground water flows system framework that I have just talked about. We have catchment communities that now have that on board. We have catchment communities that are working through that issue down at the scale of implementation. If you get the framework right and if you get the broad knowledge base and broad catchment architecture across to the people who are doing the planning when they are developing the subcatchment scales—that is, at the implementation level; in other words, at the level of the implementation of a salinity management plan—that asks the questions of the geophysics industry that we want to ask.

I think that is how we should be using it instead of flying over large areas of Australia—and doing that in a very generic way and seeing what we get back—and then having to build our knowledge base back up to the point where we were already at anyway. In each one of these systems that we have now defined across Australia throughout these catchments there are issues where we can use geophysics to answer very specific questions. They might be to do with major fractures, major gravel aquifer systems or old, weathered landscapes that are full of salt in various parts. If we go through that framework, there are going to be questions at an implementation scale that we want very specific answers to and that the geophysics industry can help us with.

**CHAIR**—Are you saying that the role of, say, the BRS with respect to the work that they have been doing ought to be responsive—

**Mr Dyson**—Yes.

**CHAIR**—to those queries rather than being out there quite separately and saying, ‘Well, we’ve got to start flying over all sorts of different regions’? Is that what you are saying?

**Mr Dyson**—Very much so. A lot of us are spending our time going back and saying, ‘Look, you have done this geophysical survey and it says that, but that is at odds with the understanding that we already have.’ There is something wrong with our calibration or with something that is there, so there is this toing-and-froing that is going on. Again, if you go back to things like the national airborne geophysics review that was done a few years ago, it said all of that. It said we should take our existing knowledge base, our existing layers of information, and add the geophysics as another layer to that information so that we are vertically integrating all that we know about this system rather than flying the geophysics—in isolation to some extent—and then

trying to interpret it. I would like to see us in many areas using geophysics more strategically than we do at the present time.

**CHAIR**—I have been looking through a number of the projects funded under the national action plan in Victoria, and Victoria seems to be well ahead of most of the other states with respect to this. I have picked up a couple of projects which are obviously topical here. The Goulburn Broken CMA capacity building is one that is being funded at nearly \$1 million. I think I am quoting Commonwealth funding, so that would be matching state funding. What was the other one? The Goulburn Broken CMA irrigation salinity is being funded at \$1.7 million. These are fairly large funded projects. Do you have some knowledge of these individual projects in this region? How confident are you that the development of those projects, which have been put forward for funding under the NAP, is based on the best possible information and science that is available?

**Mr Dyson**—It is very hard for me to comment on the detail of it. I would not know enough about the irrigation component to comment on it. I do know enough, however—and I have worked closely with the guys who have developed the dryland program—to understand that that capacity building would be built largely around the knowledge base and the frameworks that I have just talked about. Again, as far as the detail of that goes, I am not across it enough to be able to answer that.

**CHAIR**—It seems to include funding for local area plan coordinator positions and things like that and some of the whole farm planning work. What was the other one? The other one concerns the Goulburn Broken CMA mid-Goulburn catchment activities targeting salinity and water quality. From what you have seen in this whole process, are you reasonably confident that the processes to take these projects from the catchment level—and they presumably are part of the priorities put forward by those catchment management authorities—through to attracting the NAP funding are working okay?

**Mr Dyson**—Because of the work we have done in the last three to five years, and in particular the development of these frameworks we have, those guys are lining up with that framework in the dryland areas. That is a different question to the one of whether that is actually getting through to the land-holders and the people who are delivering the message and also a different one from maintaining the knowledge base in the longer term.

**CHAIR**—The question of access to and the cost of data was also raised with us in New South Wales. You were talking about the 1:5,000,000 map and you were talking about 1:250,000 areas, but clearly getting down to the subcatchment area and down to individual farms and so on means much larger-scale mapping is necessary and therefore comes down to accessing various data which live in various places. All the states have policies of cost recovery with a lot of the data that they have. Is that an issue for the various catchment authorities?

**Mr Dyson**—It remains a difficult issue throughout Australia. We have multiple jurisdictions and multiple agencies that manage data and information and, whilst one of the principles coming out of the national land and water resources audit was to make that information more freely available, I think we still have a long way to go in that area. There are many projects that I have worked on where it does not matter whether it is Victoria, New South Wales, Queensland or wherever, data is something that is still very institutionalised. An awful lot of time is spent trying

to secure access to information, particularly when you work on national projects or Murray-Darling Basin projects where you are trying to get information out of either a region or a state. It is as though you are dealing with a different country sometimes.

**CHAIR**—You would probably be aware that more than 12 months ago the Commonwealth had a policy change whereby their topographical and geophysical data and so on is now available at no cost if you can download it, or the simple cost of writing to CD if it cannot be downloaded in that way. Would you like to see that policy extended into the states?

**Mr Dyson**—Certainly. In Victoria, the minerals type information is already very much like that. I have already been able to secure information on CD on geology, geophysical surveys and that kind of thing. But a lot of the water data still has a long way to go. If you want ground water information in the right format from the right database that is a little harder to get.

**CHAIR**—Thank you very much. We appreciate your submission and appreciate your evidence today. It will be very useful for us.

[9.20 a.m.]

**MARSHALL, Mr Alex, Manager, Environment, Murray Irrigation Ltd**

**CHAIR**—Welcome. Although the committee does not require you to give evidence under oath, the hearing is a formal proceeding of the parliament. As I remind all witnesses, the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of the parliament. The committee prefers all evidence to be given in public. However, at any stage you may request that your evidence be given in camera and the committee will consider your request. That may be in relation to something which is commercial-in-confidence that you feel we should know but would not want on the public record. We have received your submission, which the committee has numbered 27. It has been authorised for publication and is now on the public record. Would you like to make some opening comments and then we will move to questions.

**Mr Marshall**—Murray Irrigation Ltd is the largest privately owned irrigation company in Australia. We also implement the Murray land and water management plans, a \$498 million, 30-year program for natural resource management improvement in our area, with the key issue being salinity and there are some secondary issues. That is why we believe we should be making a submission to this inquiry. We are here today to give our insight from a grassroots or implementation level in relation to salinity and improving irrigation salinity in particular in our region. We have had about eight years of experience in implementing the Murray land and water management plans. In that time, we have turned around the shallow ground water problem from approximately 110,000 hectares in our region in 1997 to last year, with the help of a drought, to about 5,000 hectares with a watertable within two metres of the surface.

We have a reasonably significant R&D program within the land and water management plans in our area, based at Deniliquin, just over the river. That is about a \$300,000 budget, basically taking salinity research from other areas and adapting or localising it for our own implementation purposes or filling any gaps in relation to salinity research that cannot answer some of our implementation issues. That is where I will leave my general introduction. I will probably cover most of the points in the submission as you ask questions.

**CHAIR**—Could you give us some background on the Murray land and water management plans, where they came from and their main purpose?

**Mr Marshall**—In the late 1980s and early 1990s, our area was under serious threat from salinity or rising watertables which bring salinity to our region. Especially in the Wakool region, in the west of our area, there were some serious watertable issues and a number of properties were at a stage where they were unviable. There was some salt scalding on the surface of the majority of the properties.

A measure taken at the time before the land and water management plans came along was the construction of the Wakool Tullakool Sub-surface Drainage Scheme, which protects about 50,000 hectares from a very saline watertable. Just recently we discovered some ground water out there that was about 150,000 EC, which is more than double the salinity of seawater. There is a bore field with close to 60 pumps that keep the watertable down and pump water into an

evaporation basin of about 2½ thousand hectares. That was one of the earliest indicators that we had some serious problems in our area, and that was one of the earliest solutions. After that came the Murray land and water management plans, which started development in 1990. The development of the plans was completed in 1995. There was quite extensive research that went into those plans. The organisations involved in that were the New South Wales Department of Agriculture and CSIRO, and most of the work was based out of their Griffith establishment. That is where salinity has come from in our region. As I said earlier, about 110,000 hectares of our region was starting to be affected in 1997, but that is back down to about 5,000 hectares, although probably 20,000 hectares or so of that is pretty closely related to this drought. Before the drought, we had about 30,000 hectares being affected or under serious threat of being affected by salinity.

**CHAIR**—What distance from the surface was the water that was defined as a serious threat?

**Mr Marshall**—What we called a serious threat was when water was within two metres of the surface. We have got 1,500 piezometers across our region that are read twice a year; that is how we gauge the salinity threat. Some of that is within half a metre of the surface, but within two metres is what we gauge as a serious threat.

**CHAIR**—Who owns Murray Irrigation Ltd?

**Mr Marshall**—Murray Irrigation Ltd is owned by our shareholders; our shareholders hold shares in the company in line with their irrigation entitlements. At this stage, one share equals 0.83 of a megalitre irrigation entitlement.

**CHAIR**—Do you have to be a farmer using irrigation to own shares?

**Mr Marshall**—That is right at this stage, while water is still tied to land in New South Wales.

**CHAIR**—You will be watching the current water rights debates very closely.

**Mr Marshall**—Absolutely. Our shareholders are all farmers; some are corporations, the majority are farming family type enterprises, growing predominantly rice and cereals, such as barley, wheat and canola, which are the key enterprises in our region.

**CHAIR**—One of the key issues in this inquiry is to ensure that the knowledge and the science et cetera is getting down to the farm level. Does having farmers as your shareholders make it easier to ensure that the things you are wanting to achieve, as a company, get onto the ground?

**Mr Marshall**—It definitely does make it easier. I should probably take this opportunity to clarify how the land and water management plans interact with Murray Irrigation as a company. The land and water management plans are partially government funded and partially land-holder funded. That includes land-holder funding from an in-kind perspective. Murray Irrigation raises levies on water entitlement to put into the land and water management plans. So we bill land-holders to raise money to go into land and water management plan incentives and other things like research and development, monitoring and administration. We also got about \$9.2 million this year out of the national action plan funding to go into those land and water management



plans, which are closely based around on-farm works, like farm planning, drainage and recycling of irrigation water on the farm.

To get to the question: that definitely helps us to get the message to the farmer, because our farmers are shareholders in the company. We deliver water to the farmers and provide surface drainage for stormwater run-off. In addition, we have a natural resource management role in our area of delivering extension and incentives for the better management of irrigation water on farm. I think it is a very good model. When the land and water management plans were being developed in the early nineties there was some discussion over which was the best organisation to implement the plans. New South Wales Agriculture and DLWC, now DIPNR, were discussed as potential implementers. It was decided that—and I believe it was a wise choice—Murray Irrigation be the implementers. The advantages of that are that we have a direct link to our shareholders and that our farming communities are linked by water. They all have something in common: they get water delivered via channels in the region. Also, we have some sanctions that we can put in place to provide a backup to the incentive side of things. Not only do we have the carrot of money available to help people get involved in the better management of water on farm to prevent salinity; we also have a stick whereby we can put in place policies and rules to develop sanctions to push people into getting better at managing water on farm so that they create fewer salinity problems.

**Ms CORCORAN**—One of your recommendations hinges on the need to use science to underpin plans. You made some fairly strong statements about the lack of that. Do you want to expand on that?

**Mr Marshall**—Yes. I can elaborate on that.

**Ms CORCORAN**—This is recommendation 1.

**Mr Marshall**—That recommendation is based on the recent restructure in our state and our region of the way funds flow. To a degree we are following the Victorian CMA process that seems to be getting strengthened as we speak, where previously the state and federal governments had funded directly the land and water management plans. What happened was that a regional catchment strategy was developed in a very fast time frame. People involved will tell you that it was pushed too quickly. That led to decisions having to be made on the priorities of where funds should go, with a generally low level of science or technical input into those decisions.

The time frame was around 12 months to develop a catchment plan to deal mainly with salinity and biodiversity. There are also some soil acidification issues in that catchment blueprint. Basically that left the Murray land and water management plans as a low priority on the list of natural resource management programs in our region—I believe because of a lack of good science. The land and water management plans were developed over six years with strong technical input from CSIRO and New South Wales Agriculture. The catchment blueprint was developed over less than 12 months, mainly with input from the New South Wales state department, which at the time was DLWC. That led to quite a lot of angst in our region, because we saw something that was less rigorous than our plans pushing our plans out of the way.

It was not a political fight; our argument is based on the fact that we believe our science was more rigorous at the time and that it is still more up to date, given our research and development program, than the science that was used to develop the catchment blueprint and rate the land and water management plan. That is the basis behind recommendation 1 in my submission. Just to reiterate, we believe that there needs to be some sort of standard, in terms of science, behind the catchment management plans or any plan to prioritise catchment scale works.

**Ms CORCORAN**—So why did it happen in that way—do you know?

**Mr Marshall**—As I said at the start, my understanding of why it happened that way is that there was a lack of time. The catchment board in our region had a very short amount of time to develop a catchment plan. One of the outcomes of that catchment plan is a priority list of what gets funded and when and where it gets funded.

**Ms CORCORAN**—We heard before that there is academic rivalry amongst the scientists. Is what you have just described attached to that?

**Mr Marshall**—No. What I am trying to make clear is that we believe there is a lack of science in the process of prioritising funding in our area.

**Ms CORCORAN**—So the science is available but it was not used?

**Mr Marshall**—Yes, and I am not saying that it was not used because of the people managing the process; I am saying that it was not used because of the time available.

**Ms CORCORAN**—On a more general basis, though, is there a gap between the science that is available and what the land users know about or see?

**Mr Marshall**—To a degree I believe there is, especially when you are talking about the big picture, which I believe is happening in this process. Within our local geographic area we have a good relationship with CSIRO and New South Wales Agriculture. However, at the state and nationwide level it is very hard to find specific research from right across the country. We quite often find that research has been undertaken elsewhere and that it is relative to the sorts of answers we need, but quite often it is after we have already done some research ourselves. I think there is a need to have some sort of organisation or some sorts of processes in place to centralise that information. Now I am getting to one of my other recommendations relating to a central database or an organisation that, I suppose, manages the information so that it is easier to get hold of. If you go on the Internet and look up ‘salinity research’, you get all sorts of different scales and different messages just within Australia. There is also worldwide information. It is very difficult to get a holistic list of the research that has been done in a specific area and I believe there is a need for some sort of centralisation of that information in the form of a database perhaps. I know that the New South Wales Salinity Research and Development Coordinating Committee have a database for New South Wales research into salinity.

**Ms CORCORAN**—Is that called CANRI?

**Mr Marshall**—Not to my knowledge. The one I am talking about is run by New South Wales Agriculture.

**Ms CORCORAN**—Yes, I think it might be called—

**CHAIR**—CANRI is Community Access to Natural Resources Information.

**Mr Marshall**—Something like that on an Australia-wide scale, I believe, would be extremely value to implementers such as my staff and I. Another idea I had while driving here this morning was that with NAP funded projects, or regardless of funding, there could be a salinity journal. I know that is very hard for retrospective research, but a salinity journal where all the specialised research relating to salinity is published in the one spot would make things very easy for implementers like me.

**Ms CORCORAN**—I think that is what CANRI tries to do. We have heard a number of different comments, and I would not mind your reaction to some of those comments. The first comment was that that is certainly available. The site leads you to all the different scientific research, but it is very much in scientific terms. So, for laypeople like us, and certainly for a lot of land users, it is very difficult to digest and understand. That was the first comment. The second comment was that a number of people are not aware that it exists. The third comment was that many land users do not use the Internet as their primary source of information anyway.

**Mr Marshall**—There are probably two levels that we need to talk about in order to get things happening on the ground. The first level is the extension staff that we employ to get works happening on the ground, and I think the Internet and having things in scientific terms are not necessarily issues in that case. Our implementers are university qualified people from agricultural science or environmental science backgrounds and they understand the terms that are being written. However, the next level is the farmers, or the land-holders, who do need things written in an uncomplicated manner. I think the best method of approach there is by extension, because farmers deal very much with other people to get their information in relation to everything. Whether it is selling stock, wheat or whatever else, they usually deal with a face. So on-ground extension via someone driving out to their place and talking to them about the salinity issue, I believe, is the best method of getting information out. I think, in general terms, we do a pretty good job of arming our extension staff with relevant information. However, when it comes to getting specific information about an issue, it is not all that easy for them to grab hold of a document or some information relating to a certain soil type or a certain salinity process.

**Ms CORCORAN**—You make the statement that those who are conducting the research do not always have the end user in mind. Could you expand on that statement? The second part of that question then is: how does the land user let the researchers know what the land user wants?

**Mr Marshall**—From an implementer's point of view, that is one of our greatest concerns. Researchers quite often do not have the same priorities as implementers or land-holders. As part of this process, I hope there is a better alignment of the two goals. What implementers are after and what researchers are trying to provide information about need to line up in a lot more synergy. The problem we have is that implementers and land-holders have one set of priorities in relation to salinity—for example quite often we are more interested in how to deal with salinity prevention or cure than how to map it—but a lot of research at the moment, I believe, is focused on how to find out where the salinity problem is rather than on how to deal with it. From an implementer's point of view, especially in an irrigation region, we generally know where the salinity problems are through our monitoring, so it is more of an issue of some new and

innovative ways of dealing with how to manage salinity in terms of prevention or cure. That is one area where I see quite a difference: we are after new and improved methods on how to deal with salinity; and, to a large degree, our salinity researchers are more focused on mapping and where to find salinity.

In our region, we have improved that relationship through a system with CSIRO where we house a couple of their researchers in our building. They sit in a room with our extension staff and they have a direct link to the people on the ground. That does not mean that they are working specifically with them. They are still working on their research project, but by sitting them in the same room you get some very good links and you get a practicality tied in with the research, which is quite often a concern. You also get an understanding of the research from an implementer's point of view before it is even completed. They understand the process from start to finish. That has led to some really good research outcomes in our region.

We have had that process with CSIRO at Griffith for about four years now. We have one CSIRO researcher in our office now and we have had two in the past. They have really helped improve that link. I also think there needs to be some implementation input into research priorities on salinity. With regard to salinity research, quite often researchers come up with new ideas on where they should be heading and getting those ideas funded, and pursue them. I believe there should be a strong implementation input into where the research is heading. At the moment, I think that is lacking, to a degree.

**Ms CORCORAN**—And that is one of the critical focuses of this inquiry. You have partly answered the question already with your CSIRO scientists sitting next to your extension people, but how do we give the land users access to the research so that they have input into what research is to be done?

**Mr Marshall**—The committee we talked about, the Salinity Research and Development Coordinating Committee—I have not had any dealing specifically with that committee—is generally made up of departmental people in New South Wales, so government department people. In a lot of cases, you are dealing with the extension people, but in our case you are not. At that level, implementation people need to be involved. It does not necessarily have to be people who are out talking to the farmers everyday, but there would be benefits from having someone like me, who talks to farmers a lot and who manages implementers, involved in such a program.

We would also be able to feed back to the researchers where our problems lie. Quite often we see research occurring that is not a direct priority to implementers. There are also some gaps with research we would like to see filled. That linkage within the land and water management plans occurs quite well because we have funds of about \$300,000 a year for research so we can drive research to fill the gaps. At a nationwide level, I do not see those gaps currently being filled. A central agency with input from different implementers would be a way of going about it—some sort of, dare I say it, other committee to target, from an implementer's point of view, the gaps. It is not that we do not have information on a broad scale; it is a situation where we need to fill the gaps.

**CHAIR**—Is having those researchers from CSIRO in your organisation how you do all your R&D or do you contract some of it as well?

**Mr Marshall**—We contract all of it. However, we like to get that direct link to our region and implementers, so we generally try to encourage organisations that are doing research under the land and water management plans to station someone at our office so we have a direct link to the region and a direct link to our implementers.

**CHAIR**—What did you say your R&D budget is?

**Mr Marshall**—It is about \$300,000 a year; it is closer to \$320,000 actually. It is not a huge budget, but it is a significant budget.

**CHAIR**—What is your turnover?

**Mr Marshall**—The government funding for the land and water management plans is \$9.2 million, but the company's turnover is about the \$35 million.

**Ms CORCORAN**—So as a percentage it is fairly low.

**CHAIR**—Yes, it is quite low. Does Murray Irrigation operate in Victoria and New South Wales?

**Mr Marshall**—No, just in New South Wales.

**CHAIR**—Totally in New South Wales? You do not get across the border at all?

**Mr Marshall**—No. Moulamein is our most western town—our area of operations goes slightly outside that—and Berrigan in the east and down to Echuca on the New South Wales side of the border.

**Ms CORCORAN**—How far north?

**Mr Marshall**—About 30 kilometres north of Deniliquin, so it is a long strip that is not all that deep.

**CHAIR**—Let us get back to the national database that could be established. A couple of weeks ago at the Academy of Science in Canberra, it was suggested that there needed to be a national database—somewhere to store the raw data. I see a problem arising in the sheer complexity of what might develop. That is what we have to try to get our heads around because, if we are going to make some sort of recommendation in this area, we do not want to recommend something which is impossible to do. Do you think that there has to be some sort of distinction between just sheer raw data and actual research information?

**Mr Marshall**—Yes, I definitely do. I can see that raw data would be a big benefit to the researchers themselves. But I am here from an implementer's point of view, and a database of research that has been carried out and how it relates to salinity would help us more than raw data, but I can see that raw data would be valuable to researchers. The sort of database I am talking about would have to be catalogued into various categories and basically be a list of all research relevant to salinity.

Just to add a little more detail to that, as part of one of our R&D projects, we looked at recharge under various soil types and cropping regimes. We did a literature search and came up with somewhere in the vicinity of 350 different papers across Australia in relation to recharge under various soil types and cropping regimes. It would be a huge database that would take not only a huge amount of work to put together but also quite of a lot of work to maintain its relevance and its up-to-date quality. It is not something that would be a small task; it would be a very large task, and it would require some ongoing commitment because of the need to keep it up to date and the need to assist the people who would be using it. As you said, it would become something that is quite complex and not extremely easy to use, or it would take a fair bit of flair to make it easy to use.

**Ms CORCORAN**—Does that mean that it also needs to be somehow distilled so that the layperson can understand it? It is just too big, the way it is right now, and if you are a scientist it is bad enough—

**Mr Marshall**—Yes.

**Ms CORCORAN**—but, if you are layperson, I would suggest that—and you might contradict me—you have no hope basically.

**Mr Marshall**—I think you are right: you probably would have little hope, given the complexity or the amount of information that is out there, and that is why I suggested having some staff associated with such a database. You would probably need to help laypeople, if that was the focus of the database. It would not be something, I believe, that the land-holder would be able to easily interpret and use; I think it is probably something more for the implementer or the scientist to use.

**Ms CORCORAN**—But is there a need for a database that land users can access and use, so they are not restricted to always having to go through an intermediary?

**Mr Marshall**—I think it would be good to have a database that land-holders could use, but I think it is more critical to have one for implementers to use. We have spent about six months just in developing our little database for these 350 papers that we have put together in relation to recharge under various soil types and crop types. So there is quite a lot of work involved. Also, I think you are not going to get something that all land-holders will use; you will probably get something that the more skilled computer operators will use—it is likely to be computer operated, of course. I think it is naive to try and set something up that all land-holders are likely to access. Probably only 10 or maybe at the most 20 per cent of land-holders would access it, and I think 10 per cent is probably even a little bit optimistic.

**CHAIR**—I was just going to ask that question. So, of your shareholders, you reckon about 10 per cent might be online?

**Mr Marshall**—No, about 30 per cent have access to email but, in terms of those that would go and use a database such as this, of that 30 per cent probably only about 10 per cent in total would, I believe, use such a database.

**CHAIR**—Can I ask you further about the catchment management boards and authorities. You mentioned that you felt the priorities that were put up by the catchment management board may not have been all that well researched. Do you think they possibly reflected pet projects for the various groups that came together to form that catchment management board—things that they had not got done under other programs and things like that?

**Mr Marshall**—No, I genuinely believe they have the right intentions. However, in New South Wales the catchment management boards were being very strongly driven, at the time, by DLWC and now by DIPNR. I think that is where some of the problems lie. There is an element of getting departmental programs funded under national action plan funding.

**CHAIR**—It is called cost shifting. So do you have more confidence in the proposed catchment management authorities, which were just announced a couple of weeks ago?

**Mr Marshall**—I definitely do. The only issue we have with that is that it still seems as though the same departmental people will be providing the executive for that catchment management authority. I think the catchment management authority model is a very good model; I just think we need to be a little bit wary about the provision of resources to that organisation. I think the Victorian model, where they have their own staff, is a better model than having the department providing the executive.

**CHAIR**—Thank you very much for your time this morning, your submission and your recommendations. It is always good when people actually give us some recommendations to consider as part of these sorts of inquiries. We very much appreciate that.

**Mr Marshall**—Thank you for your time.

**Proceedings suspended from 9.59 a.m. to 10.12 a.m.**

**WATTS, Mr Michael Corey, Sustainable Rural Landscapes Campaigner, Australian Conservation Foundation**

**CHAIR**—Welcome. I will not reread the formal bit with respect to evidence. You were here earlier, I think, when I read it to the other witnesses.

**Mr Watts**—Yes.

**CHAIR**—We received today the submission from the Australian Conservation Foundation, so I guess you will forgive us for not being 100 per cent knowledgeable of its contents at this point in time.

**Mr Watts**—I hope you will forgive me for sending it late.

**CHAIR**—We become speed readers in this job at times, as you would appreciate—but maybe not quite that speedy. Probably the best way for you to commence this is to make some opening comments about your submission and then we will have some questions.

**Mr Watts**—As I say, I hope you will forgive me for not having put it in earlier. We have a number of things on our plate at once at the moment. The ACF, I should just say, is about 40 years old. We are an environmental non-governmental organisation. We mainly work on policy, advocacy and analysis as well as awareness raising in the environmental and sustainability arena. We have a very strong interest in health and other rural landscapes, and the sustainability of agriculture and the future of biodiversity values in those landscapes. We take our queue from science. We work very closely with many different scientists. We rely on them to guide us and steer us in our advocacy and policy analysis work.

I represent ACF on the board of the CRC for Plant-based Management of Dryland Salinity. We are a representative community organisation in the act of Land and Water Australia. We have an alliance with Southcorp wines and we occasionally team up with the CSIRO and others. Currently we have a research project looking at salinity and biomass energy, teaming up with the Joint Venture Agroforestry Program in the Rural Industries Research and Development Corporation. So those are the sorts of people we work with. Our interest is in landscape health, and by landscape we mean the meeting point of ecology, economy, culture and society, so we are not just interested in the green bits.

I have started off by introducing our view of the role of science and scientists in NRM and the environmental policy debate. We felt it was very important to do that right up front. We feel that Australia is producing world-class science in this area—probably better than in most other countries because of the imperative now that has been recognised. In fact, the scientists who drew that to our attention were in CSIRO and the Prime Minister's Science, Engineering and Innovation Council amongst others. We feel, however, that that science is not always being followed up by sound policy. I will cite two examples. I understand that the primary cause of salinity, being land clearing, is not specifically what this committee is addressing; nevertheless, we feel it is important to be on the record. The salinity hazard maps in Queensland are a very high standard. There is a deal on the table at the moment, as you know, between the Queensland



and the Commonwealth governments. It is a deal that we applaud and one that we would like to see put into action and funded. Unfortunately, that seems to be stalled at the moment. That is the policy response to science.

Another one is the Living Murray process. The restoration of environmental flows is what we are interested in and that has implications for salinity management in irrigation societies along the Murray. There are also biodiversity issues. It was unfortunate that the commissioners decided to withhold the scientific panel's report on environmental flows and the environmental flow needs of the river. We did applaud Minister Truss's advocacy of getting that information out to the community. I just wanted to touch on those two things.

We also want to make the point—I do not want to dwell on this issue too much—that there is a sense amongst more than a few in the scientific community that governments are clamping down on their ability to speak freely and to associate with those in civil society like us. I want to draw that to your attention; I do not want to dwell on it. It is merely a perception; if there is no substance to that—if it is merely people getting their backs up or bearing a grudge or what have you—that is fine, but if there is we do need to investigate that. I am sure the committee would agree that it is in the public's interest that scientists, especially organisations like CSIRO, whom we and farmers and others in the community rely on, have a free voice in the policy debate.

Moving on to the issue of the advocacy of the scientific and technical support for salinity management, there are a number of areas that we feel are not being attended to as much as they could or should be. There is very good work being done on salinity mapping—that is, on hazard mapping and on assessment of where salinity is. We are getting to finer and finer scales of resolution. We have gone from the national scale—from those big 'mud maps' you have seen of salinity hazard, by 20:50 or what have you, down to the property scale. That is going to be very important when we come to linking catchment to farm-scale actions. In terms of those actions, there is not enough research, as we see it, into the tools and the technologies needed to arrest salinity. In some areas the processes are well under way and probably not elastic. We are going to have to deal with them in different ways. But in many parts of the landscape, especially in eastern Australia there is a chance to put the brakes on the problem as best we can, to undertake strategic revegetation, either through bushland regeneration or through profitable new perennial land uses—there are a variety of different land uses which I can go into if you would like me too—and to pinpoint engineering actions to control salinity and protect key public conservation infrastructure and cultural heritage assets.

We think there needs to be a lot more research done in that area. The CRC is doing some work in that area. Others are as well, but it really needs to be stepped up or we are going to put the brakes on the problem. To that end we need to get a better grasp of the socioeconomics associated with the development and implementation of these sorts of tools. Why is it that people find it difficult to implement these new perennial farming systems? Sometimes the answer is staring you in the face, but the thing about salinity is that it is quite site—regional—specific in terms of the processes and how they are best dealt with. There has been a growth in the sociological literature associated with natural resource management, but it still needs to go further and be applied to this problem in particular.

Obviously one area that we are very keenly interested in is biodiversity conservation. I will table for the committee two documents to begin with. One is called *Salt: nature in the balance*—

*stopping salinity and saving our natural environment*. This document was produced by us and Southcorp Wines. The other document is a summary of it. This is not a scientific document, but it is based on the best science on biodiversity conservation and salinity to date and it has been reviewed by top scientists in the field. Really it was produced to raise people's awareness—including politicians' awareness—of biodiversity conservation as a salinity issue. We felt that there was a gap there and that there really are too few scientists working in this area to understand the mechanics of the interaction between what is called secondary salinisation—there being a lot of primary salinity, natural salinity, out there—and our natural ecosystems in agricultural landscapes and elsewhere.

There are bits and pieces of good data, good literature, out there, but there really is not enough to inform good conservation management. We know broadly that there are something like 130 wetlands at risk. There are literally thousand of species—although we do not know how many—at risk. In Western Australia they have got good mapping data. They have overlaid salinity hazard maps with occurrence of wildflower species and so they have a good idea there basically. But in most other places the science is in its infancy and this is an area that really needs a lot of work. It needs a lot of work both in understanding the mechanics and in working out how we can best protect and indeed restore biodiversity values.

The fourth area is integration of long-term biophysical and socioeconomic change into catchment planning. Catchment planning in Victoria, you have probably heard before, is probably the most mature of any of its kind in Australia, and yet it still has a long way to go. There is still a lot of this data that is not getting into the catchment management planning process, and it really does need to be in there if they are going to make the best use of it. One thing that is probably obvious to this committee is the development of the scientific information that is tailored specifically to the audience at hand. It is perhaps suitable for us to use the National Land and Water Resources Audit's dryland salinity assessment to do what we do, but how do you translate that to people in the field, whether they be agriculturalists, conservationists or others working in the field?

In the assessment arena, there is one area that I think is underdone, and that is the area of risk of salinisation in non-traditional farming lands. The sociological literature now is telling us that there is a massive socioeconomic shift in rural Australia under way. It is common to many other nations, like Canada, the United States and others. It is a shift away from traditional farming—that is, where the farming family gets all of its income from a middle sized farm—towards larger corporate farms and very small farms. The values and the aspirations that those land-holders have are quite different from those of the traditional farming sector. Even the traditional farming sector is getting less and less of its income from the farm itself, and so we need to tailor our science and our management tools according to that audience. How do we effect land use change and salinity management in those sorts of new areas? It is looking ahead towards what is projected and thinking ahead about how we develop our science.

The next area is the interactions. If we are going to develop a science of landscape change—bearing in mind that our landscapes are changing now and that the task at hand is to manage the change, to salvage and to maximise or to optimise the positive values of those landscapes—then the gap, I suppose, is the interactions between climate change or variability and salinity, and between river health and biodiversity loss and those two other factors.

The community is going to be called upon more and more, as it has been in Western Australia, to inform investment decisions at different scales. It is going to need very good science to back that up. There is a strong push within the salinity community, if you like, for the productive use of resources on saline land. We do not disagree with this necessarily, but we do take issue with the assumed conservation benefits of this particular management or adaptation avenue, if you like. We would like to see more work being put into the demonstration of those conservation benefits, if indeed they do exist.

Similarly, with engineering approaches to salinity, the committee—if it goes to Western Australia—will find that in some communities there is a fever associated with deep drains and their use in salinity management. It is a fever that is largely ignorant of the science and the science is not making it to those communities and not informing the policy-making process appropriately. That needs to be done. We need to work out how to develop good engineering technologies that will protect all the values in the landscape and not make the situation worse. Of course, there needs to be development of urban salinity management technologies and protection of conservation assets as well as other public and private assets in those areas. I would like to impress upon the committee the need for adaptive management and monitoring in programs like the national action plan. It does not seem to be as evident. It may be there but it is not getting through to people like me that there are good ‘learning by doing’ approaches being undertaken.

While we recommend that the Commonwealth maintains a strong interest and investment portfolio in assessment, we do strongly suggest that the NAP and what comes after the NAP—and we should be thinking about that now—focus on the solutions and the development of those tools and technologies and how to get those through to the people who are going to implement them. We also believe that it is important to support research institutions and researchers who transcend the production-dominant approach. It is very important to focus on the land-holders; they are the people who are going to implement the solutions, so it is extremely important that we tailor our solutions to them and their needs and aspirations, but, at the same time, we all share this landscape. I think there is a growing awareness and certainly support from people in Australia that they want to see the land protected for all of its values and not simply production—as important as that is.

I would like to move on to the role of the private sector in salinity R&D. This is an area that we have been working on quite consistently for the last few years. A few years ago, we, together with the CSIRO, Southcorp and several other companies, commissioned a document, which I will table now, called *Repairing the country: leveraging private investment*. It was prepared by the Allen Consulting Group and it looked at how public policy could be shaped to leverage large amounts of private sector investment in landscape repair, for example, to give a cutting edge to profitable and sustainable commercial ventures, that right now are perhaps subeconomic for a range of reasons, and to propel them so they do become economic.

Why is this relevant to this committee? It is relevant for two reasons. One is that, if the Commonwealth were to adopt the policy package recommended in the Allen report, we feel that it would augment the public’s investment in R&D. Certainly, if you ask anyone in the commercial sector, they will tell you that they need to do good research and development as part of their market research. They need to understand the situation better so that they can make appropriate investments and provide a return for their shareholders. That is one aspect. The other aspect is that, even if the Commonwealth decided not to go with the full package, perhaps

something like that package could be used to leverage private sector investment in R&D, and that the research and development itself could be profitable through intellectual property and so on. That may be a small-scale start-up, if you like, that the Commonwealth would feel safer investing in now. I can certainly speak to that more if you would like me to.

In our submission, we touched briefly on the national coordination of salinity management R&D. We are very supportive, in principle at least, of the regional approach to the delivery of NRM in Australia—contingent upon there being national standards and targets, which there are not the moment. We believe that it is important for the capacity of catchment management authorities and regional authorities to be developed and brought up to speed. There is a great deal of heterogeneity across Australia between catchment management groups—some of them are statutory and some of them are not. A very promising sign and one that we welcome in New South Wales is the development of statutory catchment management authorities there. It is going to be more and more important for those CMAs to be able to undertake their own R&D on their own or in partnership with community public and private sector interests. Right now, it seems that many of them do not. You are in a catchment that does have that capacity. It is probably one of the most well-funded and organisationally mature catchments in the country, so I would suggest that being here—lovely place as it is—does not skew your thinking. I would encourage you to get a good sense of that heterogeneity.

We would encourage the Commonwealth to itself encourage partnerships between those private and public sector organisations and CMAs to undertake the kind of R&D that they need in their area, contingent upon those national standards and targets. We note that the Commonwealth seems set to lose its principal salinity science coordinating clearing house interdisciplinary body—that is, the National Dryland Salinity Program. We are not sure, but it seems that it is going to be discontinued. That is our sense and it is certainly a common feeling in the NRM community. If that is the case, we think the Commonwealth is losing something quite valuable. Certainly, there is room for review and revision of the NDSP's role and what it should focus on. We feel it should focus on a lot of those issues that I mentioned before. Indeed, in their recent report, the name of which escapes me, they touch on a lot of those issues.

If the government does lose that program or even if it just wants to change it, we suggest something like a landscape change program or something broader than just salinity but certainly with a focus there. We think that organisations like the CRC for salinity and Land and Water Australia should play a lead role in any new body that is developed. That shortfall will need to be taken up by some sort of institution. I think I heard one of your witnesses before speaking about the need for a central registry of information or literature or science. We feel that is a role that the NDSP could play. The National Land and Water Resources Audit has done an enormous amount of good work. It has certainly raised scientific and conservation communities' awareness of the issues and really informed our advocacy and analysis. We welcome the Commonwealth's investment in its ongoing work and we hope that it will be able to do its work with a great deal of freedom at the state and national level.

The last point I want to make is that the Commonwealth is investing a lot now, or a lot more—not as much as we would hope, but a lot more—in salinity management and sustainable natural resource management in our agricultural landscapes. Yet it still seems to be investing in traditional kinds of agriculture that either do not seem to have taken on board the imperative for landscape change or are still fiddling about the edges. I cannot emphasise this enough: if we are

going to deal with salinity and the results of that salinity in terms of biodiversity loss, the loss of water quality, infrastructure and community values, we are going to need to manage landscape change. That means we are going to need to change land uses.

There are ways and means by which that might occur. One of those is the leveraging of private investment. Government can employ all sorts of policy tools to do that. We do not pretend that the solution is easy, but we feel some cross-compliance here, if I can use that term loosely, is needed, where the Commonwealth gets the best from its investments and really starts to review how it is investing and what sort of impact that is making on the landscape.

**CHAIR**—Thank you. That was comprehensive—I appreciate that. On that last point you were making, do you not think that the national action plan is addressing those matters or potentially addressing those matters? I guess we have to appreciate that, while it has sort of been going for a couple of years, in a lot of cases it is really only just starting, because it has taken a while to get a number of the states onboard. But, when you look at some of the projects that are already being funded, do they not go to the heart of those last points that you made?

**Mr Watts**—I would not say the heart, no. You still have public R&D bodies investing in traditional forms. I am not saying they should not invest in traditional forms of agriculture; I am saying that the Commonwealth needs to assess its investment in those R&D bodies and other R&D institutions to see whether it is getting sustainable outcomes from that. So, if you take, for instance, the Grains Research and Development Corporation's investment in developing less leaky wheat, that is laudable in some ways, but in other ways it is fiddling about the edges. Less leaky wheat in the landscape will certainly be an attractive option for wheat growers, but it will only lengthen the amount of time that we have to deal with the problem. It will simply stall the inevitable. So, if we are going to be dealing with salinity head on—if we are really going to take the bull by the horns—we do need to be looking at those kinds of investments and saying, 'Is this the most appropriate use of the public's money?'

**CHAIR**—How does the ACF view the role of catchment management authorities or boards—they are all eventually going to be catchment management authorities. Is the mechanism or model whereby those authorities are, basically, the organisations between government, science and the landholder one that you think is working or can work appropriately, to make sure that the flow of information—the science—does reach the ground and does not arrive 10 years too late?

**Mr Watts**—That is a good question and one that we started to address at the CRC in our interaction with catchment management authorities. As I said, we certainly see a role for catchment management authorities in the development of good R&D and the delivery of the results of that to land-holders. At the moment we do not see that happening at anywhere near the scale at which it needs to happen. The potential is there. How you get to that point is going to be interesting. We have worked quite a bit on trying to emphasise this linkage between catchments or landscapes and the individual farm or property level. How do you start to incorporate into a farm management plan—whether that be an environmental management system or a whole farm plan or what have you—the aspirations, objectives and targets hopefully set by good science in a catchment management plan or investment? There is a big disconnect there between the big picture and the back paddock, if you like, so that is a huge area that needs to be explored. We do not have all the answers—we have some of them, but we do not have all of them. I guess that is about it. You are going to have to work on that one. But, yes, we would support that: not as the

only avenue but as one of the main avenues. But it will be a long process; you cannot just flip it over overnight.

**CHAIR**—And I guess in some respects it is still early days.

**Mr Watts**—Yes, it is. As you said, the national action plan is just getting into gear now, for all sorts of reasons, one of those being the impasse between some of the states and the Commonwealth. We would have preferred a more national approach rather than bilateral agreements. We feel that would not have encountered the same problems. I guess another problem is that a lot of people in the catchment management sector feel like it is all rushing at them all at once while at the same time there is a push to get money out there on the ground in the time frame allotted. It is going to be difficult to hold that balance between getting them to do what needs to be done in terms of national priorities and at the same time keeping them on side and not losing that social capital.

**CHAIR**—That is an aspect of the reason this committee is doing this inquiry in the first place—the danger of wanting to get the money on the ground to address the problem but the science not following. That is why we are having a look at the processes, to ensure that that does not occur, because \$1½ billion is a lot of taxpayers' money.

**Mr Watts**—It is.

**CHAIR**—And we certainly want to ensure that it is appropriately applied. It is not enough that it be seen to be work for salinity, if it is not based on the best science.

**Mr Watts**—Let me just reiterate the need for an adaptive management approach. You are going to have to do a lot of learning by doing. That means that the Commonwealth is going to have to suck in its chest and suck it and see, so to speak. To a certain extent we have been doing that, and it has created some disenchantment. The recommended solutions to salinity used to be: 'Plant a few trees up the back paddock and you'll be right, mate.' Then two years later it was, 'Well, actually, we need to revegetate 40 per cent to 80 per cent of the catchment.'

But a good adaptive management approach should be one that is participatory—that is, it should include the land-holders, the ones who are going to implement a lot of the solutions, as well as the scientists—and that starts to develop a good mutual language between the two. Often that has not happened. I can cite examples where it has happened. In the Riverina, for instance, the Victorian Department of Sustainability and Environment, the GRDC and others have been working together to implement environmental management systems that incorporate recharge targets. So they are encouraging the farmers to establish perenniality targets to revegetate areas. Another one in Victoria that I know of is, again, through the DSE—and I do not want to make those guys out to be heroes, but they are doing some good work—working again with environmental management systems to incorporate biodiversity conservation targets into those EMSs on grazing properties. By doing that, they are actually stepping out onto the farm and talking with the farmers, and so there is an enormous amount of interaction and mutual learning, if you like, between the two. That is what it is going to take, and that is where you have to look at how much the Commonwealth is investing. Sure, it is a lot of money right now, but that sort of thing is expensive. The catchment management authorities are going to be given the task of

doing that, and they cannot be expected to do it overnight. They are going to need a lot more funding and a lot more tools at their disposal.

**Ms CORCORAN**—A little while ago you talked about the disconnect between farmers, or land users, and scientists or government departments or whatever—I was not too sure which. I think it is that disconnect that we are concerned about. Do you want to elaborate? Am I correct in thinking that is where the disconnect is?

**Mr Watts**—Sort of. We held a seminar about six months ago called Farms to Landscapes, the idea being that we wanted to apply as many people's brains as we could to the task of bridging that disconnect. We feel that catchment management plans are being drawn up and a lot of the work of scientists is being done in isolation from land-holders and from conservation managers at the smaller scale, who are developing, say, environmental management systems in isolation from these catchment management plans. One has heard the view from catchment managers—who are also farmers, I might add, and they probably should know better—that it is enough that their farmers know that there is a catchment management plan out there. It is not. You have to find some way of bridging that gap, and that is going to have to be informed by very good science—science that comes up with performance indicators and monitoring and measuring tools that can be used by people at the enterprise level but at the same time do not lose their meaning in the realms of science and at the catchment and at the national policy level and that actually result in good action, rather than just saying, 'See, we are doing something.' That is what we meant.

**Ms CORCORAN**—When you said that at the moment farmers know there are catchment management plans and that is not enough, are you suggesting that they do not want to take too much notice of them or do not know how to deal with them—or is it just not measured very well?

**Mr Watts**—I think it varies considerably across the landscape; it varies from catchment to catchment. The other end of the spectrum is where the catchment does not take a leadership role and just takes the lowest common denominator: it gets everyone's opinions and comes up with something that is not going to shift anyone forward. Catchment managers are in an awkward position in that they are supposed to be very responsive to land-holders and to others in the community, to their needs and their aspirations, and at the same time they have to take a tough line in determining the future of their catchment. That means that some people are going to have to wear some pain. So catchment managers have to learn how to manage that pain, if you like. They are a strange form of governance, and there is a long way to go.

**CHAIR**—Yesterday, in evidence in Wagga we were provided with a document that was prepared by a particular sub-catchment, I suppose you would call it. The document is entitled *Land-holders Guide to Land and Water Management*. It is written very much in a farmer's terms, in lay terms. I thought it was a good example of that bridging, using the science and those people from the various departments and working together with the actual land-holders. They read it, vetted it and produced something that could actually be understood. Maybe that is the type of example that needs broader application. Is that the sort of thing you are talking about?

**Mr Watts**—I could not agree more. That is exactly the sort of thing we are talking about. You need to set up a feedback loop between the enterprise level and the catchment level. You need

something where the land-holder is both informed and stretched to a new dimension. They do need to be challenged in their thinking and in how they do things—some are leaders and some are not; there is a great deal of variation there. At the same time they provide their participation and the process provides information that feeds back up to the catchment level—and indeed to the national policy level and to the science level—to show where the flaws or the gaps are in the information and in the science that is out there and, indeed, in the tools at their disposal to implement that science and produce some good environmental and interim outcomes.

**Ms CORCORAN**—Does the ACF do their own scientific work or do you have to rely on people from CSIRO and places like that?

**Mr Watts**—We rely on others.

**Ms CORCORAN**—How do you find (a) access to that sort of information and (b) understanding it? Is it readily accessible and understandable? Then I ask: you are specialists, but how does the land user cope?

**Mr Watts**—We deal with things at a national level. A lot of the documents that we most avidly read are produced for a broad audience, so we do not usually have that much of a drama in understanding and interpreting them. We pick up the phone and talk to the scientists directly. An individual land-holder often cannot do that and, if they did, it would be a nightmare for the scientists, unless those scientists were specifically employed to do that kind of stuff. So you need a restoration of good extension really, and I do not know that we are seeing enough of that. I come back to the earlier point: if we are going to bridge the gap between the landscape and the farm level then we are going to need people out there.

Someone once wrote a paper called ‘The importance of cups of tea to conservation.’ It is extremely important to sit at the kitchen table and go through the property at that level. Jim McDonald, who is a grain grower and grazier in the Namoi, headed the Namoi catchment mob, which spent two years producing a blueprint. At a seminar a few months ago he said, ‘We spent two years talking to everyone and producing a blueprint, and I still had no idea of what I needed to do on my property—and I chaired the group.’ That is a real problem if that is happening. So an attitudinal change has to take place on the part of catchment managers and on the part of land-holders, but at the same time you need to allow a flow of information to bridge the gap—it is not enough for people to know that the catchment plan is out there. A lot of the targets in catchment plans are so airy-fairy. It is great to see aspirational targets, but then you start calculating how much they will cost. For instance, we would absolutely support the goal of revegetating at least 30 per cent of the cleared catchments in New South Wales—that goal was in a lot of the New South Wales blueprints—but I think the CSIRO estimated that it was going to cost \$4½ billion. That is shocking and it is a good reason we should increase investment, but what does that mean for the land-holders? What do they then do?

**Ms CORCORAN**—You raise an interesting point. That chap, who clearly knows a lot of stuff, still does not know what do on his own farm. You talked about an attitudinal change. It seems to me that his attitude is okay.

**Mr Watts**—Yes, his attitude is.



**Ms CORCORAN**—That is right. So we have several different issues happening here. I focus on the guy whose attitude is correct but who still does not know what to do on his farm. I think that is critical to what we are trying to find out. Do you know why he did not know what to do on his own farm?

**Mr Watts**—It is very telling, isn't it, that he was the chair of the board and a farmer, and he still did not know what to do. So obviously there is a process—

**Ms CORCORAN**—But why didn't he know?

**Mr Watts**—I think it is because the catchment plan was meaningless at his level. I am paraphrasing, but he said something like: if he wanted to save dickie bird X in his neck of the woods by restoring native vegetation, connecting fragments and, at the same time, perennialising parts of his landscape, he would have to talk to 10 different people and spend eight hours on the web; he would get 10 different answers from 10 departments—I am exaggerating a little, but you understand what I mean—and that is very frustrating for him. He is a motivated individual—he has developed an environmental management system that is outcomes based, so he has not just developed an accountancy tool and not worried about what it is actually producing—and at the same time he just throws his hands up and says, 'Well I'm just going to have to do what I've got to do.' So there are people out there who are trying to do the right thing and are finding it difficult to get the information they need to make it happen.

**Ms CORCORAN**—One of the things that became clear to me yesterday—that I did not know before—is that what needs to be done is almost paddock specific; what is right for this little plot of land here is not right for the next one. To have a broad-brush plan is not much good at all. I am wondering if part of the problem is that, so far, our approach has been too broad brush, that we do not have the information down to not only a farm-by-farm level but a paddock-by-paddock level.

**Mr Watts**—Yes and no. I think it is important that we do have catchment plans that embody a collective vision, a shared vision for the landscape and how it ought to be, bearing in mind that the landscapes that we have now are in decline. I think it is important to set aspirational targets and resource-condition targets that are applicable at the catchment scale, but somehow we have to translate those to individual land-holders.

Yes, you are going to need information on a paddock-by-paddock resolution. That is scary for some people. I was talking with a real estate agent in Katanning in the South-West of WA the other day. Of course, there is an enormous problem with salinity over there. It has a huge impact on the value of those properties—it is one of the reasons why people get so interested in salt farming. But if data becomes available on the salinity hazard or risk and what needs to be done at the paddock or farm scale, to whom should that information be made available? Should it be publicly available? Part of me says, 'Yes, of course it should be, because there are public assets at risk.' At the same time, that is quite scary for a land-holder who then has to face up to the bank.

There are issues there. Land-holders cannot just be left in the lurch. If you do find a problem, you also need to back it up with help and solutions to make it work. Certainly, we think that the model of leveraging private investment that I cited earlier is a large part of the solution. Until

you find a way of steering investment decisions at the enterprise level away from unsustainable activities, or at least making sustainable activities—or activities with more of a chance of being sustainable—more attractive commercially, then it is going to be very difficult to actually effect change without coming in and dictating to people. In some cases that will have to be done. Certainly, in the case of preventing the salinity problem in the first place, we think that regulation has a large role to play. It was interesting hearing Murray Irrigation earlier talking about the use of sanctions to manipulate behaviour of individuals. That has a role to play too.

**Ms CORCORAN**—You are just talking about the carrot and the stick?

**Mr Watts**—Yes, absolutely.

**CHAIR**—Getting down to the farm level requires a lot more information and a lot more detailed data. You may have heard me ask a question of a previous witness with regard to the access to that information and the cost of it. Do you have some experience or comments on that?

**Mr Watts**—In terms of who should pay?

**CHAIR**—Yes.

**Mr Watts**—It is tricky one: how do you unravel the public and private benefits? I think you can go too far one way or too far the other. Certainly, on private lands there are public assets at risk. Our feeling is that individual private land-holders have a responsibility that ends not only at their boundary but beyond, to the whole landscape and, indeed, to the non-production values in that landscape. This comes back to the whole issue of where we set the duty of care—either a statutory duty of care or a common law duty of care or something that is just a moral duty of care. Where do you set the boundary beyond which the public starts to pay for the use of scientific information and the harvesting of that information and its application or what have you? I do not think there are any hard and fast answers to that. Certainly, the basic rule, in principle, should apply—that, if that information is being used to protect private good or private interests, then it is the private individual who should pay for it. If there is a degree of overlap, then it should be shared and some sort of cost sharing mechanism needs to be worked out.

**CHAIR**—On a different issue, urban salinity was raised with us in Wagga, obviously, which has had and has some fairly major problems—at least, they accepted that some years ago and have been doing quite a bit about it. Do you think there is not enough emphasis on the impact of salinity in urban areas in this whole salinity debate with respect to research and implementation of solutions?

**Mr Watts**—Certainly, if you speak to someone from Wagga shire council, the Western Sydney Regional Organisation of Councils or anyone—

**CHAIR**—We have done both.

**Mr Watts**—they will tell you that exactly. Yes, that is something we mentioned in our submission and, yes, we would agree that there is not enough emphasis on urban salinity management and the science underpinning good local government, state and federal policy on urban development in salinity hazard areas. There are two issues that we would be primarily

interested in. One of those is the protection of urban bushland—remnant nature conservation assets within urban areas, and there are quite substantial ones—as well as cultural heritage, and the other one is a classic environmental justice issue. If you take Western Sydney, for example, which is a generally low socioeconomic area already and then overlay that with the salinity risk to the value of people's properties and their ability to resell that, move elsewhere and develop their and their family's potential, then there is a real issue at stake there. I think organisations such as WSROC and the council in Wagga are to be commended for taking the lead. I do not have any solutions as to how it should be dealt with, but there is a lot of experience there; they have built up a lot of experience. So, yes—more emphasis, please.

**CHAIR**—Finally, in respect of the projects that are being funded under the national action plan, do the ACF feel that the process by which it is decided what projects are funded and what projects are not funded provides enough scrutiny? Does it provide enough of the science for them to say, 'Yes, this is based on the best possible science'? Do you have any comments on how that whole process works?

**Mr Watts**—I am most familiar with the development of projects in Victoria and then in Western Australia. I am not so familiar with New South Wales, South Australia and the other states. Some of this early phase of NAP funding has gone into getting a better scientific handle on the problem. I know that there was some investment in South Australia, and there has been some in Victoria, to upgrade their knowledge of salinity as a threatening process to conservation assets—but not enough, in our view. I think there is a lot of politics involved in the NAP process. I am not sure how open it is to scrutiny by the community. In Western Australia, where they have the Salinity Investment Framework, it is a little different; that is quite open and transparent. In Victoria we have had to go to the Victorian government and rely on the good nature of key staff in the bureaucracy to tell us what is going on—to make us aware of what is going on—and to give us a chance to comment. There are processes like the NAP stakeholders forum in Victoria, which has been useful. Often the community is treated like this: 'Here's what we're doing,' rather than, 'Is this really what we ought to be doing?' I do not hear good things from my colleagues in New South Wales about how government departments there interact with the community—for the most part; there are exceptions.

**CHAIR**—I raised it because, if you look at this, Victoria seems to have the most projects currently being funded. I suspect that just reflects that Victoria was ahead of the other states with its agreement with the Commonwealth and various things, but I am not absolutely certain. At the same time, there are a lot of projects—a few thousand here, a few thousand there—and you worry that perhaps somebody said: 'This sort of fits the guidelines. This is something we have been trying to do. Let's whack this one in.' Am I being overcritical? When you see things like 'Habitat and water quality requirements for the Glenelg spiny crayfish and Glenelg freshwater mussel', you think, 'Hang on; I thought we were doing a national action plan on salinity here.' That is why I have raised it. At the moment—and maybe we can get this changed—the Victorian government has decided not to contribute to this inquiry, which we are a bit perplexed about.

**Mr Watts**—That is odd.

**CHAIR**—Therefore I am not sure who or what we will check some of these things with. I am not trying to do a Senate estimates type thing, such as often occurs, but to me it is at the heart of part of what we are about in ensuring that the best science is being attacked on the ground.

**Mr Watts**—In terms of who, it was South Australia who signed the first bilateral.

**CHAIR**—South Australia does not have the same problems that some of the other states have.

**Mr Watts**—No, but that says something about Victoria. If they have the most projects and the most money going into works on the ground or what have you, that says something about their organisational maturity or the ability or capacity of the states to undertake the work. I do not have those projects in front of me. I was fairly well satisfied in Victoria that there was reasonably good work being done on biodiversity conservation and salinity in amongst the projects that were being funded. I do not see much of that happening in New South Wales. I see bits of it happening in Western Australia, but they are more up to speed. I am not familiar with the project you cited, so I cannot be relied upon to judge it on its merits or otherwise too much, except to say that my background is in conservation biology. If I were going to develop tools for conservation management in salinising landscapes, I have to start somewhere. Victoria is starting from nil, and one of the things that you do is that you pick an organism in the environment that, for a range of reasons, is useful because of its ability to act as an indicator species—that is to say, an indicator of the health or ill health or trajectory of health decline in a particular ecosystem—and you use that as a basis for management. Again, this is where adaptive management comes into play because, unless you are getting a continual feedback of information through the implementation of management, then you are not refining that. I suggest that, if that is not costing a great deal of money but it is producing, in terms of the public benefit, valuable information which can be transferred to other landscapes or information which is critical to the management of salinity and biodiversity in that particular area then it has a great deal of merit. If it is not producing that, then it is somebody's pet project and needs to be looked at again.

**CHAIR**—I emphasise that I was not passing any great judgment on that. I just dragged it out to use as an example in the discussion that we are having.

**Mr Watts**—Sure.

**CHAIR**—This has been very useful for us. Thank you very much for your evidence this morning and your submission. We very much appreciate the assistance you have given to the inquiry.

**Ms CORCORAN**—I move that the submission from the Australian Conservation Foundation be received as evidence and authorised for publication.

**CHAIR**—There being no objection, it is so ordered.

**Ms CORCORAN**—I move that the three exhibits—*Salt: Nature in the balance*, the community information kit of the same title and the *Leveraging private investment: Repairing the country* report provided by the ACF—be accepted.

**CHAIR**—There being no objection, it is so ordered.

[11.06 a.m.]

**HOXLEY, Mr Greg, Principal Hydrogeologist; and National Salinity Coordinator, Sinclair Knight Merz Pty Ltd**

**CHAIR**—Welcome. Although the committee does not require you to give evidence under oath, I advise you that this hearing is a formal proceeding of the parliament. I remind you that the giving of false or misleading evidence is a serious matter and may be regarded as contempt of parliament. The committee prefers that all evidence be given in public. However, you may at any stage request that your evidence be given in camera, and the committee will consider your request. The committee has your submission, No. 28, which has been accepted and authorised for publication and is now on the public record. We thank you for providing a submission. I invite you to make some opening comments before we go to questions.

**Mr Hoxley**—I thank you for the opportunity to appear at this inquiry. Our submission outlines our key areas of interest in relation to the terms of reference, so I do not intend to read it out. But clearly there is a need to involve the science base that is out there. The points we have made say that a lot of work has been done, not all of which is equally accessible to all people working in the industry. There is some work that could be done to bring that up. The basis behind that is really the issue of bringing the best science to bear, understanding what we mean by ‘best science’, and determining how we bring it in and what level of effort we want to go to to make sure that it is available.

There is also an element of ‘command and control’ going on with science; there is a view that if you spend money on a research project, you cannot have another one that might be doing something similar, because that would be duplication. Yet we believe that the need to corral everything and avoid duplication tends to stifle a lot of other creativity that could be helpful to the process. So we have made some comments about how we believe that could be freed up a bit.

We are also looking at the issue of how to link the people doing the research—the ones who really understand that science—and the people who need to use it, and the efforts involved in making the linkage. Some of the commentary we have made is about the fact that that is a time intensive process; it involves people time and it involves giving people the space to be able to have the conversations. The previous witness was talking about the value of a cup of tea. I think that really does relate to how you get a scientist or somebody who has been considering a problem to find the right language or the right way to communicate that. It is not an innate skill we are born with. It is difficult to train in. You cannot pull off the shelf a manual entitled: ‘Landholder communication: here is how a scientist does it’. This is something a person has to develop, and we need to recognise the effort that that requires.

Also, there is the long-term nature of that. We are not talking about something that has to be done in the next three years; we are talking about a program that is going to have a lifespan of—and a need to continue it for—30 to 50 years. We intrinsically find it very difficult to get our head around how to respond to these time scales—certainly in a public policy sense, which is often driven by shorter term cycles.

As to the terms of reference for the adequacy of the technical support, we see a real crisis out there at the moment between the number of trained people with experience and the demand for those in catchments and regional communities. There is way more demand for information than there are adequately trained and experienced people to provide it. We need to be thinking, in terms of longer time frames, how we can deal with it, how we put it up. An analogy I can think of, which was talked about a lot a few years ago, was the IT industry and the need to make sure that we had adequate skills in the IT industry. We are facing, I think, a similar sort of challenge with the salinity industry and the need for trained and experienced people, yet we do not have such a good institutional framework for training them. So that is a real challenge, I think, for the community as a whole that we ought to be looking at and addressing.

Our final point relates to the role of salinity management and government as an investor and how that plays out in monitoring, evaluation and return on investment. There is a real tension between best science, demonstrated outcomes and value for money and the need to be able to get out there and do something and take a bit of a risk as to whether it may or may not work. At the moment, the sense is that the balance may not have been struck in agreement with all the players. So, again, this phrase, 'ensuring that the best science is used' keeps coming up. But I do not think we have deconstructed, if you like, what 'best science' means. I will draw again from the commentary of the previous witness. On the one hand you can say there is the particular project that you highlighted about crustaceans in the Glenelg, but if you are unaware whether they live or die at what salinity level, how can you possibly believe that you are using the best science to manage that river system? Yet, on the other hand, we are saying that if we spread all our money across a myriad of little projects that are all looking at little bits we will not get anywhere. I do not think there has been a conversation about that tension and where the levels of balance remain. That, I think, is an area that needs a lot more discussion amongst communities. It is a bit of a grand statement to say, 'Of course we will use the best science,' but how much science are we prepared to pay for, I think, is one of the key questions that perhaps needs to be asked. That is in monitoring and evaluation reporting as well, because there is a sense that you could spend your entire net budget just on monitoring what is going on, without necessarily doing a great deal else. You still probably would not have a good description of the systems in all their diversity across the whole of the continent. With those opening remarks, I am happy to take questions and further clarification of them.

**CHAIR**—Just to reinforce the point you are making, a farmer near Wagga said to us yesterday, 'We can't wait around until the best science bus arrives.' At some point in time you have to say, 'This is the best we know at the moment, let's do something.' What this committee is saying is that you are making that decision with the best information that is available and you might think it is the best, but because of problems in communication, problems in getting the information out there, you are in fact dealing with something which is two generations out of date.

**Mr Hoxley**—It is interesting to look at the development of the National Dryland Salinity Program. If you look at phase 1 of the NDSP, there was a lot of talk there about best bet solutions and going out there and taking what we thought were the best solutions at the time and a bit of a punt that they would work for us. It is interesting to see how that has evolved over the last six or eight years where we are now getting down to the stage where, if you are going to spend \$1½ billion on this, that is a public investment that we require some certainty that it will work. So we have gone from this model of saying, 'As long as we get a lot of things going in the

right sort of direction, some of them will work and therefore that is beneficial,' to one that says, 'Unless we've got a pretty good certainty of outcome, we're not going to invest in it.' I think that at the moment the pendulum may have swung too far the other way in that there are so many people out there monitoring and measuring and looking for the correct outcome that we are stifling the ability to give a few things a try. In talking about a balance there that, I think, is the best science.

As a private organisation working in a commercial sphere and dealing with the likes of academic researchers, one of the things that we come up with all the time is that the view of best science of an academic, whose job relies on publication record, is very different from the one that you espoused. If you have a platform that says, 'We will only use the best science,' then it is very easy to bring up a whole lot of people whose careers have revolved around making sure that the leading edge science is being used and to turn that into criticism. That undermines all the work that you are trying to do because you have a difference in perception of what best is. Articulation of that, and having a very clear understanding of what that means, is possibly part of the way through this over the next few years.

**Ms CORCORAN**—I was wondering if you could explain the difference in definitions between best from an academic's point of view and best from a user's point of view.

**Mr Hoxley**—I think there are a number of them. The example we used in our submission involved, say, reinventing the wheel. If a wheel is invented in Wagga, it is much more likely to be used than if it is invented in Katanning—even though it is the same wheel. You tend to get a view after a research group has worked in one area and come up with an answer that it will work in their particular environment but that, for whatever reason, because the process has not been developed and the community has not followed the process of development of that science, it is not the best for another region. It is really the one that has the most likely applicability, the one that is going to lead to the changes in the system—and I am falling into the jargon here—and lead to the landscape scale change that everybody wants or says is needed that is most likely to be used. There is no point having the one which has the right number of decimal points and is correct to the right statistical probability if it has little chance of actually getting out and being used. Those are the tensions that I see.

We have come across this before when we have tried to work in a management sense. We will come up with what we think is a management solution that meets the particular group's needs and then will be heavily criticised by professional researchers who feel that the algorithm on which it was based does not reflect the latest paper that has been published and that therefore is not the best science.

**Ms CORCORAN**—We are interested in whether or not this best science, having arrived at what 'best' means—and let us assume that for a minute that we have—is actually getting to the end user. We are hearing lots of different comments but it seems to me there is a big possibility that there is a gap in there. Do you want to comment on that?

**Mr Hoxley**—For sure. There is; we do mention that in the—

**Ms CORCORAN**—I must admit that I have only skimmed your submission; I have not read every word, I am sorry.

**Mr Hoxley**—We certainly agree that that gap exists. In trying to work out what the source of that gap is, I would say that part of it is the language and part of it is the physical accessibility of the material. We talk a bit about the grey literature and about how accessible that is. Even if the report were physically available to a land-holder, would they be able to read it and understand it in a way that enabled them to take action on it? Also, there are a couple of different assumptions about the way in which land-holders or people who make decisions about managing land will react to the pressures that are on them.

Fundamentally, what it comes down to is that a lot of the research is based on a pure resource management model whereas a lot of the decisions are made on an economically based model. As a society, we really have to have a look at what we are expecting the farming community to do for us. If we are expecting people to grow food and if we are expecting them to grow produce—whether for export or for our own consumption—that has environmental damage in the same way that an industrial plant will have an environmental emission. If we have an ecological outcome which is inconsistent with that production outcome, we do not at the moment have a way of reconciling that.

A lot of the difficulties of implementing on a farm come down to people who say, ‘I can’t meet my society based production objectives if I also meet your ecosystem objectives, and I have no way of understanding how to resolve them.’ In one sense, if people accept the message and say, ‘I need 60 to 80 per cent more trees on my farm to lower the watertable to a point at which it stops discharging to a stream,’ when they say that they do not know what to do, they do not mean that they do not know how to plant trees; they are saying, ‘I can’t accept the impact that 60 per cent of trees will have on my property.’ It is not, ‘I don’t know what to do’; it is, ‘I can’t resolve that conflict.’ I think there is a lot of that out there at the moment. They say, ‘If I could do it on my header, I’d be able to do it, but because it would stop my header from working there I don’t know how to do it.’ So there is some different language being used in that argument as well.

**Ms CORCORAN**—That is a different perspective again. It is a very interesting one. We have heard of people not knowing they have to plant—or not plant—trees here, or not knowing they have to do something else, so that is an interesting thing. Do you have any ideas about the best way of making this information available? I think the New South Wales Department of Agriculture have an Internet site that people can access, but in fact no-one does, and if Joe Blow or I, for instance, did access it we would not be able to use it because the information is very technical. It is just scientific research reports. How do we get all that information to a place where laypeople can actually use it, and where is that place?

**Mr Hoxley**—That is a key issue, I think—a very core part of it. I will put that into a couple of different subsets, if I may. You talk about who pays for that information and its availability. I think there need to be some in-principle policy decisions about the value of the information. I suspect, and we suspect, that it is probably far better to make the information completely freely available, because that will free up better decision making that will yield results in catchments in the future. So, we suspect that in the first instance you do not need to quarantine information into stuff which some people have to pay for and others do not, because then you have to run this whole gatekeeper role: ‘I can’t let you in unless you give me a cheque, but I can let someone else in.’ If you dispense with all of that and say, ‘Everything is out there in the public domain to be picked at,’ you then have more opportunity for access.



The second part of it is that if you have a science study that has some answers in it, but it is written in words of 10 syllables and nobody can understand them, then it is not accessible either, even if it is free, on the Web or whatever. This is where the role of the catchment communities really comes in. The sort of thing that we suggested in our submission here is changing the way in which researchers are recognised and rewarded to include the transmission of that information into the community as a core part of their role or their job. We believe there is a need to make sure that dedicated people are available who understand both the region and the community and the science.

The previous witness was talking about extension officers. I think the role is actually broader than extension. There is some talk about knowledge brokers. I think knowledge brokers also have a high overhead. From my role of both developing science and knowledge and trying to implement it in the field, some of the best ways I have ever got information across were at sausage sizzles where I have been sitting down and talking with the people, either on their property or out with them in a way that is non-threatening and in which we can both understand where the other is coming from. At the moment, it is very difficult to build those types of things into research or investigation projects. You could easily chew up 30 to 50 per cent of the budget of a research project in doing that type of activity. It is not trendy to fund it. It is very difficult to get projects accepted that have that type of thing in them. We see that both having the information available and giving people the time to be able to translate it is a really key part of that.

**CHAIR**—I will break in very briefly to welcome the local federal member, Sharman Stone, to the balance of our hearing this morning. Thank you for coming along. Mr Hoxley, who are the major clients you are working for in this area?

**Mr Hoxley**—They are largely government in one form or another, either through the catchment communities or directly through state and federal government. There is relatively little investment in consulting firms such as ours through the private sector. They would tend to go in partnership with an NAP or NHT type grant, which we would then be funded through.

**CHAIR**—Companies like yours are not doing a huge amount of work directly for landowners and farmers at this stage?

**Mr Hoxley**—It varies across the industry. Our particular company is structured in a way where we are more into the science and technology generation side. There are a number of consulting firms that are more regionally based that have more of that contact. Yes, it is being done, but if you look at the way it is priced—the full market price for people to go and talk to farmers at, let us say, typical consulting rates of \$50 to \$100 an hour—it is seen as very expensive to put many hours into that in the way that projects go up, so it is selected out of projects. They do not tend to go forward when they have that level of communication in them because they are very expensive. Spending \$50,000 or \$100,000 on a project just talking to people does not seem to be delivering outcomes—whereas, in fact, we would suggest that is probably the best way to deliver outcomes in many cases.

**CHAIR**—Just coming back to the data situation, you said if it could be out there much more freely and was able to be accessed and the cost was reduced you would have a lot more activity

happening. Have you noticed that to be the case over the last year or so as a lot of data that is held by the federal government has become more freely available?

**Mr Hoxley**—We are starting to see the beginnings of it. It takes a while to go up. The form of that availability is also interesting. You have to fight a little bit to get it. There are some web sites with some things on them. There are commitments from people that if you contact them they will give you the data but often that is slow in coming and not responsive to other time frames. We are beginning to see it but we have not made a great deal of a stretch forward.

An example I can use is the time it took for the airborne geophysics that was trialled—the ‘ultrasound of the earth’—in the Honeysuckle Creek catchment just to the south of here to be made available. As of yet, I am not aware that that data set has been made publicly available on a web site. There have been statements that it is available but you still have to go to the public servant who is the custodian of that and seek that information. Someone in my position can go and make a lot of noise about it, but if you were more of a landowner that would be a difficult thing to do. So yes and no are both answers to your question.

**CHAIR**—When was that data acquired?

**Mr Hoxley**—It would have been probably at least 18 months ago.

**CHAIR**—And BRS is the custodian.

**Mr Hoxley**—And the whole process that is around the package of the geophysics program is almost a good case study, in that the way in which the need to get the right interpretation and the best science has actually considerably slowed the process of getting the information out. We would argue that if you had let more people have a go at it early you would have run the risk of duplication but you would have had a faster response back out into the community.

**CHAIR**—Does that contrast fairly sharply with your experiences with Geoscience Australia, for instance, with their topographical data and geological data?

**Mr Hoxley**—That has become more available, but there are still quite legalistic licensing issues associated with getting that information and using it. For a firm like ours that is being paid to do a job, if there are formidable barriers of a legal nature, even though the data may be technically free, utilising that in a way which is of benefit to local groups and understanding the licensing control of topographic data are not trivial tasks. It does require a specialist to get through that. If you were a land-holder, for example, and downloaded a topographic map and published something and put it back up on the Web you would be breaching the copyright of the Commonwealth in doing that.

**CHAIR**—Only if you do not acknowledge the source of it, though.

**Mr Hoxley**—You could put the disclaimer on it. But by publishing it and making it available there are some questions in there as to how that works. Practically, that is possibly a bad example because practically you are going to say nobody is going to worry about it. That is true. But there are some issues in there about how all that data is managed. Because of the gatekeeper role I was referring to, are we as a firm who is working for a land-holder group making a profit

on that data? Therefore, should we be paying for it? If we have to pay, we are just going to bill back to the community group we are working for. So that is adding overhead there.

**CHAIR**—That is why those decisions were made: to try and stimulate that activity a lot more. This committee, in its previous inquiry into research and development, made recommendations about the states following suit. It will be interesting to see whether that occurs. It was also interesting that this inquiry got submissions that said there are problems with access to the data, the cost of it et cetera. It is an ongoing thing that needs a national solution somewhere along the line. It is a lot harder when so much of the data is held by various state authorities and there is a bit of an ‘I own it, so I’m going to hang onto it’ mentality.

**Mr Hoxley**—It is a key issue for the speed at which we want to move.

**Ms CORCORAN**—You used the term ‘grey material’. What does that mean?

**Mr Hoxley**—Yes, I referred to grey literature. For example, if we produce a report and give it to a community group, it is not a published report in the international literature, so it is what scientists call grey literature. There may be good information in it but, because it is not published or peer reviewed, it does not get put out there in a known place. It will not be held in a state library or in a research organisation’s library. Yet there is quite a wealth of information that has been put together by land-holder groups and catchment groups, who have commissioned work, which then exists in this grey zone between an officially published document and a research paper.

**Ms CORCORAN**—Would that sometimes be available if you knew it existed, or is it not available?

**Mr Hoxley**—It could be either. If it is five years old and nobody kept a copy in their library, it may well have disappeared. If you know the right person to ring you can easily get a copy of it, but if you do not it is not there. There are some efforts being made now, which we should acknowledge, to try to get these reports—for example, the tool kit that the National Dryland Salinity Program is working on—put on web sites. Our comment on that is: if it is irrigation it is treated one way, while if it is dryland it is treated another way. If it is a catchment it is treated this way, while if it is Commonwealth funded it is treated that way. There is possibly an advantage in an overall structural framework that could deal with all of those things so that everything is served out of one framework, rather than silos—which is how things are at the moment.

**CHAIR**—That is basically what a number of people have put to us. As I mentioned to one of the earlier witnesses, it is a matter of finding a way in which that can be done without it being such a huge task that it becomes counterproductive. From your company’s point of view, you would find it useful to have a one-stop shop to get into everything that is available with respect to salinity research and other things?

**Mr Hoxley**—Certainly—both to be able to draw from it and also to contribute to it. Most of the work that we do ends up back in the public domain. It is done by us for public groups, so it goes back there. It is often frustrating for us as scientists and engineers to do some work that seems to then just disappear into a library and not get back out again. From both ends, to be able

to use the work and also to see the work that we do out there and being used by others, it would be useful. We would suggest that the model on which that should be based would be a catchment or a region, rather than necessarily a discipline. We think the way in which most of the data gets used is that people ask, 'What has been done in my area that I can deal with or work from?' If you started with that as the central model, that might be one way of building the information up.

**CHAIR**—How would you build into that national research on issues related to salinity that may not necessarily be applicable to any one catchment?

**Mr Hoxley**—I wonder how much truly national work there is that does not need modification or adaptation for individual regions.

**CHAIR**—Certainly the need for local solutions to local problems has come through loud and clear in most of the submissions we have had.

**Mr Hoxley**—I come back to the issue: if something has been invented over here, because it was not invented in the other catchment, unless it is regionalised or made locally accessible it is not going to get used. Take a wheat species that is developed in WA. People are immediately going to say, if you put that in the mallee, 'We've got boron toxicity problems,' or, 'Summer rainfall is different,' or, 'How do I know that is going to work over here?' You need the ability to shepherd or move it in a way that is relevant to the local community, and then that is the way they would access it.

**Ms CORCORAN**—How much of that natural resistance to adapting someone else's solution is actually a good, or valid, reaction?

**Mr Hoxley**—A lot of it. A lot of it relates to the risk that is being taken on by trying it. People want reasonable certainty that it is going to work and deliver the outcomes they want. Coming back to farming, I referred earlier to the need for the people who are running the production systems to understand how they are serving the community. Are they better off serving it by maximising the production or by trading off more of the production against the overall catchment landscape? If they do that, how do they get compensated for those decisions? That is really where the nub of their choices lies, and there is no dialogue, language or framework to help people make that decision. So on balance they will say, 'I'll do the one that is best economically for me,' because that is an easy one to resolve.

**CHAIR**—Is SKM involved in any of the projects that have been funded under NAP?

**Mr Hoxley**—Yes.

**CHAIR**—Just in Victoria?

**Mr Hoxley**—We do work all around the country, so we have elements of it in South Australia, Victoria—fewer in New South Wales, Queensland and WA. We are still working on projects that are NAP or NHT funded.

**CHAIR**—Just putting NHT to one side, has your involvement in the NAP projects come, as you said earlier, from the various clients you are working for either directly for the state or the Catchment Management Authority?

**Mr Hoxley**—Yes, pretty much so.

**CHAIR**—Have they been projects you have been working on that got up as priority projects and therefore got funding, or was it a case of projects being selected as priority projects and then the Catchment Management Authority or the various departments coming to you and asking if you can help with a particular project?

**Mr Hoxley**—A bit of both really, because the NAP did not come in a vacuum. There was a range of work and investigations going on for catchment management and salinity management. Very often we had been previously involved in those, so we are seeing extensions of previous work and new work that has come up to meet particular NAP priorities. A lot of the monitoring and evaluation components are relatively new and there have been specific projects that have been worked up. Some of them have even been developed by the regions, which then say, ‘We need a provider to help us deliver,’ and that is where we would come in. In other cases, we have been more instrumental in trying to establish the project as a regional priority and then find a funding source for it. It varies, but more often than not the region sets their priority and we assist them in delivering it.

**CHAIR**—Thank you for your evidence this morning and also for your submission.

[11.38 a.m.]

**STONE, The Hon. Dr Sharman, Federal Member for Murray**

**Dr Stone**—I would like to make a few comments. You may have covered these points before and had them presented to you, but one of the things about information, especially maps or anything that is defining the potential or the actuality of high watertables, is that it is very sensitive to local communities. A lot of communities will resist very strongly any public exposure of those maps as it might lead to their land values being affected. You have probably had this presented to you as evidence before. For example, in Queensland, under the NHT—just as we moved into the NAP—where there is a lot of resistance to airborne geophysical mapping, a lot of land-holders were still in a state of denial at that stage that they even had salinity problems. Publishing maps that they did not believe were necessarily being groundproofed or that could have evidence in them that would be very difficult for them if they were trying to sell their land was very emotional for them to imagine. It was very emotional for them to think that the data went straight from the scientists or the technicians onto a web site, say, or to some other public document of some sort.

We had this problem years ago in this region—20 years ago when we first developed the state salinity program and we were having soil mapping undertaken. The soil mapping was to look at what watertable levels were across the country. The A-, B- and C-class soils were to be mapped across an individual's farm, to give them a tool to work out where to put most of their investments on a farm. The notion was that where you had a higher salinity problem—closer ground water levels to the surface—you would put less investment and then perhaps you would put most of your investment and effort into the better class of soils on your farm. It was meant to be very much an on-farm tool. That initially caused a lot of upset and concern, because the understanding was that everyone's soil maps could be made available to the whole district to look at, and farmers were very sensitive about that.

We then said that that information was owned by the land-holder—that it was not going to be made available beyond the farm, unless there was permission for that to happen. I think that is still very much the case, but I mention that point because, with salinity—especially where you have got a district or region entering the earliest stages of, say, dryland salinity, where there still may not be much evidence of it in the landscape and the community might still be building its capacity to understand what the cause and impacts of salinity will be—delivering the scientific information to them requires a lot of diplomacy and the careful development of trust between the scientific or research agency and the people. A lot of issues about privacy have to be discussed.

**CHAIR**—Does that partly explain BRS's slowness to make some of this data available?

**Dr Stone**—I think that is behind a lot of people's worries about, for example, just putting on a web site a map showing future salinity scenarios. There are a lot of maps around that have a lot of shaded areas showing where there are likely to be salinity problems in five, 10 or 15 years. Unless you are absolutely sure about your scenarios, you can expect to be under attack when you put those maps out for public discussion, depending on how advanced your community is in understanding the salinity problem and depending on how much they have agreed that the problem is regional and not an individual's own fault through bad farming. If the community is still at that stage—still blaming an individual farmer for their salt problem—then, that is a

concern. As you know, farming is a lot about your own self-esteem, your own stewarding of that land for your family—farm succession. To have it implied that your country is being degraded by your own farm practice is a very big concern.

Salinity data is a bit like data about foot rot or some other communicable stock disease—or even some weed infestation diseases. If you plan to sell your property, for example, there are certain notifiable diseases you have to put in front of the agents. There is discussion about whether you should also be putting, for example, your salinity maps in front of a buying public, if you have a property for sale. That is being discussed. For someone selling land, especially in areas that have been designated as likely to become salt affected in the next decade or so, that is a serious matter to consider when you are trying to sell your property. So all those issues are there bubbling away as the emotional or social context, if you like, of the research data that is available. How you present it, when you present it and where you present it has all of that baggage associated with it.

Another part of what I want to say relates to what we have found for years in this part of the world. We were probably the first area in Australia to become salt affected on irrigated country. In fact, the first salinity impacts were evident in the 1920s about 100 kilometres from here, where I grew up. How to get the scientific evidence across to the farmers was a real issue over the years. In the early days—in the seventies and eighties—we depended upon extension officers on research farms. They piloted and trialled different sorts of things. That helped farmers, who could see what was actually likely to happen in an area near them, on land like theirs. At the end of the day, we found that the most powerful thing was engaging the farmers themselves in the research activity. When we were looking at soil mapping, for example, it was very important for the farmer to go out with the technician and the machinery, understand what the machinery did, be confident that it worked, know exactly what was behind it all and participate in the surveying itself. It was very important for them to develop salinity plans—in other words, stakeholder engagement was very important. That meant that they came face to face with the technicians, consultants, engineers and hydrologists. They got to know them as people. They sat down in working groups with them. That meant that the information transfer occurred both ways much more readily.

Today, we also use arrangements that are already in place—like land care groups. We use those, obviously, to transfer information. We also use things like the tanker drops in dairy areas. Every dairy farmer has a milk tanker drive into their property twice, sometimes three times, a day. They have a notice board in every one of their dairies. The tanker drop, as we call it, or the tanker driver will put onto the notice board any information that the dairy company—or any other agency that wishes to use that system—wants to transfer to them. For example, there was all the drought information for dairy farmers. There are 2,000 or 3,000 dairy farmers in this area nearby. I got through to them through the tanker drops by having the information pinned on the notice board in the dairy, where the farmer spends half of his day. That source is the most powerful one for getting written communication across.

If it is information about where a meeting is being held, what a web site is or what is going on, for a first look at how that information can be got to a farmer in the short term those sorts of vehicles are very effective. In fact, it costs less to provide the information in that way and, because it has come through their dairy factory, it is more trusted as information that will be of use to them. I mention that as just one example. There are other ways. If you are a cereal

cropper, you have regular contact with other sorts of agencies. Too often, we overlook those sorts of systems of communication.

The other thing, of course, is never to underestimate the use of radio as science communication. Farmers, in particular, spend a lot of time listening to radio, especially the ABC. When they are sitting on tractors, when they are in the dairy and when they are driving, they are listening to radio. A lot of very good preliminary information is transferred by a very articulate scientist or some other sort of extension worker via radio. Farmers will often say, 'I heard it on the radio. They also said there's a field day happening.'

Finally, we have institutions around here like Dookie Agricultural College, which is part of Melbourne University, and Tatura research farm, which is not far away. We have to make sure that those research institutions are also engaging locally with farmers, not just with students who undertake an undergraduate course. We have to make sure that local farmers have the opportunity to access very short-term courses. They might only be three-day courses or they might just be one-off workshops, but it is often much more effective for a scientist to go and use an institution like the ones I mentioned—institutions that have the facilities and that also have reputations for being user friendly, because they are based in the local area—to get across information than, say, to send out a pamphlet or brochure or to invite people to travel somewhere that is two hours drive away. It is much more effective to invite local land care groups to a workshop that includes a farm walk and a barbecue. So there are lots of ways to do it, and I am sure that you have covered a lot of those in your other evidence.

I just mention that first point about the sensitivity of salinity data as something that is always one of the barriers to simply putting all that you know out in the public domain when you are talking about salinity hazard. Salinity impacts on private property value and personal sense of self-worth.

**CHAIR**—We witnessed yesterday a farmer who bought a property next door that was affected by salinity. He saw it as a great challenge to clean it up, because he had done such a good job on his own place.

**Dr Stone**—Well, there you go.

**CHAIR**—So that was interesting.

**Dr Stone**—That is good. He probably had a significantly lower price to pay for it as well.

**CHAIR**—Possibly. Thank you, Dr Stone, for your evidence. It has been very useful to get that local feedback on implementation, because it is certainly an aspect that we are looking at with respect to this inquiry—getting that information through and engaging those people who have to implement the solutions on the ground.

**Dr Stone**—I would like to add as well—and I realise I am going on a bit—that our region is very multicultural. We have whole districts like Shepparton East where English is a second language. So a long time ago we employed extension officers, salinity officers—we call them irrigation research officers—with other language backgrounds. They work very closely with the Punjabi community, the Turkish community, the Italian community and so on. So, again, unless



you identify what those specific communication needs are and then deal with them, you cannot be surprised if a lot of people do not show up when you advertise something in English—probably at the wrong time of the day and in writing, when a lot of these communities are not necessarily literate either, either in English or in their home language.

**CHAIR**—Thank you. I now bring to a close this public hearing.

Resolved (on motion by **Ms Corcoran**):

That this committee authorises publication, including publication on the parliamentary database, of the proof transcript of the evidence given before it at public hearing this day.