Mulga Lands "Giving Effect to Science" Symposium

6 September 2007, Charleville

Conference Presentations

Official Welcome:
Mark O'Brien, Mayor, Murweh Shire Council

The dream is finally starting to come to fruition for me and the Murweh Shire. Over the past four years I have spent time with the Councillors trying to work out the future of the Murweh Shire and in fact the whole of south west Queensland. We all know about the decline of the sheep industry, you've got land clearing legislation and all that sort of thing, so we had to find a vision and a dream for where we want to be in twenty years time.

Through a process of talking to as many people as I could amongst this Council, I came up with a plan that has been adopted by South West RED which incorporates the shires of Paroo, Bulloo, Quilpie and Murweh, of rebadgeing the whole of south west Queensland as "The Home of the Natural Sciences". I will spare you the extended Mayoral version of that dream but I'll give you the sixty second one.

The idea in my head is this, that the rest of the world currently looks at western Queensland and its use of natural resources by looking back at white history over the last hundred years mainly, of cattle, sheep and goat industry, and then you go back to Mt Isa around mining industries there. South west Queensland's future should be known for how we can sustainable live in a semi arid, pretty tough environment. For those of you that live on the land and make your living that way, you know exactly what I'm talking about. Over the last five years or so with the drought that we've been going through. But in the same way that it's very difficult to live and be productive in a sense in this area, we can also find answers about the future, for a sustainable existence.

Now I'm really enthusiastic to be able to say, south west Queensland is now known as the home of the natural sciences. And without overdoing the bragging too much, only in the last couple of months the Federal Government have given us five point one million dollars to build the National Bilby and Endangered Species Centre in Charleville. And only two weeks ago gave us one quarter of a million dollars to upgrade the Cosmos Centre, new observatory and some other facilities. We're also working with the State Government, about the sale of the old research station at Croxdale to the shire as well. And that would be where the other education house which would be run by the high school as part of natural sciences and conservation facilities there for school groups. Also academics and scientists could come and spend some time there and use that facilities at the Bilby Centre and also at the Cosmos Centre, and for us to use science and education as the basis of our future.

So for me, three years ago I thought we needed to, and this is just a personal view, to progress this idea of a science festival, so we reinvigorated our festival as the Bilby Festival which runs through this week, through Endangered Species Week which culminates on Sunday with National Bilby Day.

Now that's become special for our community, and to his credit Geoff from South West NRM, he's had the idea that maybe we ought to start doing some science stuff, some discussion groups, having some symposiums like today, in order to get serious about this idea of natural sciences, and talk about where we should go. So for me, I am really grateful to Geoff and South West NRM for hosting this symposium.

I was really impressed at the array of speakers that we've got today, some of you I know better than others, thank you for your time and your interest in contributing to this. I know that the hall is not full, but that may actually help this year anyway in the sense that the fact that we can generate some discussion. I just really acknowledge Rachel and Geoff and South West NRM for sponsoring this, and taking the interest and time involved in organising it.

Can I just tell you, for those of you who are staying around for a couple of days over the weekend, we're going to have a dance and fireworks at the racecourse Saturday, and on Sunday morning at the markets we've been lucky enough to get the Australian Toastmasters Champion to bring five of his companions from Toastmasters to do a light hearted debate. I've seen this guy he's just a champion, Mark Hunter is an absolutely sensational debater. The topic of the debate is climate change so I suggest if you're around here I'd suggest you have a look because they've got a lot to offer.

Could I close in just again thanking you all for your participation and interest. I hope that this is the start of an annual event of its kind where people from around Australia, scientists, producers, anyone interested in sustainable existence will want to go to Charleville because there's great things happening for their science and education. I hope you will pass that on to your fellow scientists.

So I wish you well for today with the symposium I hope you get everything out of it that you came for, and I'm sure that you will find it interesting. And again thank you. This is the start of the dream, the start of the vision. Lets through today start to share our knowledge of what science is about and sustainable systems.

I would now like to acknowledge Uncle Bob and the traditional owners. So Bob would you like to come up here?

Traditional Welcome:
Uncle Bob Mailman, Bidgera Elder

My speech isn't as long as his. Thanks Mark, but good morning everyone, and on behalf of all the Aboriginal elders around here, the Bidgera people and so on, we welcome you. That was short and sweet.

Official Welcome:
Mark O'Brien, Mayor, Murweh Shire Council

That's lovely. I had an ongoing joke with Uncle Bob because some months ago it was really dry and I saw him around town and I said can't you, don't you know the rain dance thing he said they never taught me that one. Anyway he just tells me there was a speck of rain last night and he said he did that one, so the rule of the science is about.

Anyway thank you very much everybody for coming out, have a really great day and here's to the future.

Conference administration:
Rachel Greenfield, Consultant, South West NRM

We are fortunate enough today to have a wide range of speakers as Mark said and practitioner representatives to share their knowledge with us. At the end of every presentation we'll have a few minutes dedicated to questions for individual speakers and the afternoon will be dedicated to actually having a discussion forum so that we can see how the information and science that we know and that we learn about today can actually be considered in future planning for south west Queensland.

Conference proceedings are actually being recorded which is why we have the microphone and the flash room set up is in preparation for other events this week as well so it probably looks a little bit over done but we are sort of preparing for rain a few indoor conferences.

Just so that everyone knows bathrooms are located on the other side of the glass doors in the foyer. We've moved lunch and morning tea inside just to accommodate for any weather changes.

The only other thing is because of the horse flu we've got quarantine issues with this racecourse now so I ask if everybody could actually stay away from the stable areas and if you do want to go outside if you just stay within the white fenced areas. That will just make sure that we meet all our quarantine measures here.

If you're smokers you can't smoke in the buildings so you can either go outside, there's ashtrays outside on both sides.

And in support of National Bilby Day which is being held on Sunday, we've got some bilby merchandise for sale during the breaks as well.

I will now pass you over to Geoff Edwards, the CEO of South West NRM. He is going to be doing time keeping for us today and facilitating the flow of the day. So thank you very much for coming.

Introductory Address:
Geoff Edwards, CEO South West NRM

Thanks Rachel. We're not overwhelmed with residents of Charleville who've come here to hear science and I think that underscores the value of today, and the purpose of today.

As some people may know if they read the fine print in the documents, South West NRM which is the catchment body for this area is charged with preparing a new regional plan to guide natural resource management investment for the five years from July next year. And this regional NRM plan is a strange beast because it comes from the community it must be endorsed by the community it must be acceptable to landholders, however it also must reflect government policy because the two state departments and the two federal ministers won't sign off on the document unless its consistent with government policy. But yet it is not a government policy document and it must be owned by the community. So how we reconcile that I don't know, but I'd also point and in particular reference to the day, it must represent the best available science that's been accumulated in this area over the last four decades and longer. So before we even start to address the policy questions and the regulatory problems and issues, we must make sure that it is grounded in first grade science.

Now once upon a time I was a scientist myself so I can say I think that one of the problems with science is that the results of science tend to get published in scientific journals and the scientific journals are not read by every landholder and they're not read by every resident of the town. Similarly there's a large policy debate that goes on within government that's largely invisible to people outside government. There's huge numbers of documents and submissions and drafts and memos that circulate day by day right across government within the state and within the federal bureaucracy and between them, but most of that traffic is invisible.

And then of course we have a media debate. But to a large extent, these debates tend to go on in circles which don't overlap a lot. From time to time we have a hardy journalist, and we have journalism present today, that will try to cross these, build bridges across these sectors.

But the purpose of today's sector is to pick some of the predominant scientists and those who are familiar with the science that has gone on in this area and to ask them for an update, a summarisation of what they've learnt during their careers so that we can pick up this information and put it into the new regional plan.

So I suppose the internet has made it possible for the results of this kind of, these kind of presentations today to be distributed very widely, even if the people who take the benefit of that aren't here in person. So I would strongly commend to you the value of today and we are hoping that we will pick up a great deal of insight today that we can use as a foundation for the next regional NRM plan which will guide the investment by the state and federal governments in natural resource management for the future.

Enough introduction I will have plenty of opportunity during the day to bring you my thoughts on the proceedings. I think I might ask the speakers to use this microphone the hall is a large hall and I think the microphone will be helpful, so if I jump up and down and make strange gestures that is probably what I mean.

I'm going to introduce Peter McRae to the front of the hall. Peter's very well known in Charleville and in fact I went to the art show last night and the first picture I saw was a painting of Peter holding a bilby on the wall, which by the way South West NRM has purchased for our office. So can I introduce Pete McRae. In saying that I would be remiss if I didn't knowledge the state and federal government's who've given us money so that we can buy photographs of Peter.

Session One: Possibilities and the Potential of Science and Passion

Peter McRae
Queensland Parks and Wildlife Service/ Environmental Protection Agency
Save the Bilby Fund
Topic: Conservation of endangered species – The impact individuals can make to conservation and research priorities

Thanks Geoff. I'm not used to standing and having microphones in front of me. I like to be a little bit more casual and I'm hoping that today and particularly because there's only a small group here that we can be as casual and informal as possible, and we probably don't need this so you people can hear, but we do need it for recording purposes.

Typical of the nature of me the beast, I'm totally unprepared, and I'm not going to talk about what what's in the program because I failed to look at the program and see what I was supposed to be talking about until two nights ago and I thought ooh. And then I realised its threatened species week and some of you may be aware that it is threatened species week, this week, Australia wide and some of you may not do.

But threatened species was I'm not sure when it was gazetted, but we have a threatened species week and its to I guess to highlight endangered species. The issues of us losing species in Australia anyway. And its centred around tomorrow which is the seventh of September, which in nineteen thirty six the last pharlacean or Tasmanian Tiger died at Hobart Zoo on the seventh of September nineteen thirty six.

And I think such an iconic species like the Tasmanian Tiger which lived, has lived in Tasmania for many years and also used to occur on the mainland of Australia, and with the coming of human beings to the place the Tasmanian Tiger couldn't deal with the things that were associated with human beings.

And that's it's a tragic story I guess, but its something that's worth remembering and not a lot of people are, we take life for granted, and we don't think about all the other elements on the planet, the biosphere that make life possible not only for all these other species the plants and animals, the insects the viruses the bacteria, all these living things that the wonder of life is so complex. And yet we as human beings, as one species in millions of species living on this planet, are the only species that has this computer up here on our shoulders that makes it possible for us to think about things.

Ants, as far as we know don't think. Horses don't think, beetles don't think. They don't have meetings, they don't have forums like this, they don't pay taxes. There's millions of species out there just like us, have to suffer and deal with the chance of life. And we, as human beings the only species that can think about this, often don't think enough.

And I think its important for us not to take life for granted and we as human beings do it so readily. We take life for granted and we think that life on the planet is all about us. And I think that, that attitude, is changing a little bit, now. And the interesting thing about changing attitudes to life is when the big planet lets you know that something's going wrong, all of a sudden us human beings don't feel so powerful.

Tsunamis can do enormous damage in a short amount of time and we've got no control over it. Diseases, epidemics, plagues, whatever they may be, continually remind us human beings that we're just another form of life on the planet. But we're so different that we got this, and I don't think that we use it enough to think about how important all those other life forms are, in making the planet suitable for us to live here as well.

That's just a little introductory thing that I thought I'd talk about, and I think its important that it it's a critical thing. If we're going to change the way the planet is, and everybody talks about sustainability and I think it's a phrase that's used or a word that's used so freely and often these days that it really doesn't mean anything and I think it's a homocentric term. Its more about sustainability of human beings. And I don't think human beings per say I mean all the things that human beings do. We're attaching this sustainability to the things that we want to do and I think there's more to it than that and I think we could possible discuss that later on today.

So having made an excuse for not talking about what I was supposed to talk about on the program I thought, being endangered species week or threatened species week, the theme from our department, the EPA, has a water base and I thought ooh, that's fits in with what, things I've been very interested in, in terms of water in the landscape and the impact of water in the landscapes in these arid and semi arid parts of Queensland.

So I was able to draw upon a Powerpoint presentation that I did for the Ecological Society a couple of years ago. And I thought ooh, I can get out of this easy and I'll just get it and I'll put a couple of extra little things in it and talk about, put it into context anyway, with what the impact of human beings are on these arid and semi arid landscapes and so bear with me for one second and I'll try and find it here. You can talk amongst yourselves while I'm doing this if you like.

We invented technology. Its not natural, ants don't have computers.

(*How Ecologically arid is our arid zones? An example from the Channel Country - Slide 1*) Aha. Now I sort of like looking up there rather than looking down there so I might just turn around this way a bit. You can probably hear me anyway. How's that? Well that's self explanatory.

I guess I've been out here in the west for twenty three twenty four years, and I was lucky enough, working for Queensland Parks and Wildlife Service to be able to become involved in doing bilby work out in the Channel Country. And its all very fine when you go out and people think oh wow bilbies are beautiful and you know it must be fun and all that sort of stuff, and I was started doing the basic things. Things that we didn't know about bilbies, basic things like what they eat, when they breed, how many young they have, how far they move, all of that sort of basic biological stuff that we really just didn't know about wild populations of bilbies. And the main reason behind all that was to address the issue of why were these things that used to be everywhere only in this very small area in far western Queensland, or south western Queensland, in Queensland, in the Australian context they're in a few other little places too but they've disappeared from you know from ninety percent of their former range and seventy percent of mainland Australia.

And one of the interesting things once we started finding out something about the basic biology of these critters was that they're not specialised in I mean every life form's specialised, but they're not specialised in a way that they need special things. They don't eat in special ways like echnidas only eat termites and ants, koalas eat a variety of Eucalypt leaves and nothing else. Bilbies will eat anything they'll eat small mammals, they'll eat small reptiles they'll eat mostly insects, grasshoppers, bugs, termites, ants. They'll eat underground fungi and seeds so that they've just got a broad dietary range, so they're not specialised in any way in that sense, dietary. They also don't need to drink water and that helps obviously if you're living in the arid zone, but they're not an arid zone specialist. Some species that are restricted to the arid zone and to the deserts have a very specialised physiology that allows them to concentrate the water usage and to do all sorts of things to make them highly specialised for living in deserts. Bilbies aren't that specialised but they have enough physiological and biological attributes that allow them to live in those harsh areas. But they also used to occur on the Darling Downs in Queensland and they used to occur right up to the range to the eastern ranges and they've disappeared from those areas.

So once I started finding out about a lot of the basic things about what bilbies do you've sort of got to try and address why have they disappeared, what's gone wrong, why are these things there and not in Charleville right now or why aren't they at Roma or why aren't they somewhere else? What's happened? And that's why I guess after sixteen seventeen years of looking at these things you start to come up with some answers and you sort of think when you get the answers, wow that's so simple. And it is among biology and field biology is like that its people say well how does this work or what does this do, and they think that scientists know all the answers. But very quickly you realise once you're out studying a wild animal in the field that you know jack shit, and it takes a long time to find out the really basic things. And then to piece it together into a broader ecological framework takes a lot of using this thing up here. So its fun doing it but I just want to take you on a little bit of a journey about what I've been doing out in the Channel Country and how the impacts of I think human beings have, or part of the impact anyway, that has contributed to the decline in bilbies.

(*Slide 2*) The area I've been working is out north between Birdsville, Bedourie and Boulia. Out in the Channel Country right on the edge of the Simpson Desert, and an area of about eighty thousand square kilometres. And it's the only eight hundred eighty seven thousand square kilometres, and it's the only area that bilby populations occur in the wild today in Queensland. And in that area there the populations are very very fragmented and isolated and low in number so they're just a little dots of a few bilbies here and a few over there.

(*Slide 3*) I'll give you an idea of climate and most of you probably don't need to know too much about the climate out in those areas, but its desert environment, hot in the summer, cold in the winter and dry most of the time.

(*Slide 4*) To put it into context to how dry it is, if you compare Birdsville annual mean annual rainfall to most of the capital cities in Australia its way down there in the bottom.

(*Slide 5*) But occasionally it does flood out there, and the Channel Country, as its name suggests, has its an amazing landscape if some of you may or may not have been out that way but its an amazing eroded landscape which is generally endlessly flat. But its permeated by this network of river channels that drain from the north, up around Mt Isa and Cloncurry and around those sorts of areas. And whilst the local rainfall is very low sort of around a hundred and sixty to two hundred millimetres a year, every so often with the big rainfall events monsoonal influences, what the catchments of the Diamantina and Georgina and the Mulligan Rivers to the north and the Cooper to an extent too, the catchment for those big river systems is hundreds and hundreds of kilometres north or this area. So on average every two to three years you get these big rainfall events on the well up in the north and they send huge amounts of water down these big major channels and you get, because the area's so flat you get these enormous flood plains that can be twenty and thirty, forty kilometres wide and they are just pulses of biological activity in an otherwise very dry landscape. And its fascinating to see the effect of those pulses of flood rainfall that doesn't isn't local. It says it all up there I don't really need to say that do I?

(*Slide 6*) Just to give you a bit of an idea of the catchment versus the local rainfall.

(*Slide 7*) Another interesting thing about that area is that it's a big area and the properties out there, the cattle stations, are big properties. Davenport Downs is one of the places out there and its about nine thousand square kilom nine thousand square miles in area. So you compare that to the sizes of prop average property sizes around here in the Mulga Lands its just a different scale. And there are only about seven or eight landholders out there I guess or properties out there, particularly in the southern part of that area that I'm talking about. And those, most, the majority of those properties, seventy four percent of them are company properties. And by company properties I mean they're owned by the big companies the AA's the Stanbrokes the NapCo's those type of places, those people who have got a network of properties strip spreading from the Northern Territory down through Queensland into New South Wales. They've got feedlots they're big operations with big budgets. And I think that's had quite a major impact on the way the land out there has been managed.

And I guess what it means is that that landscape out there is very fragile. Its an ephemeral area in terms of it responds quickly to rainfall, and plants can disappear very quickly. There's some perennial obviously some perennial plant elements out there too but its dominated by an ephemeral plant, by ephemeral plants that can grow, set seed and flower within five or six weeks some of those plants and its an amazing landscape that can do this. Obviously that doesn't lend itself very well to cattle grazing because the times available for feed food for cattle can come and go like this. The addition of water though and flooding water can make a big difference and can allow grazing to extend over a bigger area.

One of the things that the big companies can do, unlike a smaller private enterprise, is that if things, if you get into a drought out there and things, and when its dry out there everything is dry. The plants just die there's just nothing to eat, for stock, for livestock domestic livestock. What the big company players can do is they can say okay, its too dry here I've got to get twenty thousand head of bullocks out of here tomorrow. And that's what they'll do and you'll see road trains coming from the horizon, out, the dust and stuff and they pack up their twenty thousand head of bullocks and they take them somewhere else where there's something else to eat. The big players can do that. Small, smaller operations who are depending totally on the block of land that they've got which is the case here in the Mulga Lands and to a certain extent in the northern part of this area that I'm talking about, can't afford to do that.

So in some ways the Channel Country in that part of Queensland is in pretty good condition because I think largely its as a result of these big company players being in there and being able to respond quickly to dry times when there's just not pasture about for stock to eat. So I think that's one big thing that has made a change and has allowed something like a bilby and other species to exist out there. The landscape's not, lets say its not flogged as much and its in a much more natural condition than areas that we experience here in these Mulga Lands.

(*Slide 8*) I probably don't need to read all that out you can read it and you are probably all aware of the things that are threatening processes for native fauna in Australia and the ecology of native fauna.

(*Slide 9*) The situation in the Channel Country which is what I've been just talking about not all of those things that impact on endangered species and other things occur in the Channel Country. So there's no agriculture in the Channel Country so that's not a problem, there's no urbanisation and yet I put a cross where that doesn't apply in the Channel Country the same with changed fire regimes, there's generally most times not enough biomass there to sustain fires at all in the Channel Country. Its different if you go into central Australia where there's big Spinifex communities which do sustain fires but the Channel Country hasn't a long fire history and as such it hasn't modified the landscape too much. Weeds and the exotic predators, yes and no. The last one is the one that I want to talk about mostly and its artificial water.

(*Slide 10*) When I first started looking at bilbies out there, everybody was saying to me that grazing is the problem. You know you can't have grazing and expect to have these endangered species running around too. And fifteen, sixteen years ago I used to subscribe to the same idea, that that might be the problem.

But on reflection and for the reasons that I was talking about before, grazing's not really the problem in the Channel Country anyway as far as bilbies are concerned. Because of the nature of the landscape, the density and the biomass of the plants and the size of the properties, the stocking rates are relatively low, and spread over huge areas, so that the impact over big areas is not huge. And I think the fact that bilbies can still survive in the presence of that, the level of grazing is the main reason that they are surviving in there because the stocking rates aren't high. And so I changed my mind about grazing in the Channel Country and having an impact on native fauna. It changes a little bit around water obviously as you get a greater grazing impact and usage of water and stuff which means locally you get some degradation. But locally is only a small spot on a two thousand square kilometre paddock and so its not really too much of an issue.

The other thing that I've got there and this might make people sort of think, stop and think a little bit is an increasing desire for a better utilisation of existing areas is the problem. And I guess from a producer's point of view better utilisation is obviously an ideal in terms of property management and livestock management, and profitability and sustainability all those things that people talk about.

(*Slide 11*) But I sometimes wonder whether better utilisation by adding water is really the best thing for the ecology of native species. Sure it's the best thing for domestic stock, but in terms of adding water to a very dry environment where the plants and animals that are living there are used to surviving and doing very nicely in an arid ephemeral landscape, adding water for domestic stock to me is a bit of a no no or its something that we really need to look at and be aware of.

(Slide 12) I will let you read that this is Francis Radcliff was in 1935 was a guy who came out from England and he was a naturalist I guess and in those day's naturalists where they weren't scientists but they were pretty switched on to lots of things, and he came out and did some work with CSIR which was a pre cursa to the CSIRO and he wandered around in Australia and he came out in the early 30's and he came back in 1962 and he made some wonderful insights into

(Slide 13) Australian landscapes way back in the 30's. Well that's Radcliffe again and that's a very nice bath tub out at my camp and it gives you an idea of the landscape where bilbies are living it's this amazing tree less flat Mitchell Grass plain on it's called Mitchell Grass plains but it's really a cinopod dominated community which is salt bushes and mariana's and sciroenas but there's all sorts of things but there's little patches of Mitchell Grass in there too. And in the middle of it is a really nice bath if you get dirty but I don't get dirty very often so I don't have a bath very often.

(Slide 14) So and I started then looking at once I started to get a feel what Bilbies were doing and what might have impacted on them and contributed to their sort of decline from other areas, I started looking at this water thing and started looking at the artesian bores that are spread all through that Channel Country and I thought why this is interesting and I thought what if there's any relationship between the bilby numbers and where bilbies occur in relation to water.

Not from a grazing perspective or an impact of grazing as a result of water, but more of a predator perspective where water or artificial water was providing water for things like dingoes, foxes, cats that sort of thing. I thought it was a long bow to draw but I'd just have a look at it so I started looking and going back and looking at the history of when artesian bores where put into that part of Queensland in the Channel Country and it's interesting to see back in 1900 that there was about eight bores I think in that part of Queensland and up until well I don't know how many there are out there now but it gives you an idea of the artificial water explosion of artificial water in a very dry landscape.

(Slide 15) Graphically I've sort of tried to represent it spatially to show you just 1900 spatially where the bores were

(Slide 16) 1930 a few more blue dots

(Slide 17) 1970 a few more blue dots

(Slide 18) 2000 a few more blue dots

(Slide 19) Then I went through and added tanks and dams I digitised off the 1 : 250000 topographic sheets and I went through to get as many earth dams and tanks and things that had been put in to addition to the bores.

And once you do that you see the transformation of the very dry arid landscape that periodically gets water from those big river channels coming from the north but most of the time it's dry and then all of a sudden we've got these little toilet blocks or shower blocks all over the place and all of a sudden to me the landscape becomes ecologically not arid or semi arid anymore because there's all this additional water that's available for particularly introduced feral pest animals. Particularly foxes and cats and to a lesser extent dingos, dingos have been around for six or seven thousand years so the impact of dingos is different on native fauna.

I mean lots of people complain and legitimately complain about dingos and domestic livestock grazing stock in domestic areas, particularly in sheep grazing area's particularly, but from a native wildlife perspective dingos probably aren't as big a problem and one of the things about dingos is that there's some, there's a bit of evidence that suggests that dingos also have an impact on keeping foxes at bay in some areas and high densities of dingos will generally mean very low densities of foxes and because foxes are a little bit newer to the ecologically of Australia they probably they do present a much more serious threat to native wildlife than dingos do.

(Slide 20) Why am I out here?

(Slide 21) The Greater Bilby, but you already know all that.

(Slide 22) Just to give you an idea of the contraction in the range or the decline in the range of bilbies in Queensland, I've put together a little series of maps that show where bilbies used to occur when Europeans first got out here and this is the bioclean estimate based on the estimation based on specimens and climate data. And there aren't a lot of specimens so the bioclean data doesn't necessary is not the best thing we get but it's the best thing we can get with the few specimans available from those times.

(Slide 23) 1936 is the estimated range of Bilbies in Queensland.

(Slide 24) 1970, so you can see the contraction going on.

(Slide 25) 1994 and the little red bit in the middle there 2000, so it about 98 percent reduction in run or contraction in range over a couple of hundred years so it's pretty dramatic for a species like the bilby, which is as I said not a specialist in terms of what it eats it breeds quickly it doesn't need to drink water its, this sort of thing that it almost should be a pest and yet it's declined by 98% of it's former range and if that sort of things happening, we're doing something drastically wrong.

(Slide 26) So what I did looking at the artisan bore the proliferation of waters out in that Channel Country, I wanted to see if there was an impact at all with bilbies with all these new bores around the place.

(Slide 27) So what I did I got all these bores, and I put a ten kilometre radius, a circle around each of the bores to get an idea of how much, particularly from a predator from a fox, dingo, cat perceptive what an area could be where that water might influence native populations particularly of small mammals in relation to increased usage of those waters by foxes, cats and dingos. So I basically said okay these are all these points where the waters are, lets draw a circle about ten kilometres from where they are and say these areas are most likely to be impacted by the effect of that water being there. Then without knowing anything I just plotted all my current bilby records where there are active populations of bilbies throughout that whole area I just plotted those in and stuck them of the top of it and to my amazement, that's what I saw.

It was just that where ever you were basically ten kilometres or more than ten kilometres away from an artificial water source, bilbies where occurring. Now its not as simple as that, but and I haven't I haven't got a substantial amount of data to measure if that's what's really happening but to me graphically it tells a pretty good story, is says okay they used to be everywhere, particularly in this part of Queensland and now and they're only occurring in these areas that are well away from artificial water sources.

There are some additional water sources that have been added into the landscape in recent times and there are more that I haven't added on that, but what's happening with the GABSI scheme that DNR are running, is in terms of water conservation, most of these bores out, well bores everywhere, but the ones out in the Channel Country in particular I guess, when they where first put down, artesian bores flowing bores were just opened up and let run in bore drains and forever and ever and ever and they just spewed out water for twenty four hours a day.

And the bore out at my camp out at Astrebla Downs National Park was put down in 1903 and was flowing at about seven hundred or eight hundred thousand galloons a day into a bore drain that was about twenty five kilometres long in winter, and about seven kilometres long in summer, and this in a two thousand square kilometre block a two and a half thousand square kilometre paddock which is now a national park, that used to run, and if you put it in context with the scale of properties here, it's a two and a half thousand square kilometre paddock and it used to run, they used to run two thousand bullocks in there, Brahman bullocks, when there was something to eat.

So this water which it just flowed from 1903 right up until well it's still flowing now but at a very reduced rate its basically dribbling now but it was just wasting water and DNR realised that and everyone realised that where wasting water if we have these bore drains and bore, flowing bores and bore drains just spewing water out where ninety five percent of its lost to evaporation and seepage and things and three or four percent is available for stock. So admirably, water resources said okay lets get on to this lets recondition these bores lets tap them lets reduce flows lets put tanks in, and stop evaporation and make it better, well huge water conservation effort and from a pasture, from a grazing enterprise perspective it made sense too because you where saving water and you could put waters where you wanted them.

The big problem I see with it is that there's a point water source where a bores is, which once upon a time provided water for anything that was coming into it, now with these water conservation efforts and piping away from bores it means that all of a sudden instead of there being one water source for potentially for dingos or for foxes or cats, there can be three or four or five water sources, five and ten kilometres away that previously weren't watered. So to my from my point of view the piping and refurbishing of point water sources is wonderful water conservation outcome but in terms of what is does to the potential for increased predator population is something that we really have to think about seriously.

And I think if we're not going to lose a lot more of our native wildlife we have got to come up ways of saying okay what can we do about all these additional water sources? Can we exclude predators, can we be more vigilant with controlling predators, exotic predators, and I think if we don't do something like that we're going to run into trouble and we are going to lose a lot more species.

(Slide 28) I'm not sure what it means, but the picture reveals a telling story.

(Slide 29) You can read all that, I don't need to tell you much about that.

(Slide 30) The problem species, and I have been talking about dingos, foxes and cats, and they're the problem species for exotic species for bilbies.

(Slide 31)

(Slide 32) Talking about dingos and foxes, I started, there's a fair bit of anecdotal evidence that I mentioned it before that foxes tend not to occur in areas where there were high densities of dingos, and everybody sort of talked about that over quite a few years, but there was no substantial evidence that suggested that that was the case. People just had feelings that that was what was happening, there's a little bit of evidence coming out now where there's some work being done on dingo and fox interactions, but not much, so I started to looking through the literature and found this Lands Department report, rural lands protection board or something like that in Queensland in 1951, and it had this amazingly drawn map, hand drawn map of dingo scalps and fox scalps, and dot by dot this had been done in ink on this map which was only a map this size in a Lands Department report and it had the map of where fox scalps had been taken and where dingo scalps had been taken.

And I thought wow this is amazing. So I digitised it and there were something like in the dingo one I think there's something like twelve thousand dots. And I scanned these old maps from 1951 in and then digitised them not on a computer but on a digitiser, something like twelve thousand dingo dots and seven or eight thousand fox dots. And they were separate maps but I just I looked at them individually, fox and dingo, and thought well there's a bit of a pattern there, I'm going to digitise these and overlay them and see what happens.

And that's what I came up with and I think it shows fairly clearly that where you've got reasonably high dingo densities you get reasonably low, or absence of foxes and its probably the first bit of evidence that supports what people have been saying about foxes and dingos. I thought it was just a really nice little exercise even though it was painful doing it, it was worth doing it.

(Slide 33) And that's I guess the main thesis of what I'm all about is just artificial water and I won't bother you by reading it you can all read that yourselves.

(Slide 34) Francis Ratcliffe again. Its just a wonderful insight.

(Slide 35) Blank.

(Slide 36) This goes on to what I was saying before, you know the bilby is a non specialist omnivore, it has no strict habitat preferences, it has a high reproductive output, shows little or no seasonality in breeding, is semi fossorial so its living underground, two metres underground, strictly nocturnal, so its not exposed to dional predators, birds of prey, goannas that sort of thing, two metres underground dingos can't even dig bilbies up. So all these things mean that we should be running over bilbies on the road, there should be road kill bilbies, and there aren't. So we're doing something wrong.

(Slide 37)

(Slide 38) Meow. Meow. This is a five five and a half kilogram feral cat that I shot out at Astrebla Downs National Park in May 2004 or 2005, I'm not sure when it was but I hadn't seen a cat for a couple of years out there. And shot this one and opened its stomach up and lo and behold there's a bilby tail two hind legs from a bilby, a couple of dunnarts, and a rat. And that's that was about eight thirty at night so it was probably the first meal of that cat you know from six o'clock or something in the afternoon until eight o'clock at night. So its one cat in about two hours. That was what was in its stomach and I think its everybody knows how bad feral cats are and I think we've got to do something about that and I think the obligation we have, in terms of the cat situation is as a community, make people aware, really make force the issue in terms of what cats, cats have a wonderful role in human society and in terms of pets and companionship and I'm not against that, but we've got to be really responsible for dealing with stopping any further intrusion I guess of feral cat or domestic cat populations getting back out into the wild otherwise we probably can't deal with the wild population of cats now but at least we should be trying to. *(end of slide show)*

That's all about the Channel Country and I've tried to put it into a broader context of the same issues apply in the Mulga Lands as what they do in the Channel Country. It's the more water the more problems you might have with introduced predators which are going to have impacts on native fauna.

So very quickly, last night to really have some Mulga Lands emphasis on this thing, I got the data together for bores in the Murweh Shire Council. And very quickly, and it was done at about half past ten or eleven o'clock at night and I had had a couple of glasses of cordial so it wasn't as professionally done as I would have liked, but I just wanted to get it so that I could show you that the same sort of thing happens, or has happened, everywhere. And this is just the bores in the Murweh Shire Council.

(Slide 1) Nineteen hundred, and its interesting there was something like a hundred and forty six bores there at the turn of the century, and the Murweh Shire Council the Murweh Shire area is round about forty seven thousand square kilometres. The area that I was looking at in the Channel Country scale wise was twice as big as that eighty seven thousand square kilometres and in 1900 there were eight bores in the Channel Country in an area twice the size of in here. And in 1900 in here there were a hundred and forty six or something bores.

(Slide 2) Nineteen fifty a few more blue dots.

(Slide 3) Two thousand and five quite a few more blue dots. And the bore dams and earth tanks and things like that I didn't have time to do that last night. But I think its just a reminder for people that these arid and semi arid landscapes, when you overlay that much water in these landscapes, its not semi arid or arid much longer. And this is not for grazing purposes I'm not talking about the impact of those waters on the other species that are benefiting from them, and the impact they're having on the native plants and animals.

(Slide 4) Thank you.

(Questions and discussion)

Geoff Edwards
CEO, South West NRM

We might just about pause there. There's an interesting lesson here because I was associated with the bore piping program during the early days of the Mulga Lands Strategy and we thought we were doing great strokes. We had no idea in the early nineteen nineties about ninety three ninety four, no possible idea that the bore piping program would extend water way out into the landscape and that that would then have an ecologically detrimental effect. Never even crossed our mind. So I think there's a lesson there for scientists, and policy makers and decision makers and pastoralists, we never have perfect knowledge, and we never know what's lying around the corner.

I think Rachel has got a bottle of red cordial here for Peter, so I'm not sure whether I'm supposed to pass it over now but thank you very much Peter.

(Morning tea)

Session Two: Changing Landscape Dynamics

Geoff Edwards
CEO, South West NRM

Alright it is my privilege to introduce Dr Ian Beale now. Ian is one of those rare individuals who is both a landholder and a scientist and he can brings experience from both. In particular, he was head of the Charleville Pastoral Laboratory for twelve years and he's been studying the Mulga Lands since 1965 I understand now we at South West NRM have contracted with Ian to collect some of the anecdotal knowledge some of the insights and some of the unpublished records so that they're not otherwise lost in addition to what's already been published. So would you like to welcome Ian to the podium.

Ian Beale
Scientist and Grazier
Topic: Vegetation change in south west Queensland

Thank you. Anybody that read the title of what I am supposed to talk to today I'd better do another change because in a way this is the past revisited because in 1999 only because it was the south west NRM I gave a session which was called Vegetation Change in South West Queensland so this is Vegetation Change in South West Queensland number two. And I'll start by revisiting a summary graph of the tree cover effect and if anybody wants more of a background of it etcetera we'll go into that later, but basically in this area the pasture production potential anybody that wants to call that ground layer potential that's fine I won't argue is about the same from zero percent tree cover canopy cover to round about ten percent. Then it declines very steeply and so by about thirty percent cover you're down to about a quarter of the potential. If can you see around me? I can turn sideways um now that obviously the effect of what's happening down on the ground is pretty drastic even more drastic when you take the rate of thickening in and my punch in 1999 was Beale's rule of thumb was about one percent per year so the peak to the trough you'd do in about twenty odd years.

I've had various supposedly eminent type people tell me that this can't possibly happen according to the way they calculate it but I just wonder what they've been using for eyes when they drive from Morven to Charleville because most of that mulga along the road wasn't there when the lane was fenced off and the road was bichamened in the 1970's. And that's gone from nothing to harvestable in about thirty years.

There are other examples which I could produce but that are doing the same thing at the moment but some of the flow on effects of this are one, on the ground cover, and Peter McRae and I are not going to have an argument on utilisation levels and so forth on that because in amongst the work that came out of Charleville Pastoral Laboratory was a ball park figure that you shouldn't utilise more than about thirty percent of what you were seeing from your summer growth and that fed right through the livestock side there was an optimum level of production etcetera and it went a fair bit over the squiggly widgets etcetera as Gus McGowan would call it.

The other thing that comes up is the and its usually in the context of buffel grass now I've got a short summary of the status of the buffel grass but we'll leave that to the discussion part because it doesn't really fit in here but I'll what I will find out is if you have wall to wall buffel grass then your diversity index isn't very high. But don't you anybody try and tell me that if you have wall to wall mulga and bugger all else that the diversity index is very high either. And just because one's supposedly imported and the other one's native, come on.

The another effect is in water relations and sometimes I have to ask people what brand of calculators did you use to work that out because I'll make sure I never buy one. And one of them is the water relations in these thickening woody areas and I hope nobody in this hall was a signatory to the Brigalow Declaration because if you were I'm going to award you a failing grade in landscape ecology. And that is because somehow or other as these woody species increase we're supposed to be able to run more squiggly widgets.

Now anybody in commercial agriculture knows that if you're going to have more plants that you'll more you'd better have more water. And there are various things about water in semi arid and arid that I'll get to eventually but basically if you're going to have thickening trees you're not going to have more water. And so the yield of good stuff goes down. And so the potential squiggly widgets go down too. And so the thickening of woody species has ramifications for the wildlife side and its got ramifications for the management with fire which is what hindsight suggests was kept these mulgas and so forth under control previously.

Now Peter's left brought some things up which fit in to what you might call the first fallacy of academia, particularly university type. Now that is in university academia if you get ninety five percent you're pretty well assured of a high distinction or whatever its called this week. It takes a fair bit of adjusting to work out that once you get into real life you can have ninety five percent and a right bloody cock up at the same time.

And one of the things that gets mentioned is that we need better grazing management and one of the prime requirements for grazing management is that you can control time and severity of grazing. And we have all of these kangaroos grazing uncontrollably. Now in fact I'll make a punt here, today, that we're well on the way to end that because I suspect like we're going to find out like in Western Australia that we have the roos move down the hills and down onto the flat country that we're having the same thing happen with the wallaroo population. And I suspect partly because the hills are where the feral goats start off, the hill country is amongst the timbered country which people like me can't do anything with anymore. And, this is a recent couple of photos and I probably over shot them there, sometimes I can drive these things, this is along a fence line on our place and you've possibly heard people talk about the better effects that soft footed kangaroos on pasture damage etcetera or it seems to me that anybody that talks about a soft footed kangaroo didn't have much of an inspection of a kangaroo hopper to start with. And the second thing is that around our area we seem to have invented a kangaroo claw cultivator.

Question: Is that a version of a plough?

Probably better it goes over the stuff better I think, Chris. Alright now probably ten years ago I didn't expect that I'd be up here doing this but definitely what I didn't expect to be able to have to tell you about is the astounding widespread lack of knowledge of available published information for this region.

Some of you will know that this is lately has been up to the level of the Federal Minister for the bloody environment. And so this started me thinking well why because one I can read, I'm quite familiar with the literature and why can't other people find out about what's published? And so that, the question to ask is did does the world now begin with CD ROM's? And it, if it does, then Einstein must have been sighted by someone pretty recently because otherwise he wouldn't be there, but I can't actually answer that question for you.

But the next one, as anybody who's familiar with the internet knows, is Google. So some time ago a friend said oh you ought to Google yourself and find out what they've got. Well I should tell you we're probably one of very few households in Queensland I guess, where the TV's sent to hooked up to a video but it never got hooked up to an antenna. So my first go was "Ian S Beale", in complete absence of knowledge that East Enders character called Ian f-ing Beale. But I can assure you that didn't add a lot to the mulga knowledge. So I tried "I F Beale". And there are reams and reams of pages around the theme of "if Beale Street could talk". But I'm no W C Hanley either. So then I tried "mulga tree thickening" and in terms of learning any knowledge of the area, didn't strike out well there either.

I would have to say that when you go Google scholar they do have a pretty fair selection of publications by Charleville Pastoral Lab authors which is usable if you know who the authors were. And unfortunately for Mark's visions of what's going to happen in the area, most of the authors have come from a world class rangeland unit called Charleville Pastoral Laboratory, to a place to be from. So it would have it wouldn't be widely available knowledge as to who the authors were.

And with things that I have to deal with, particularly from a property basis, the effect of this is obvious in vegetation management, some of these things I'll allude to without going into further detail. In this, dryland salinity, now why there was so much bloody time and so forth and hazard maps and etcetera on this dryland salinity and the Queensland Murray Darling Basin when the Queensland Salinity Management Handbook 1997 known by Gus McGowan as the little golden book, states bluntly that in Queensland, the chance of dryland salinity in under six hundred millimetres of rainfall is negligible. And this has to do with the potential evapo-transpiration being so far ahead of available rainfall that there just isn't enough water left over to go anywhere. But I have to keep telling people what that question this that around our area that the standing water level is about three hundred feet so we've got plenty of scope for bloody raise and.

One of the mantras that we're getting lately is that you can apply to thin trees out. What happened to the results in central Queensland that have trial work on response and economics that said well yeah you physically can, but it'll never pay. The trees will beat you.

And then we have agroforestry and just recently I was at a field day and it was explained of what you could do and so forth and how it had to be back in remnant in twenty years etcetera and to summarise it in terms of the increase in ground layer that you might be able to graze, production and economic wise the result was about three fifths of five eights of a proverbial number and even less if the discount of thirty percent hadn't been put in and which I'm not sure, but then we've got potential cypress pine for timber. And the gillet was brought up that the stand that started the mulga Mungallala sawmill with best forestry practice isn't yet ready for reharvesting and that was more than fifty years ago. So I think the only people around our territory that would be taking on agro forestry and thinning are the bold ones who figured they're going to get a rolling start on the current vegetation management being declared past its used by date within twenty years.

And all of this leads me to commend South West NRM for taking on the project to try and get this information from where it really isn't hidden to where it might be easier to find, and get people to take notice of. Or are we basically dealing with a mixture of spin doctoring ignorance?

And you can get, bringing Einstein into it again, the theory of relativity was a unifying influence in physics. But to my knowledge there's been no nobel prize awarded for a similar finding in biology. And which I will emphasise to you that rangelands are different. And this one size fits all ie management philosophy will not work.

And its like the mechanic working on your prize vehicle, only having a shifting spanner in his toolkit and you'd be most impressed with that. And to embroider on that a bit there's a saying about how you can fool all of the people some of the time and there's usually only three lines in that statement. But there's a not usually known fault line which I'm not going to tell you.

But I will give you a quote from Jennifer Mahorahassy. That if you leave data inconvenient to your thesis out, the data does not go away. And while you may fool some of the people some of the time, you will not fool an ecosystem. And it will only abide by regulation performance requirements on its terms, and I suspect things like this are going to force changes in vegetation management. Now this is in the realm of this, if necessary it is easier to beg forgiveness than it is to get permission. And I've recently had some dealings with Rangelands Australia. And one of the things that interested me very much in was the result of their focus group meetings which were right across the rangelands Australia. And they put that together that unusually they then winded up with what's available from tertiary and TAFE courses across Australia. And a resident of the rangelands wouldn't be at all surprised to find out that it didn't line up at all well. And I suggest to you that that's how we got the Vegetation Management Act we had to have.

So I'll give a little plug here, we need to have the people of the rangelands to be the voice of the rangelands expressing the knowledge of the rangelands with the qualifications of the rangelands. And the commercial is that my wife Janet and I are among the group that are champions for Rangelands Australia so if anybody wants to know any more we'll do that later. Thank you.

(Questions and discussion)

Geoff Edwards
CEO, South West NRM

We are delighted to have someone of Ian's status and stature to talk to us today. Ian would have an unparalleled knowledge of the science and the experimentation that's gone on. There is a parcel under here for you Ian but I need to make sure I give you the bilby wine and not the bilby red cordial so I'll give that to you afterwards, thank you very much.

I think Ron, are you able and willing to speak? May I introduce to you Ron Akers, Ron is an eminent and prominent buffel grazier and was described to me the other day as being well ahead of his time in insights and observation of the country. And Ron's speech is a little bit softer than it used to be so Hugh Brown from the Department is going to deputise him and delivering his presentation. Would you like to welcome Ron and Hugh.

Hugh Brown
Vegetation Client Liaison Officer, Department of Natural Resources and Water

Thanks, Geoff. I hope I can make up for Ron's limited volume, he used to have a strong voice. We go back quite some time I suppose, he is a friend of my wife's family and he also came and did some experiments on "Lanherne" the property we owned at the time and ran sheep and cattle. I have some experience on the Mulga Lands, we were land managers on "Lanherne" for twenty years. I came out to the Mulga Lands in 1970, I think it was, working for the Australian Estates Company at "Thylungra" after other properties they owned around Queensland. My father- in- law was a land manager for thirty years in the days prior to when we went to "Lanherne", and, he told me in no uncertain terms of the hardships, issues and so forth in the Mulga Lands. So, I also have quite a lot of accumulated experience around the place.

I would also like to take this opportunity to acknowledge the other scientists that are here today who have done a lot of work over the years. It is very, very, good to see "Bealy", Doctor Beale, deliver his papers When I went and spoke to him this morning he said, "Doctor Beale today!", and I must acknowledge that.

The other information and science that's around and not readily available is really really sad, because there's been some enormous work done, some very very good science.

I think as graziers, we all acknowledge that. It is really important to understand what's come before I left land management and left Charleville in 2000 so that we we might better plan our future.

I sold "Lanherne" in 1998, and I had quite a lot to do with South West Strategy Natural Resource Management Group. Just as I was leaving, there was a project which I thought would correlate all that information we had available. We are now seven or eight or nine years down the track and it is still not done, so that's a bit sad.

I'd better get back on track to what I'm meant to be doing for Ron, otherwise I'll run out of time. And I'd just like to try and read this word for word from the manuals and so forth that Ron has put together over time so that I don't misinterpret his words.

Ron Akers
Retired Grazier and LandCare Practioner Scientist
Paper: Restoration of native pastures – The value of grazier science

"Our Mulga Land appears to have past its use-by date, with woody weed invasion reducing grazing capacity to a nil." This was a recent lament from a member of a Landcare group in south west Queensland. The Warrego Landcare Group has long been concerned about compaction, very high run off and woody weed invasion. These three elements combined with winter rain have caused degradation of the Mulga Lands of south west Queensland, particularly west of Charleville.

When my forefathers brought stock to south west Queensland Mulga Lands in 1875, a beast left tracks of about two centimetres three quarters of an inch deep. Today one is hard pressed to track a beast in some places. Compaction causes high runoff, allowing woody weed invasion. Compaction of the ground surface is a legacy of over one hundred years of grazing. Where once native pastures were the dominant species, woody weeds have taken over, causing loss of productivity.

Examples of woody weeds are:

- Green turkey bush (Eremophila *gilesii*): thrives during winter rain when mulga pasture is dominant, thus giving the species a massive advantage.
- Grey turkey bush (Eremophila *bowmanii*): tougher and more fire and drought tolerant than the green. There are at least four varieties of this species. Further trials to control bowmanii are planned.
- Sandalwood (Eremophila *mitchellii*): vulnerable to fire, but difficult to get the necessary basal fire contact to any but small seedlings, thus requiring two or three successive treatments, preferable at mid winter to obtain a kill.

With Mulga Land valued at only a few dollars per hectare, an inexpensive woody weed control method is the only option. Trials undertaken show the following options to be successful:

- Cutter bar raking damages woody weeds severely, but is expensive and may need to be redone at intervals.

- Grubbing is very successful, but expensive.
- Chemical control is also expensive, but may have some potential as a follow up treatment.

A low cost solution to controlling woody weeds is fire. The problem is growing grass, a good fire fuel, in areas infested with woody weed. To grow grass for summer pasture, there needs to be a method of conserving, in the subsoil, some of the moisture from winter rain. After many trials, water ponding seems to offer real possibilities of conserving some of this moisture. Ponding enables rain water to penetrate into the soil, regardless of how compacted the area may be.

A landcare project application funded the purchase and development of our present water ponding implement. It is a TPL toolbar with a ripper shank and a sixty centimetre (twenty four inch) disc on the other side. This arrangement gives ample ripped depth for water penetration, and a rill easily able to hold 7.5 cm (three inches) of water above ground level.

The implement in this form, completed many kilometres of ponding in many different areas and conditions. Most were reasonably successful but required two, three or even four passes at times. The usual comment was 'fine, but you must learn to do the rill in one pass'. This put our tractor and implement in direct comparison with the big power graders, which need at least two passes. Experts consider the process requires at least a 150 horse power grader, at a cost of $42 per hectare, which is not a viable Mulga Land option. Landcare funded a second bar for the TPL toolbar, so it was possible to run two shanks ahead of the disc on each side, to build the necessary rill in one pass (or possibly two).

Results

In the first season the resulting mulga pasture growth was quite encouraging, in and immediately outside the ponds. However, the offending green turkey bush also thrived. Nevertheless, the mulga oats, Mitchell and wire greases grew up through the stand of turkey bush to the extent that when the grass died off, a 'micro' fire in each pond would have been possible. Yet, our fence failed and hungry stock totally degrassed the area – we operate in the real world!

The ponds themselves needed to be infinitely variable depending on the particular location and the hazards present. We have graduated from the dumpy level for surveying ponds to a very small laser unit – a vast improvement.

Ponding on claypans was also investigated. We tried 75 cm (30 inch) discs on the implement for this work and results have been very encouraging.

Our hope is to get the cost of ponding down to something like $6 per hectare for groups doing their own, or perhaps $18 for contract work, maybe less if the single pass is successful.

Last season, grass re-established in the turkey bush trial area and we were able to burn in the early spring. Any germinating turkey bush seed will have to compete with mulga grasses. This competition in itself is a form of woody weed control.

This is nature's way of establishing native pasture in the Mulga Lands, and we are pleased to be able to help matters along. However, pasture needs careful management.

For information on burning mulga country refer to "Burning Mulga Country to Control Woody Weeds" by Paul Jones.

Lessons learnt

- We are greatly encouraged by the resulted achieved, which has enabled controlled use of fire, as the key factor.
- Let nature dictate, don't work against it.
- Steeper country needs special planning – do it later.
- Plan plenty of by-wash area.
- Ponding is a useful tool in control of soil erosion, especially from scalding, and sheet and wind erosion.
- Ponding enables rainwater to penetrate, regardless of how compacted the area may be.
- Ponding effectively doubles natural pasture growth from light storm rain, with stored moisture taking plants through to maturity where seed can continue to cycle.
- Full scale ponding on ground produces good results, but has some limitations.
- Once established, ponding is self generating, requiring very little long term maintenance.
- Rainfall, sunlight and fire are free – learn to use them.

Conclusion

Ponding natural pasture progressively reclaims degraded Mulga Land by enabling fire to control woody weed invasion. The technology is there, nature does the job; we just need to initiate the process.

Hugh Brown
Vegetation Client Liaison Officer, Department of Natural Resources and Water

I would also like to add an excerpt from the Best Management Manual for the Mulga Lands.

Ron Akers
Retired Grazier and LandCare Practioner Scientist
Paper: Restoration of native pastures – The value of grazier science

South West Queensland

A further development of the Charleville Landcare Group has involved slashing treatments of green turkey bush.

Results

Trials indicate the slashing of green turkey bush in "run on" areas of a ponding site generates rapid native pasture growth after suitable rain. The resulting seed bank helps to re-seed other areas of the site and improves the overall growth of pasture and a further reduction of green turkey bush seedlings through competition.

It has been indicated that this system requires further research, particularly regarding other thickening shrub species such as grey turkey bush and hop bush.

It is possible that the development of this slashing system could bypass a wait of up to two years for fire fuel to grow, as is required when water ponding is used for the treatment of thickening native shrubs.

(Questions and discussion)

Hugh Brown
Vegetation Client Liaison Officer, Department of Natural Resources and Water

Well it looks like we've come to a close, so I would just like to acknowledge Ron's work over many many years.

Session Three: Ecology and Biodiversity Science and Future

Geoff Edwards
CEO, South West NRM

I'd like to introduce Teresa Eyre. Teresa is a genuine scientist. I'm told she has a doctorate from UNE on habitat management and habitat of gliders and so she's now in the Biological Sciences Unit of EPA and we'd like to welcome Teresa to the podium.

Dr Teresa Eyre
Principal Ecologist, Environmental Protection Agency
Topic: Biodiversity Research on grazing properties in south west Queensland

(Slide 1) I thought given the title of today was to give effect to science and policy management I thought I might spend a few slides just looking at that issue from a biodiversity scientist point of view.

And then after going through that I'll get off my soap box and just briefly run through some projects that we're currently doing on biodiversity science research in the Mulga Lands.

(Slide 2) So basically I do think we need science for policy management because it helps solve problems, and brings logic and knowledge, or fact to political and social debates. Science provides an evaluation of ecological consequences for a variety of different policy choices. Provides policy makers with information to create new visions and then science should provide the mechanism to convert that policy vision into a reality, for example through the development and validation of assessment tools, such as criteria indicators for monitoring management and impact upon particular values.

(Slide 3) So I think we'd all be happy to agree that the goal is to provide effective biodiversity science at the science policy management interface. But we are faced with a number of conundrums, if that's a plural word, conundra. Ecology and ecological policy issues are by nature messy and complicated. And a number of scientists can be reluctant to provide advice because their science will be challenged by particular stakeholders who may not be happy with the outcomes of that science. And in trying to make sure that your science is as water tight as possible, there is a syndrome that's known in America as paralysis by analysis whereby scientists sit on their data for way too long, over analyse their information, and this tends to delay political action and frustrates policy makers, and ultimately, in my experience at least, decisions can be made without any scientific back up. Also I think science can get caught up with values, and this leads to political advocacy of personal preferences. And the problem with this is that the credibility of that science is reduced amongst your scientific peers.

(Slide 4) I don't know what the solutions are but there was a recent issue in Conservation Biology that came out that actually looked at this issue of getting biodiversity science into policy in an effective manner. And there was a number of papers by foremost conservation biologists and I drew a bit of inspiration from those guys, plus a little bit from my own experiences working with a government scientist for many years, to come up with some very basic pointers which I hope help get biodiversity science into the policy arena. First I think we need as biodiversity scientists, I think we need to assist the use of normative science or political advocacy. And by normative science it's the definition of that is where science is based on an assumed preference for a particular policy or policy choice. And the problem with that is its not scientific in the classical sense of the term because its not value free and its not largely not reproducible.

(Slide 5) Or if you are going to go down that road at least disclose up front your ethical preferences, and communicate as such. That's not to say that scientists should not provide advice on what society ought to do about a situation, as in the words of Paul Erlich, a renowned conservation biologist if you're standing in a building that's burning down you don't just give measurements of the temperature and so on you say in addition lets get the leg dawning out of here. And I have to say it is really hard to avoid advocacy totally.

We are human after all. But if we aim to try and keep our language neutral, fairly neutral, for example and this is hard to do but perhaps not to use words such as degraded habitat and use changed habitat instead. The reason for that being that some species indeed a patch of habitat that's changed it may be degraded for them but for other species its not that, its not the case at all. The other point I think is to share your information with all interested stakeholders, and there's been a lot of discussion this morning about getting science to the people on the land who are managing it at that on ground level. Scientific papers don't really cut it, and so its looking at other avenues of trying to get that communication out.

(Slide 6) As a biologist scientist I think we need to constrain our advice to make us informed by science, and of course this can include expert opinion as well as empirical data. I was talking to Manda Page about this on the plane out this morning, avoid trying to avoid empty promises to policy makers and funding bodies about what you can achieve with the funding and time that you are given to do a project. And this is particularly true in rangeland situations where you may be, start off your research in a drought, the drought breaks half way through and you have two different situations. Most research projects, as we all know are three or four years in term, and it does make it very difficult to have air tight conclusions from that.

(Slide 7) This is an obvious one is maintaining linkages in communication with your policy buddies and decision makers and managers, and let them know what you're up to and draw inspiration from what they're having problems with. Also, recognise that policy makers have other issues that they have to deal with, and a lot of policy makers talk about the triple bottom line and I think it was Hugh before brought up that the environment, society and economy are the three broad issues that policy usually has to deal with. We need to be adaptive with our science which basically means, you know keep at it for as long as you possibly can. Just don't lose inspiration. And obviously, publish and present your data at scientific venues because peer review is important.

(Slide 8) And I wish I could practice what I preach because I don't do all of those things at all. So in the Mulga Lands one of the policy strategies that have inspired my unit to try and get some science underway out here, the big one of course is the *Vegetation Management Act*. Even though broadscale ceased in two thousand at the end of two thousand and six, in the Mulga Lands we had this situation whereby you could still clear regrowth, but also for fodder, you could still clear remnant for fodder harvesting. There's also the Statewide Rural Leasehold Land Strategy. And a component of that strategy is the capacity to demonstrate duty of care through condition assessments of pastoral leases.

(Slide 9) So in the Mulga Lands, of all the rangelands systems, sorry bioregions, between ninety one and 2003 predominantly all clearing occurred in the Mulga Lands and between 2001 and 2003 fifty five percent of all clearing in Queensland occurred in the Mulga Lands, and that's a direct consequence of having to fodder harvest for fodder during a drought period.

(Slide 10) Pastoral leases there aren't so many throughout the Mulga Lands but its still a real issue.

(Slide 11) So the *Vegetation Management Act* there's been a number of issues and reiterations on how to fodder harvesting. The latest codes, you're probably all familiar with this so I won't go into it but basically its at a landscape scale so the question raised is what are the landscape scales of biodiversity in the Mulga Lands from these different types of fodder harvesting.

(Slide 12) Just to give you a feel of what it looks like from Google Earth, the different landscapes that you get in the Mulga Lands are just so different to ecosystems that I've worked with in south east Queensland and Brigalow bioregion which is very relictual. We have large retained blocks and strips.

(Slide 13) We have cleared strips and large retained blocks.

(Slide 14) We have an artistic sort of approach to how you might harvest your fodder, how you might harvest your mulga.

(Slide 15) And you have large blocks of how at a paddock level from a past clearing codes of practice. On this slide I particularly wanted to show you that this the fence line in the middle there is between two properties that we're currently working on. And what we're seeing there is a fence line that's been left so this is the other complicating issue is that different approaches to management of whether you graze sheep or cows or goats or all of them, and how you push your, how you prefer to push your mulga, it all ends up with your landscape looking quite different.

(Slide 16) With regard to the Leasehold Land Strategy or just in general, landholders capacity to show demonstration of duty of care, another question that we've been thinking about lately is condition assessment and a lot of people talk about yeah lets do it. But from a biodiversity point of view there's a number of questions that I don't think have really been looked at in the literature very well. One of those is what indicators do we use to assess for biodiversity, and particularly in a rangelands which is so ephemeral. Can we deconstruct the complexity of ecology so that you can come up with a single index that represents condition for biodiversity. And are various condition states meaningful for biodiversity in the general sense anyway. But foremost are the general shared indicators for biodiversity and management which is land condition. I'm not sure if everyone's familiar with the Grazing Land Management education package and the ABCD framework, but that's a very well, well utilised land condition sort of assessment tool that DPI have been rolling out across the state. So it can be they have a shared indicators about what can be picked up to monitor what could be good land condition for grazing and biodiversity in the Mulga Lands.

(Slide 17) The other issue is that we don't really know all that much about just general biodiversity in the Mulga Lands.

And I just thought as a very rough indication of what we currently have stored in our Wildnet in our knowledge about the distribution of species, while we downloaded all the number of records out of Wildnet which is EPA's species record data base for three bioregions, the south east Queensland, the Mulga Lands and the Brigalow Belt bioregion, and as you can see Mulga Lands is the little blip down at the bottom of the graph there compared to south east Queensland which is relatively huge.

(Slide 18) And the same for birds, even though there is a relatively quite a number of, lot of records for birds for the bioregion compared to those other bioregions, not very much at all.

(Slide 19) So the problem what basically we have minimal knowledge on the biodiversity values of the Mulga Lands, appoaches, the effects of various approaches of mulga grazing land management upon biodiversity values, at that landscape scale. But also, and this has come up this morning a few times as well there's not that many tools or mechanisms as well to support the delivery of the information that we may get as biodiversity scientists to be relayed to land managers, people who are working on the land.

(Slide 20) So in response to that we did up a number of project proposals which happily got found funding families around the country. The first one has been funded by Land and Water Australia, and that project is looking at the biodiversity values of regrowth mulga in modified landscapes. Our second one is by Meat and Livestock Australia which is looking at biodiversity condition assessments for grazing landholders. And the third one is in biodiversity in Queensland rangelands it's a basically an extension support tool for grazing land management managers. And that project is indeed run by Ron Akers son David, who's based out at Longreach. And that's funded through Desert Channels NRM Group on behalf of all the five rangeland NRM groups, including South West NRM of course. And all those projects we are partners with grazing land scientists and the Department of Primary Industries.

(Slide 21) So in it's a little tiny package of projects which hopefully is a step forward towards the bridging the gradient from research through to production of tools through to building capacity for people on the land.

(Slide 22) Our sites are, we have started these projects and our sites are largely restricted to the eastern, more softer mulga land types of the Mulga Lands. Our landholders have been really fantastic and somebody mentioned before that since during the drought people are not so interested in you know learning about peripheral things like biodiversity. But they've all been just brilliant in getting us on, allowing us access to their properties. We have selected our sites at a landscape level, whereby a landscape is a one kilometre radius spatial extent.

(Slide 23) So for example landscape a is a small patch of regrowth in a large in a landscape of remnant.

(Slide 24) And that's what it looks like on the ground.

(Slide 25) Another landscape type is a, that we're sampling is a small patch of remnant in a landscape of regrowth or cleared.

(Slide 26) And that's what it looks like on the ground.

(Slide 27) And then predominantly regrowth landscapes.

(Slide 28)

(Slide 28) And predominantly remnant landscapes.

(Slide 29)

(Slide 30) What we are collecting information on include vertebrate fauna, birds, bats and reptiles. We're not looking at ground mammals unfortunately. Mainly because the amount of effort for what you get back was just not logistically possible for us. At a sub set of the sites, CSIRO is working with us and they're collecting information on invertebrate fauna. Floristics data, landscape function and soil information, and management of course.

(Slide 31) I wasn't really going to go into the results, but I will, seeing that they're there. The just very briefly looking, for the preliminary data that we've got, which is from forty sites, so its not very much at this stage, but we're not seeing very much of a pattern at that landscape scale using broad indicators of biodiversity, being species richness and species abundance. Between three of those, three of those four main landscape types, its only the largely regrowth landscape type where you get a significant drop in species richness or abundance. But as I'm sure most of our biodiversity scientists here would agree that species richness and species abundance aren't always a very good indicators of biodiversity values, because you get certain species responding in different ways to the landscape. For example this white roud tree creeper I think is going to be a species of interest to us because its looking like its very much attached to large blocks of remnant vegetation. We lose these species where we lose those large blocks of remnant vegetation in the landscape.

(Slide 32) With the reptiles, a similar sort of pattern, this is the little gecko's a dipdiladaptoras dilardaptorii and it seems to be happier in the more open landscapes and will be happily found in largely cleared or regrowth landscapes whereas other gecko species are much more sensitive. So basically we still have a long way to go to find out what's going on. And I'll leave it there. Thank you.

(Questions and discussion)

Geoff Edwards
CEO, South West NRM

I think I've got these bags organised Therese, so I'll ask people to put their hands together and thank Theresa for her presentation.

Now I'll hesitate to compare Manda with Ian Beale, but I do think the centre of research on the Mulga Lands has shifted from the Charleville Pastoral Lab to the University of Queensland at Gatton, mainly that's a role playing that you've, but a lot of work is being done out of Gatton. I'm delighted that we've contracted with Manda, so long as the lawyers agree that is, to do a summary of the whole scientific literature of the Mulga Lands, to produce potted summaries that we can make available to modern people who don't have the time to read them out and to research them. Would you like to welcome Manda Page.

Dr Manda Page
Lecturer, University of Queensland
Topic: Conservation Research in Semi-and InlandS (CRISIS)

(Slide 1) Hi there, first of all I would just like to thank South West NRM and everyone here for coming and getting this up and going because its something a few of us have been talking about for a while and never been able to make happen, so congratulations to Rachel and you guys for getting it going.

Before I start, there's a few points I would like to make, in fact I now wish I'd written a totally different talk after listening to all the conversations and discussions inspired by previous speakers So I'll just add my two cents worth while I've got the floor. First of all I've been working out here for about fifteen years now, and yes I was only ten years old when I started so that's why I'm so young. But even in that time, and I realise that that's not a long time in the scheme of things when you look at the experience of Bealy, Keith, Chris and a whole lot of other people in the room, but I've noticed a change in the number of scientists that are actually residents out here, that actually live out here, that are doing work out here. And you know there's been a massive change in just fifteen years which is really disappointing and I think its now starting to really reflect on policy and other decisions which I think is a problem.

So what I did want to say is that despite that there are some of us that are still really really keen to work out here, we are passionate to work out here and in order to do that I've set up a small research group which I'm going to tell you a bit about today. It is called CRISIS, which stands for Conservation Research In Semi-arid InlandS. The reason its conservation research focus is obviously because that my and my students are of interest and the type of students that I get. But we are interested in the broader picture, I guess ecology and ecological systems and things that are happening out here. So I thought I'd talk a bit about that.

But the main thing to get across is working out here for fifteen years has not been easy. Not because the place is difficult, or the people are difficult, it's the funding. Because getting money to work out here is quite difficult and its expensive for us to work out here. It costs me several thousands of dollars just to get a four wheel drive out here and back, and that's without doing any research at all. So money is our limiting factor, but of course that would probably be different if we had more residential scientists living out here.

(Slide 2) So what I want to do today is do just a bit of an overview of a few projects that we've been working on. We're fairly young, we've only been going for a few years. But I just want to give you a bit of an idea of the sort of work we are doing out here, and that science is not dead in the Mulga Lands, we're still trying to do work. The idea behind this group is to support research in this region by pooling our resources. Obviously it works out cheaper if we can pool our resources and all come out in one four wheel drive rather than everyone coming out separately. We can share our knowledge and experience, because we can learn a lot from each other as we've learnt here today. And we can encourage collaboration between other agencies, other universities and other people. And most importantly, we can provide students with exposure to this area. It's really hard to get my students out here, they're all mostly from Brisbane, mostly from south east Queensland, and they don't venture west too often. So we're trying to give them some opportunities to get out here and actually see what this country is like. And it's amazing what you can do when you do that. Jen (a former student) got really inspired by doing some work out here and now she lives and works out this way. So, I think exposing students to these areas is fairly important.

(Slide 3) So what I want to do today is just cover, really quite briefly, a range of different projects that we've been working on. And they include things about understanding ecosystems, quite a bit with the bilby reintroduction, and a predator control program.

(Slide 4) Now they're only short snap shots, if you want more information we've got a website or you're quite welcome to contact me or come and have a chat to me in one of the breaks. The first one I'm going to talk about is, and the reason this is the first one is because this is the current one that we're working on at the moment and I'm heavily involved in. It is also the one that we have a decent amount of funding to do which is nice. And that's to look at the economic and environmental effects of fodder harvesting.

Of course it's a topical issue, and of course it fits in well with Teresa's work, and we've actually been communicating quite a lot between our projects. But it's basically to determine the effects of fodder harvesting on biodiversity and the economic implications of fodder harvesting. So we've been out and about looking for sites, and we've found quite a number of sites so far where we're going to look at the effects on plants, animals, the soils and ecosystem processes of different fodder harvesting approaches. So we're including variables like pushing and pulling, time since its happened, the frequency of harvesting, and the type of grazing pressure afterwards.

We're hoping this will contribute to the debate on the impacts of fodder harvesting and hopefully inform policy. But basically we're trying to attempt to gain a greater understanding of the interactions between management decisions, vegetation dynamics, the whole shrub/grass/tree ratio issue and grazing pressure.

(Slide 5) Another project I wanted to talk about today is also topical because we were just talking about long term vegetation monitoring, or long term monitoring of sites. And you're right there's not too many of them that exist now but we've got one that's been going for fifteen years on Currawinya National Park.
And this has been funded by the Queensland Parks and Wildlife Service and the Save the Bilby Fund (and currently me personally). And this is a project that's been going since Currawinya became a national park in 1992.

We set up some sites there to see what would happen once they removed the sheep, and we've got sites on park, off park, and some total exclosures. So that's fifteen years of data, a nice record as it is measured at least annually, though initially it was done more often than that.

So we've got a fifteen year record which I just have to try and make some sort of sense of and have to try and write up at some stage. I'm waiting for it to rain which I think will result in some really interesting changes.

We've got different grazing regimes, but we also have woody weed control areas where we've removed woody weeds and we're looking at the issues shrub thickening. Out there its mostly turkey bush and hop bush. Basically what we've learnt so far is really there's a hierarchy of factors which influence vegetation dynamics in this region, and obviously as everybody knows, it's pretty much dictated by rainfall. inspiring. That took me about five years. I could have just asked one of you guys.

But the amount and timing of rainfall is what's really important, when it rains and how much of it you get is obviously important. And that really does influence the composition and the cover of your grass species. But next to that it is grazing pressure that has a huge influence. Mostly in those good seasons, obviously when there's nothing there and nothing to eat and its dry it doesn't have a big influence but at times, especially during the good seasons, grazing pressure, the type of grazing, and the amount of grazing, obviously has a really big impact. And the fact of the matter is that despite removing domestic stock alone, which of course is what we've done on Currawinya, you rarely produce significantly different results to what's happening next door where there's still sheep and cattle. So that's something I think we could learn a lot from.

And woody weed removal is only really successful if we couple it with grazing management, and I think that that was alluded to earlier. Basically the grazing pressure is really important if you're trying to manage your woody weeds as well.

Those photos down the bottom are, if you believe it or not, are the same site. Back in 1994 I didn't have a digital camera obviously so it's a pretty poor photo, but you can see that today it doesn't look much different to what it did in 1994. However, we had a bit of rain in the middle there so those photos reflect that.

(Slide 6) Jen Silcock is in the audience here and she can tell you a lot more about this project, she was one of my honours students a few years ago. She did a nice project on Currawinya National Park on a rare plant, or a plant that's fairly limited in its distribution out this way, called *Melaleuca densispicata*. It was one of the reasons Currawinya was declared. We wanted to identify patterns in the distribution and describe its ecological role in order to provide some management recommendations because we noticed that it wasn't actually regenerating. Again we measured a whole range of variables there, of where they grow, what position they are in the landscape, and a range of ecological factors. Basically Jen found that they're more common on the dune slopes, that there's a relationship with clay pans and there's probably some connection to paleodrainage systems.

We found that it is an important refuge for flora and fauna in the region but there's no regeneration happening. We do know that the seeds are viable, so its not because its not dropping viable seeds. So it may have something to do with the grazing pressure, or maybe some sort of climatic conditions. There's still more work to be done on that.

(Slide 7) Another project that we've been doing is looking at seed banks and seed rain. I'm really quite interested in seed banks because its really quite amazing how resilient they are out here. But one thing we thought is that seed rain might be a good indicator of rangeland condition and ecosystem health. If things aren't dropping seed then they're unable to reproduce. It's like any animal population, if things aren't reproducing then the population really doesn't have much of a chance in the long term. We can think about plants in the same way that if they're not reproducing or in other words if they're not dropping seed then they're likely to disappear from the landscape at some stage.

So we did a project where we designed some seed traps, which are really just these little funnels that sit at ground level and they've got a little collection bag at the bottom of them. We tried to design them so that ants couldn't get in but the ants are much smarter than we are. But anyway, we designed this and then put them in the ground to collect seeds for over a year and we've done some analysis on it and we're still trying to work out what it means. It is really complex I think.

(Slide 8) Biological soil crusts, I'm not sure if you're all familiar with them. It's often a blackened colour on the soil surface and contains lichens and mosses and bacteria. This is a PhD student who's currently working on that and she is trying to determine the distribution of soil crusts in this region, but also the ecological role, and their usefulness as a monitoring tool. So again it might be something that indicates degradation or restoration or ecosystem health.

She's basically found that nearly fifty percent of all the bare ground out this way is covered by these soil crusts. And that they're well adapted to wet and dry cycles so they can sustain really long drought periods, and they'll come back really quite quickly. They're highly productive at really high temperatures. During drought, they're often covered up by wind blown sands but even under those sands they're still fixing nitrogen, so they're still helping cycle the soil nutrients. This means they could be really important in restoring ecosystems after drought cycles.

(Slide 9) Then of course we've got all the bilby projects, and Pete can tell you a lot about more about the reintroduction. I'm sure you've heard a lot about bilbies. But we've had a couple of honours projects that we've worked on with Pete and the Save the Bilby Fund as part of the release program. I had a student who had a really interesting project trying to determine if the captive bred bilbies could actually recognise predators. One of the big issues is the fact that all these bilbies have been bred in what we call 'Hotel Charleville' where they get food and water and protection and they don't have to do anything, just sit there, get fat and breed. And then we throw them out in the Mulga Lands in the middle of nowhere and get them to fend for themselves and we weren't quite sure of what they were capable of doing.

One of the things we thought is that maybe they don't have any recognition of predators (cats and foxes) so she did this neat little experiment where she looked at the captive bilbies, and played recordings of predators, and non predators. She played recordings of cows and people talking, of cats and foxes etc. She also put scents of animals around places to see how much food they would uptake when that scent was around.

Basically we worked out that they were pretty hopeless and that they had no recognition skills whatsoever of these things, which is a real problem. But there is hope. There is a lot of variability between individuals and therefore they probably have the ability to adapt to these things. This obviously helps explain their poor survival rate in other rehabilitation programs where they haven't been controlling cats and foxes.

(Slide 10) More recently when we released some bilbies I had a student who had a look at their burrow habitat preference and their use. We tracked where they went where they build burrows, what habitat they liked to use, how long did they stay there and how much they moved around.

We found that these eight bilbies that we had followed for a few months basically used over 51 burrows. They initially liked to use rabbit warrens, rather than make their own burrows, they would just dig some old rabbit warrens out first. But then after a little while they didn't use them at all and they would much prefer their own homes. They seemed to prefer the mulga sites and liked to build burrows under logs and vegetation. These sort of things might be able to give us some indications of what sort of habitat is suitable for bilbies or maybe what's missing from their habitat.

(Slide 11) I've got another student working bilbies and their role as ecosystem engineers. We are trying to determine if they have some sort of effect on helping to restore or rehabilitate the landscape. We've lost a lot of these small to medium sized mammals from the Mulga Lands, especially the ones that dig and turn dirt over while foraging and making burrows. We think that maybe the loss of those actions may result in the loss of some really important ecosystem processes like turning the soil over and moving seeds around the landscape. So we are basically looking at seed accumulation and how the properties of soils are different where the bilbies dig. In addition we are looking at lots of bilby poo and see if there's any seeds in it. She's still working on that so we don't have any results for you at the moment.

(Slide 12) And the last project I wanted to just mention is by a colleague of mine, Dr Greg Baxter, who's been working on a wild dog project. I know wild dogs are an issue in this area in particular at the moment. He's got three years of funding from the Queensland Parks and Wildlife Service looking at their control programs and how effective they are. They use things like these passive soil plots which is where you just lay out some nice fresh soil and you come back and look at footprints. You can quite easily identify footprints of dogs and other animals. They are also using these sticky boards to collect a bit of hair from the animal as it goes past. The can do some DNA analysis on that. Basically they're trying to understand the population effects of dingo control programs, describe the kin relationships and hopefully improve the outcomes for wild dog control.

(Slide 13) So that's basically just a snap shot of a few different projects that we've been doing out here to let you know that science is not dead in the Mulga Lands just yet. Well not this ecological science anyway. We think it's really important because the arid and semi arid regions cover over seventy percent of Australia. We recognise that its really difficult for your organisations to attract people to come out here and work, and to stay for long periods. So that's why I think its important to provide students with the opportunities to do work out here, to do research out here and to get some exposure to the Mulga Lands. It's such a wonderful place to live and work and we need to give our students an opportunity to fall in love with it. At the same time, we're trying to improve our understanding of these ecological systems, how they work and hopefully inform management and policy.

We're only a small group at the moment, but we're growing in reputation and size and of course we always need money so throw it our way. If you want any further information my email address is there, there's also our website if you want to get on and have a look at some of the projects that we're doing. And that's it for me. Thank you.

(Questions and discussion)

Geoff Edwards
CEO, South West NRM

Now I'd just like to introduce Phil Norman. Phil is a Principal Scientist with Natural Resources and Water in Brisbane. And I understand that Phil is across well his position requires him to be across a range of the scientific projects going on within the Department. And we expect to invite Phil out here to Charleville later in the year to give us a briefing, but we welcome you to the Symposium, Phil.

Phil Norman
Principal Scientist, Community and Integration Sciences, Department of Natural Resources and Water
Topic Natural Resource Science – Mulga Land Projects

(Slide 1) Thanks Geoff. I don't know how everyone else feels, but before lunch I was feeling a bit pessimistic about the future of research and science in this part of the world. After those few, those two talks I feel much more optimistic. I think science is in good hands with people like Theresa and Manda with all their energy and enthusiasm so, and everything else.

Okay, I'd also just like to add my complements to Geoff and South West NRM for the initiative in doing this today and for their initiative in the whole Mulga Lands knowledge, I'm not sure what its actually called, knowledge systems, knowledge

(Geoff Edwards) Information Hub

Information hub. I think its well and truly overdue and I agree with all the other sentiments that have been expressed about how we have to find more efficient ways to capture the legacy of the work that's gone in and carry that forward. I'd also like to say that I really, it struck a cord with me what Mark said this morning about trying to make Charleville the centre for, what was it, natural sciences and education.

A group that I manage at Indooroopilly, that's really our charter is about linking natural sciences and education and using systems like education and social sciences to transfer hard science knowledge into practice. So I'm with you on that one as well.

I'm from Natural Resources or Natural Resources and Water. And I'm from the Natural Sciences part of Natural Resources and Water. I have to put a plug in here for the fact that whilst we are the major science provider in the organisation there are other parts of the organisation who are in science, and they're people in the regions like Andrew up there and I'm sure there are some faces in the audience who I half recognise as well from the regions. So guys, an apology for the fact that this is going to be focusing mainly on Indooroopilly stuff and not all Natural Resources science staff, but to under recognise the fact that there are people who are doing good work in the regions as well.

In this talk I'm going to be giving a couple of slides at the beginning as a bit of a, I suppose it's a free plug, but just giving an outline on to what the organisation does and how its made up and some contact names. I think that would be a useful thing for a session like this. And I'm going to profile just a few of our projects. And they're a wide spectrum, and I deliberately picked a wide spectrum to showcase I guess or introduce different bits or different science activities that have happened or are happening out here. And I will finish with some reflections on the questions that were posed on the circulation sheet which was about you know how, what would I say to policy makers, investors and economists about the lessons that we've learnt out of our science.

I guess the comments I make are just embedded in the sort of projects I talk about here and my own experiences which are diverse. I've worked in at least three different states. Started in Victoria and progressively migrated north following the sun. Until relatively recently, last year, I spent a couple of years in New South Wales, and spent a summer in Bourke which for those of you who live in Charleville know what that really means. When I said to people I was going out to Bourke in November, December and January they all just shook their head and why would you want to do that? But I have to say it was one of the most rewarding experiences I've ever had in my life so it's a great experience.

(Slide 2) Okay, so Natural Resource Science what we're about is we assess, map and biota land, vegetation and water. There's about three hundred and fifty of us, and we're largely based in Brisbane, Indooroopilly and Rocklea. We've got a few people posted but as I said earlier, there are other scientists in this organisation, in Natural Resources and Water, a lot of people like Andrew and others who aren't part of Natural Resource Sciences but are closely linked with us are based in our regions. And we partner up with regional NRM bodies, with industry, landholders and community. But that's the important part of our business.

(Slide 3) Just recently we've been through a we were restructuring for once we've got a directive and names that make some sort of sense, that tell you something about what we do. As you can read there, we've got a group that deals with water science, we've got a land and vegetation science group, we've got the Queensland Climate Change Centre for Excellence, you can forget the last three words of that but it does deal with climate, we've got a science strategy and integration group and we've got a natural resources information management group.

(Slide 4) So Water Sciences what are they about? Well as the name suggests they're about water, they're the people that basically measure how much water there is and monitor its condition. This sort of information feeds into decisions about water planning, about water allocation, about managing catchments. And Don's details are there, I think his is a name you'd probably be familiar with, directs that group so if you want to ask anything you ask Don.

(Slide 5) Land and veg with Beverley Henry. And again Beverley might be someone some of you know. Land and veg contains most of our soil scientists. It contains people who look at things like salt, people who look at erosion, those who are left, and a few who look at soil processes. It also contains the remote sensing centre which is a new joint initiative with UQ.

(Slide 6) Okay the Climate Change Centre of Excellence I don't think I need to say a thing or two about that. It grabs enough publicity without me having to give it any more.

(Slide 7) Science Strategy and Integration, this is where I sit within the organisation. But its name probably is one of those names that doesn't tell you really that much about what we do. It has a dual role, one's an internal role about making sure that our science aligns with external agendas. So today really, and me being here today is about taking away lessons from this agenda and feeding them back into our agency's strategic investments in science. So particularly this afternoon's discussion, where we start talking about well where are the priority needs and gaps, I'll be taking that back and I'll be fitting that in to our research and development strategy and into our business plans, and try to influence them to align better with what the needs are out here.

The other stuff that we do, as I said we deal in education. We have schools programs, we have community education programs, and we also have social scientists. Now again, I like the fact that there's somebody to fly the flag for social sciences because it is so important. All of the hard science stuff we do is great in its effectiveness and its really important but don't forget in the end people have to implement the change. We can understand how the systems work, but in the end we have to influence the way people behave. We have to change their attitudes or influence their attitudes to influence their behaviours. So it really is about understanding people and what makes them tick.

(Slide 8) And Natural Resources Information Management and again Dave looks after that group, that's the first port of call for Davo. So if your GIS layers your looking for our tools, information tools data bases, they're the people you have to go to.

(Slide 9) Now I'll just talk about a handful of projects. I've only picked four, I know there were, I don't know how many there were I could have choosed from. Before I picked I tried to represent a suite or range of things that have happened or happening in this part of the world. There's a project that deals with waterholes and drought refugia so that's in the water sciences group, the carbon sequestration work is really in the land and veg group. The monitoring condition and trend, that's in our remote sensing area.
And the regional NRM social and economic dimensions is a joint project between ourselves and the science area and people in our community partnerships policy area.

(Slide 10) Waterholes and drought refugia. This is a bit of a piece of work or two projects really. It came out of the what we used to call the CRC for freshwater ecology, property of research centre. The work was done last year by Savich Troy and Johnathan Marshall who are a couple of scientists based at Indooroopilly.

And what they were really trying to find out was well how important are these waterholes in these inland rivers, how connected are they, and what sorts of management issues might relate to that? In other words, if we dam these rivers, if we extract water from these waterholes, those sort of issues, what does that mean to biodiversity. This is work that was mostly conducted in the early 2000 and its ongoing.

(Slide 11) What did they find? Well I guess they found that just that first point there, despite infringicly high levels of turbidity and you saw the photo before, anyone who lives out here knows that they're dirty rivers they do have quite significant biodiversity, in fact very high biodiversity. The other thing they found is that the waterholes vary quite a bit along stream and between streams. So basically anything that you do that disrupts that connectivity is important. So damming these rivers or extracting water from these rivers is just as important as damming or extracting water from those more perennial streams further west that's the type of, further east. The graph there is you can't really read it, its basically the Cooper on the left the Warrego on the right and their different seasons of sampling. That's just showing you basically that at certain times of the year there's much higher levels of biodiversity than at others, or much higher volumes of biodiversity. So they're quite variable and quite sensitive.

(Slide 12) You don't really need to see that its just a list of publications that those guys have produced for the purposes of the record so.

(Slide 13) The carbon sequestration work. There's a couple of studies, one by John Carter and one by Ben Harms and Rayon. John was focused on a comparison between grazed and an ungrazed system and he was working at Croxdale. And Ben ran, I think he worked at a range of sites including some intensive work at Bongaview which I'm not sure exactly where that is but as the name suggests

Audience member: Between St George and Bollon

So John, John sampled soil there and vegetation. Ben and Rayon focused on soil.

(Slide 14) What did they find? What Ben and Rayon found was that after clearing there was a decline in soil carbon both in terms of the quantity of carbon and in the quality of carbon. And by quality, basically what they did is they broke the carbon up into two types of carbon, what they called the white fraction carbon which is if you like the more biologically active component. And the other sort of carbon which is the thing including charcoal which is relatively biologically inactive.

And as the graph on the right shows when you compare mulga versus pasture versus cropping, both in terms of total carbon and in particular in terms of light fraction, the mulga which was the uncleared was much higher. I think you can pick that up.

What John found was that, with his grazing trial, was that soil carbon increases where grazing is included, but plateau's after years, using his model after about twenty four years. And whilst it is a bit higher, its not hugely higher, so he found it was about five percent higher. And I guess the bottom line of that was, and this is a conclusion but its only a draft conclusion of Johns was that because of the risk of extreme events such as a wildfire, which would basically wipe that slate clean, that the viability of carbon trading in this sort of environment might be a bit questionable. But that was a position or but I guess you can see why he would say that.

(Slide 15) A bunch of publications about that as well.

(Slide 16) Okay, ground cover work, this is basically been built around the work of the SLATS theme, which is the State Land and Trees Study work that Tim Danaher, the ground based data collection, I think its called Rapid Mobile Data Collection by Rob Hassett and Greg McKeon's AussieGrass I guess its sort of trying to pull together those three pieces of work to try and develop a rapid, reliable, remote sense tool to monitor ground cover. And that works been largely driven by Peter Scar.

(Slide 17) So what Peter's been able to develop is a way of, basically what he does is he screens out all of the most heavily treed areas because obviously the satellite can't see the ground to see through tree cover. So anything above about twenty percent foliage protective cover he can't do ground cover for but anything for the balance of the landscape, he's able to, using satellite imagery work out roughly what the, work out what the percentage of ground cover is. And ground cover is both I think living and dead, is a grass. And that, if you look at that picture like the green areas on the map are the treed areas the areas where he hasn't been able to look at the ground cover, the brown areas are the ground cover and it ranges from a hundred percent somewhere up in the north what is it north east there, towards the bottom of the Cape and right down there to zero down at the bottom of the south west. That particular picture is just a snap shot.

(Slide 18) What Peter's doing now is he's working on how he can develop that into a whole range of other products. That map there is a, what he's called a bare ground trend, so that's taking the imagery from 1986 through to 2006 and looking at the well actually looking at the trends. The red areas on the map are the areas where the ground cover has reduced to the greatest amount, so there's been the greatest continual loss of ground cover. The green areas on that map are areas where the ground cover's reduced to the least amount or actually maybe even increased. But he's basically giving you a tool to be able to identify from a independent, remote sense image where or perhaps which part of your landscape are under the most stress, or are least protected by ground cover.

There's a range of issues that Peter's looking at there, there's some technical based that he's trying to overcome and of course issues like trying to look under trees cause just as I guess its just as important to understand what's happening under trees.

(Slide 19) And the final project that I wanted to profile briefly was this social and economic dimensions project. I'll just hold up this little CD here, I've got two or three of these which I'll leave behind. Basically this project is an outcome from the state level investment projects so the previous NHT NAP where there was a whole lot of projects done looking at social and economic needs, and they've been put together into this CD and packaged up into a whole lot of fact sheets for distribution so it, I guess it's a bit of a model of the sorts of things which we've been talking about. How do you capture all this knowledge from a whole range of different projects and put them into a format where even though the people who did that work have now moved on, and in this case they all pretty well have moved on, its still there and its still accessible to people.

(Slide 20) The sorts of things that this projects done is its looked at social and economic impact assessments, there is information in there about social and economic impact assessments, how to do it, how to learn how to do it, who to talk to about it. About brokering NRM knowledge between research providers and users, so this in a sense is part of a knowledge system, but there's a bit more to go. Capacity building in the area of market based instruments so there's ongoing work in that area, there's a, we've just been awarded a national contract to do the capacity building of market based instruments, which is things like incentives and trading systems and those sorts of marketable approaches. And there's some other sort of ancillary activities involved.

(Slide 21) And as I said there's a range of products, this is one of the products from it. There are a number of other I guess you'd call them sort of legacy products, the Community Water Monitoring Manual has been developed, there's a web link there if you want to get access to it.

(Slide 22) So just a few reflections at the end here about and in response to the question that was posed, about what would I say to policy makers and investors and economists that I've learnt out of my time and my readings and the people I've spoken to about Mulga Lands, rangelands. The first comment I'd make is be realistic. I think one of the, I think there's a bit of a barrier that we face is that so few of the people we're talking to who are in those decision making processes have actually had direct on ground experience in this environment. So they have, I guess a view about how much they can achieve how quickly is influenced by working in environments over by the coast where there are a lot more people, it's a lot more compact, and the environment is more productive there, so they can generate more change more quickly, and its more reliable.

So the points that I made there is for me one of the stand outs of this environment is there's big areas, there's actually been quite a long history of human involvement with this landscape, of post European involvement in this landscape enough that its actually changed quite a bit and there's been quite a lot of impact.

Whilst, and there's debate about this I guess, it can be seen to be generally resilient, there's a perception that its resilient because after rain it greens up, it looks good, but maybe its not as resilient as we think it is.

Certainly its not terribly productive that's for sure. Which means that the sort of tree planting stuff that people talk about doing on the coast takes a lot longer and is a lot slower to make an impact out here. Certainly the human capacity is limited. There are far fewer people and they're stretched pretty thin, and most of them are pretty much flat out earning a living. There over on the eastern coast you've got a whole lot of people who are sort of nine to five professionals like who you can sort of tap into as a volunteer capacity and who you can get to do that sort of stuff. So I guess the bottom line is there, recovery will take a long time, so be realistic about what goals you set.

Next point I'd say is do your homework. I think we are perhaps a bit too keen to jump in and be seen to be doing things instead of taking the time to actually understand the system, and particularly to understand the idiosyncrasies and differences of the system out here. And sort of, as part of that I guess is listen and learn from those who know. So actually take the time to find out how people, like Indigenous knowledge talk to farmers, take notes of that sort of take note of that sort of experience. Again, I think people who fail in this kind of environment fly in and think they can make a difference, rely on stuff that they've brought with them, and don't bother to sit and listen and take the time to learn a lesson from things that others have.

And the other thing I'd say is be strategic. I think it can be very overwhelming, I remember having this conversation with my colleagues in New South Wales in the Western CMA, I would always just shake heads and say how on earth do you know where to start, you know like its, it just seems to be that this job is just overwhelming, and the clue I think is to build on to the things above and then to pick your target. Do your strategy, identify what the criteria are that you're going to use to see your priorities, pick your target and then start where you can, start doing what you can.

Peter's bilbies are a great example of something where he's picked a target, you know he could have tried to tackle every species in every environment in a semi arid environment but he said no, I can't do everything, I for whatever reason that Peter's decided considered bilbies are really important as an iconic species, they're also I think Teresa used it, are a keystone or linking species, so pick your target and focus in on your target.

I'd also say monitor. And we had this discussion a moment ago about why long term monitoring sites are really critical, and I know its more critical in this environment than any other, and adaptively manage so set yourselves some targets and some goals and be prepared to revisit them, be prepared to change your course of action.

(Slide 23) So if we get it all right this is what it'll look like. Thank you.

Geoff Edwards
CEO, South West NRM

I'm just delighted at the amount of time that the speakers have been putting into their presentations, there's a lot of insight and a lot of depth into all the presentations we've had today and can I just emphasise what Phil has said.

I think science is in good hands after hearing the three that we've had after lunch. I think we can be very, very optimistic about the quality of some of the work being done.

(Questions and discussion)

I'd like to thank you very much Phil for the time it must have taken you to give us an overview of what's happening and this is a token of our appreciation.

Session Four: Sustainable Management of Natural Resources

Nicholas Swadling
Emerging Industries Development Officer, Department of Primary Industries and Fisheries
Topic: Wildlife sustainability, management and use in south west Queensland

Thanks very much to Rachel for the invitation to talk to you today on emerging industries and the sustainable use of some of those wildlife that we have out here such as kangaroos.

(Slide 1) My position was created as a result of industry pressure on government actually to provide some sort of liaison between industry and government departments, and basically that's what my function is to do. And some of the industry development roles that come in under that are native timbers, goats, camels, macropods. And you might say that some of these industries aren't emerging, but they nevertheless fall under my responsibility. Unkind people call my position the novel industries development officer, but that's a bit cruel.

On the twenty first of August we had a macropod industry forum out here, in Charleville, it was the first of its kind for quite a number of years, and it was as a result of industry asking for some sort of help in order to plan for the sustainability of their industry into the future. So we invited around about sixty odd industry representatives, right across the board from processors to chill box operators and of course the government departments were represented there, harvesters, and also land owners in the form of AgForce representatives. Now, I think we had fifty two actually turn up which was quite significant for us.

Out of that, they raised eighty issues, which we refined to around about twenty nine, thirty, and took them further down to five of their most important issues, that we could actually cover within the next six months to two years and to come to some sort of conclusion. And out of that, the top issue was the sustainability issue, for the animal, but also for sectors of the industry.

Now, Queensland Parks and Wildlife Service do a great job of maintaining the sustainability of the animal. We don't have any dramas with that whatsoever.

The DPI focus is on the sustainability and the profitability of that industry, and that's where we have a monitoring role of what QPWS does, also Safe Foods and also some of the government departments. In monitoring, its more along the role of facilitation and liaison with industry, so we get them talking together.

The macropod industry in Queensland, or in Australia, is around about two hundred and thirty million dollars in return to Australia. Queensland gets sixty six percent of that, so it takes about a hundred and four million. It employs over four thousand people. Within Charleville you've got around a hundred and fifty seven macropod harvesters, we don't use the term kangaroo shooters any longer, they've been upskilled to macropod harvesters. So we have a factory up the road there which is called United Game Processors which has been recently built, 2005 I think it was opened. They employ around about sixty to sixty five people. May of those are non Australian born people. The same with the goat works down the road, they employ around about a hundred and thirty people. We find that those two plants are of a great economic benefit to Charleville, however the whole industry, the whole macropod industry is of enormous importance to regional Queensland.

We had other operators from other states coming into Queensland to source a Queensland product, and whilst many people regard against that as an invasion of you know their territory, if you look upon it as being effective and exciting competition that raises standards all over, I think that the boom will improve in the future when further plants are established in Queensland or interstate.

Most of the products go for domestic consumption these days due to the export market, around about seventy percent. Thirty percent goes to between skin and pet food, but the human consumption market is really driving prices upwards.

Kangaroo numbers have fallen in recent times, fluctuations in population from around about fifty six million down to about thirteen million. But based on the way that Queensland Parks derives its quota it's a completely sustainable harvest. If you imagine that every roo shooter, sorry, macropod harvester, has to buy a vehicle, has to buy a gun or rifle, has to buy bullets, maintains his vehicle, panel beats his vehicle just about every week, changes tyres frequently, its an enormous benefit to regional Queensland. And without those two thousand odd harvesters, we'd be a lot poorer in this area.

Now, I heard Chris Evenson throwing off about goats, and I just want to say that during the week I took around three University of Queensland Gatton students who were conducting a survey about goat producing. Now they know nothing about goats, its part of their fourth year studies they had to design a survey and take that out and then interview those processors. And it opened their eyes up, I can tell you that. We saw people who were dressed in rags and were very very hard workers, and but got nowhere and we saw other people who were laid back and were cruising. We saw differences in country types and differences in effect. Poor country, improved country, and some astounding things you know, erosion and all that sort of stuff attributable to stock management practices.

So I just, I went home whilst Ian Beale was talking, I'm sorry I missed your talk Ian, but I just wanted to round up some photographs that the students took out along the Adavale road so we'll just move onto that.

(Slide 2) Animals and their effects on the landscape.

(Slide 3) Okay, now this is country along the Adavale road. I can't divulge where this is at the moment because I haven't got their permission to, so we were out there looking at the effects of goats.

(Slide 4) And its typical country out that way.

(Slide 5)

(Slide 6)

(Slide 7)

(Slide 8) That's one of the students there. Well fed.

(Slide 9)

(Slide 10)

(Slide 11)

(Slide 12)

(Slide 13)

(Slide 14)

Audience 1: Are these all on the same property?

They're, one's right next door to the other.

(Slide 15)

Audience 2: Are they all around about the same time?

They were taken the last Tuesday, so that, remember they're in drought, and you can see the effect of goats on the country. Except the country that was good, grassed up, all the rest is sheep and cattle. And that place that's grassed up has had its sheep and cattle removed for the last seven years and its been loaded up with goats heavily, and the change in that place is absolutely extraordinary, I just couldn't believe it.

So, whilst we're ready to stick with stereotypes about grazing animals, I think that its paramount that a, experience comes into the equation, and also good science, and that's why I'm pleased to see this science symposium held here today.

Now, I don't run goats, I've never run goats, but some of the country that I've seen is extraordinary. And the changes that have occurred in it as a result of using goats in it for a particular purpose is good. You know but I've seen other country where its degraded, like I looked after Mariala National Park from 1992 to 2003 I think, and we had a goat problem out there and the effects were detrimental to that place, but the numbers were light. So whilst we might say that sustainable grazing capacities, what are they you know, is a low number of goats worse than a high number of goats held over short periods? So I suppose, rather than sticking with stereotypes we actually use science and experience and research to look at how we're going to go and how we do manage our country.

There's a question with camels is that right? We're advocating the use of camels for weed control at the moment. Similar to the use of goats for weed control, but my role within the goat sector is to change from feral goats, and get people, rather than just harvesting feral goats if they're going to do that then to actually manage those goats behind wire and make it a sustainable industry for them as part of their diversification.

Similarly with camels we don't want to see camels develop into a feral problem in Queensland much like they have in the Northern Territory, South Australia, Western Australia. We want to prevent that so people are already using camels for weed management in Queensland, and we want to make sure that at the end of that period, at the end of their useful life, they have some place to turn them off to. Now that's proving more difficult to establish than we ever thought. But it comes down to lack of capital, and lack of history I suppose in the use of camels in Queensland. Probably the way to establish a camel industry in Queensland is to collect from the wild in the other states and bring them over, do their job as weed eaters and then perhaps instead of sending them off to a red meat abattoir is to actually game kill them similar to kangaroos. And perhaps then that may be an avenue that we can then get some sort of economic return for those animals. That's pretty well it. Thank you.

(Questions and discussion)

Geoff Edwards
CEO, South West NRM

Can we put our hands together and thank Nick very much for today? There's a bag for you. Okay, Chris has spent twenty four years in western Queensland. Fifteen years in the DPI, he worked in the Charleville Pastoral Lab, so its not true that all those old timers have disappeared. And he's been managing national parks in western Queensland until 1998 and he's now in the nature conservation extension area of the EPA. So thanks Chris.

Chris Evenson
Regional Extension Officer, Southern Region, Queensland Parks and Wildlife Service
Topic: Conservation opportunities and Nature Assist

I'm going to liven thing up for the afternoon with a few pictures and just chat to you a little bit about some of the programs that we've got in QPWS EPA when it comes to encouraging people to manage their conservation values of the properties.

But before I do that I would just like to reminisce a little bit about my days in DPI. I think I gained most of my knowledge from about half the people who are in this room. And one of the first people I came across when I moved to western Queensland, when I was eighteen years old, straight out of Gatton College, was I.F. Beale over here. And he was part of a gaggle of scientists in Charleville Pastoral Laboratory that expanded my mind. Before that, I was interested in cars, trying to figure out what girls did, and that was about it in my life.

And these guys, the discussions around the smoko room that was full of scientists, they were absolutely amazing. They ranged from Bealy trying to make Bill Burrows stop smoking by putting gun powder in the ash trays, which didn't seem to work but it shook Burrows up a bit, through to some very in depth discussions about how the ecosystems that we're still managing today functioned. And they were very very lively debates.

I guess, for an unclaimed brain like mine, one of the things that we used to do when the debates got really really heavy was we'd stand at the end of the table and try and catch the ideas as they went over the top. We caught some of them. And I guess our job became, apart from trying to keep the scientists alive in those days, our job became trying to take what these guys were discussing and were pontificating about in a very scientific world and trying to apply it in the outside world with the graziers, our clients at the time. And I gained my experience somewhere in amongst all that. And when I got some ideas from Bealy I went out in the field with people like Hughey Brown and Bean Schmidt there and all sorts of funny things would happen. But in amongst all those funny things happening we'd come up with some pretty interesting ways about managing the landscape.

(Slide 1) So what does the landscape mean to people? I'm about, well I guess these days I'd say I do nature conservation. So I try and take what our scientists in EPA are saying and I try and mix that up with whatever people are doing across the landscape to try and preserve biodiversity as best I can.

There's eleven of me across the state. The nearest one to here at the moment is a guy called Richard Johnston based at Roma. Richard's on leave which is why I'm speaking to you today.

So we go about our business by I guess meeting up with all sorts of different people and trying to coordinate all the opportunities that are coming past the landholder who might want to try and do something about conservation. It could be finding some funding through an NRM body, it could be finding some advice from some people in Brisbane. There are some clever people who've got some really good science going on. It doesn't really matter. It could be getting the shire councils to meet with some of the private landholders to negotiate or build a corridor or corridors across the countryside.

We've got a tool we use primarily for that function and its called a nature refuge, and I'm going to talk about a nature refuge and the nature refuge program in a minute. But what I thought I'd say to start with, to lighten things up, give you an idea. Everybody has some perceptions about what western Queensland is about and what it is that's so precious out here. And I guess today we've heard a lot of those ideas.

(Slide 2) And there's a famous sort of dude called Henry Lawson who was a cranky sort of bugger, lived in the city, he went up to Hungerford. And on his way up to Hungerford he wrote this. To set the land out west is grand, I do not care who says it. It isn't even decent scrub, Nor yet an honest desert; Its plagued with flies and broiling hot, A curse is on it ever; I really think that god forgot the country around that river. Now, I tend to disagree with him. And being an optimist I reckon a couple of white ants at least a few geckos could use that stump, and the big plain there is probably a great place for rappers to go harvesting kangaroos as they're going across, running across there perhaps, or a goat.

(Slide 3) So I thought I'd just throw up some of my visions of what the conservation values in western Queensland are, and particularly in the South West Strategy area, the important ones. And the one's I'm going to show you here all come from some devolved grant work that we did a few years ago now out this way, with South West NRM. This one's up on the Paroo River, near Cooladdi and it still looks like that. Probably not as green at this time of the year.

(Slide 4) Warrego River. On the flood plain down south of Cunnamulla. Nice big native pasture growing there after a flood.

(Slide 5) Out at Lake Dartmouth out at Adavale Road. Doesn't happen very often out there but when it happens, its full on. And it just becomes the most incredibly productive landscape. It can do that on a small flood but it can do it even better after a really big flood and endure that for quite some time.

(Slide 6) Ambathalla Creek which feeds into Lake Dartmouth. A very much a permanent waterhole, I don't think its been completely dry this century. A beautiful piece of waterhole. Great habitat for bats, koalas and things like that.

(Slide 7) Now this is one of Bean's great ideas, and I apologise for putting you in the picture Bean. This piece of countryside we've debated I guess whether you should or shouldn't strip pull mulga.

This was an area that I think was quite a successful strip pull of mulga. Bean pulled along the contour and he did a couple of strips bigger through that country. As you can see he's got a bit of pasture growth reaction. But he's still got some trees for storage for fodder for himself but also places for birds who like to stay in the forests, small geckos and things to live in.

(Slide 8) We did have some very big wetlands in western Queensland. And some of my, one of my friends here would recognise this one straight away, Lake Wyara, the salt lake down near the border, south of Thargomindah, on Currawinya National Park. But they're not just on the national parks. There are thousands of small and large lakes all the way across the South West NRM area. They come to life whenever we get good rain. And they function in marvellously different ways. They're the kinds of things, kinds of areas that I think as a national parks type person thinking from a green point of view need a fair bit of protection. Habitat and home to a lot of what do you call them, migratory birds, and also some of the locals.

(Slide 9) And right next to it, three K's away, there's a freshwater lake, Lake Numulla. Now I was going to toss up to Geoff that perhaps he could sell the water from Lake Numulla to Brisbane and get a fair price for it at the moment, but I thought that might be a bit extreme.

(Slide 10) So Henry Lawson didn't like the country side. We've heard some people talk today about why they do like the country side and why they're living here, and their issues that they're concerned about in living here. A guy called John Sommerfield, or Jack as he's known, was published in a book just recently that the South West NRM's book which is the Paroo Life A Journey of Faith Flood and Dust by Matt. And Jack said this and I thought this was important, this probably captured a lot of people that run properties in western Queensland. We could walk out of here tomorrow and have a much more financially prosperous lifestyle, but we made a conscious decision that this is not what we want. So he's staying.

And I think I heard over a conversation over coffee today somebody saying that they might be better off not actually running certain animals on their property, that they might be better off actually investing the money. But they still go about, they want to go about running their business and doing things with domestic animals which is great.

So I've just shown you a few conservation values from a visual point of view. The scientists in the room have probably already assessed a list of about five miles long of what would have actually lived in each of those habitats. The graziers in the room probably thought well we could probably get a good yellow belly in there, and a good place for a camp, and a great place to water the stock, and a really nice place to be able to appreciate the wildlife.

(Slide 11) I went round in 2003 I think I went grabbed these little grabs from a book somewhere. And in the Mulga Lands, and we've discussed this already that there is a degradation going on. We've got sixty six distinct regional ecosystems.

We've got five endangered communities, in amongst there, and you'll see mound springs are one of them. And we've got twenty two of concern communities including river red gums and alluvium.

(Slide 12) We've got three endangered fauna species, we've got nine vulnerable ones and we've got fifteen rare ones. And that's what we know. And we've been talking about the fact that we don't know a lot of things today.

(Slide 13) So nature refuges, where do they fit into all of this? Well you've got the science, you've got the guys doing the stuff on the ground. And the people on the ground could be people in the shire council, they could be people from another government agency they could be people from DNR, they could be private landholders, they could be large companies. Some of them identified that they have got conservation values on their area and they are also very proud of the fact that they can manage their conservation values in amongst their normal sustainable production that they do. And some of them are fatalists, like they realise at some stage in their life they're going to move on. And they're looking for something that might actually secure the way that they manage that land into the future. And that's where nature refuges come in.

(Slide 14) We've got a stack of nature refuges. The nature refuge mechanism occurred in 1992 when the *Nature Conservation Act* was declared. But it really didn't start getting exercised until the last few years. We've now got two hundred and forty nature refuges across Queensland, so all those little blue dots that you can see in down in the bottom area down in Brisbane where I come from, there's a stack of blue dots on top of blue dots. In amongst that there's five hundred and sixty thousand, or more than five hundred and sixty thousand hectares, that are signed up to an agreement.

So what is a nature refuge agreement? Well it's a binding agreement that ties to the tenure of your land. It's the highest level of protection that you can afford when it comes to conservation to a piece of privately owned land. It doesn't take away the fact that all your rights that you own the piece of land, no matter what kind of organisation you are. It does set out the principles to which you're going to manage that area. It identifies what the conservation values are of the area that you want to manage, and then it sets out how you might go about doing that. It's signed off between our Minister, and its done in Parliament.

It then becomes a piece of legislation, subordinate legislation, that stays in perpetuity. So if you sell that land its stuck tot that piece of land, those management conditions that you put on there.

Now we're not talking about the kinds of management conditions that say this week with this much rain we're going to put so many sheep in this paddock. We're talking about generally identifying what the conservation values are of that area. They can either be conservation values from the point of view of critters, or they could also be from a cultural point of view.

(Slide 15) Just a couple of examples for you just to quickly give you an idea of the range of places we have under nature refuge. Toomba Nature Refuge, forty seven thousand hectares has got four thousand head of cattle on it, their breeding and finishing operation. Mulligan River, it's a macro property, so we're talking big here, two hundred and fifteen thousand hectares. And they carry up to fourteen thousand head on that particular property. So you can actually do grazing and commercial operations on a nature refuge, but its under the constraints of the conditions of the thing.

(Slide 16) Carnarvon Station is with the Australian Bush Heritage Fund. And fifty nine thousand hectares was already brought for conservation purposes and they've put a nature refuge over it to secure that even further.

(Slide 17) So the initiative aims to develop landscape, whole of property approach to landscape management. When we assess people's nature refuges we're looking for linkages that run across the country side. They could be linkages that go down through creeks, they could be continuous pieces of vegetation, ridge lines that join from property to property. Something that's going to actually function across the landscape. Its sustainability comes into it, productivity can come into it. We do have nature refuges where people have just got them locked up for conservation and that's it, they don't want to do anything else.

(Slide 18) So there's some giggly gook some big type words that try and say what I've just said which is that a nature refuge is a binding agreement which you can put on your property which means that when you sell that property on people are going to continue to manage it for the values that you thought were really special, and that the Department thought were really, or that the government thought were really special.

(Slide 19) So the next stage of this quick, I'm quickly going to do a review of a thing called Nature Assist. So there's different ways of providing assistance to landholders that might go into a nature refuge. There's got to be some benefits and those got to benefit, particularly if you're coming from the point of view of productivity, if you're going to lose a bit of productivity, or its going to make some sort of change to the way you manage your place. Under the nature refuges, we have Nature Assist and we have a couple of different things that we provide there.

(Slide 20) Okay, we've got the financial incentives. It's designed to encourage and assist people on private land, and it encourages people to make the commitment. And it may or may not suit people. So we do have people who don't want to take up Nature Assist but they do want a nature refuge. The kinds of things we have, if you've just bought the block within twelve months if you start going into negotiations for a nature refuge you can actually be eligible for land tax and transfer duty rewards over the area pro rata, over the area which you put under it. And then there's the incentive tenure scheme, which is the one we've currently got running.

(Slide 21) And that's really horrible.

(Slide 22) And I don't like that.

(Slide 23) And I don't like that.

(Slide 24) I'll go to this bit. The incentives scheme provides the opportunity to actually tender, for some cash, to do some things on your property up to two years. The money comes from the federal government, it's managed by EPA. It also gets contributions from natural resource management groups across Queensland and that does vary from year to year. So it hooks into those sorts of programs. In around for an incentive tender, you put your hand up for an expression of interest. At the moment we've got an expression of interest out and if people are interested in doing something for conservation values on their property. They don't have to, this isn't binding, its just for them to put their hand up and say I'm interested. We take their name, address that sort of stuff, have a look at the conservation values and see if their property is or does have potential for a nature refuge, and then they get offered to tender.

(Slide 25) Now they can tender for a whole range of things. They can tender for management activities, I think I've got a list here somewhere.

(Slide 26) No keep going.

(Slide 27) Nup.

(Slide 28) Yep. So they can get for managing the areas that are going to regenerate you can tender for that. To fence sensitive areas, establishing water points away from sensitive areas, eradicating and controlling weeds. All those usual property management type things.

The tricky part about our incentive tender scheme through Nature Assist is its competitive, so you've got to put your hand up but you've got to be realistic about how much money you want. Then you get thrown into a pool and put up against a very large matrix which and also in front of a panel of three people who decide whether what you're tending for is reasonable. Now that's okay, but it's a little bit unknown. And for some people, that's a bit scary. For other people, they take the bit between their teeth and off they go.

We've got around about a hundred, sorry I'll retract that, saying about sixty, sixty successful tenders out of Nature Assist one, and we're on to Nature Assist two at the moment. So out of I think it was about a hundred and sixty applications we ended up with about sixty odd. So those people are going through the process of signing up their nature refuges once they've done that they'll get the funds and they can go ahead with the work on their property.

(Slide 29) So Nature Assist is one thing that's around the place

(Slide 30) to help you

(Slide 31) with your nature refuge, but I just thought I'd jump clean out of there, and I've got some documentation down the back of the hall here. There's some really good newspapers with the latest news from people who have nature refuges across Queensland. There's also some application forms and some more details about Nature Assist.

One of the things that they do now at the beach where I live, down at the Gold Coast, is that the shire council actually runs a conservation voluntary conservation type agreement type set up similar to a nature refuge. When you sign up you have, you actually get two thousand dollars as year just as a straight out ex gracia type payment to help you manage the property. But you also get a rates rebate. But that's a shire council that has a billion dollar budget.

So in western Queensland the councils don't have billion dollar budgets. And they're never going to be in a position to fund that kind of thing. So I guess I was just throwing that up for discussion later on, for whether there's some other either incentive or conservation agreement type scheme that could be considered for western Queensland under South West NRM. There may be potential for that.

Having said that, I'd better give you some history on our track record in western Queensland when it comes to nature refuges. In 1998 we had a hundred thousand dollars. Boom. Sitting in a bucket. We could give it to anybody who wanted to sign a nature refuge for that year. And we canvassed people all across western Queensland, we had meetings with graziers all over the place. And we got a flat rejection.

Quite honestly, we didn't really expect people to jump up and want to sign an agreement with the government, and right now I'd get that perhaps people mightn't trust the government as much as they as maybe they could at times. Nature refuges have a place. Right now we've got Nature Assist two out and I've got nine applications across western Queensland, starting at Roma and heading up through to Augathella. So there are some people that have actually shown some interest. So that's ten years down the track. People are starting to think maybe there is a place for conservation agreements on my property, which is a little step ahead for us. I guess we've got a long way to go. But there's a lot of wetlands out there and a lot of good country that has wonderful nature conservation values that could be included in our program. That's all I've got to say.

(Questions and discussion)

Geoff Edwards
CEO, South West NRM

Thank you very much, Chris.

We have one last presentation, and I'd like to introduce Bruce Boyes from Land and Water Australia. Bruce was involved in the Landcare movement and he did a particular study in the Helidon hills west of Brisbane, and Bruce is now the significant player in the Knowledge for Regional NRM programme.

And he's attempting to provide an avenue by which scientific data and knowledge can be made available to the world, including to decision makers and landholders. Would you like to welcome Bruce.

Bruce Boyes
Program Officer, Knowledge for Regional NRM Program, Land & Water Australia
Topic: Knowledge for Regional NRM Program

Thanks Geoff. We've heard a lot of discussion today about the connections between science and on ground outcomes, and I heard Geoff mention earlier today that something that he wants to take out of today is the issue of how we carry knowledge across the decades.

(Slide 1) Land & Water Australia is a major research investor. Every year we invest millions of dollars in research across Australia. And as an investor in research, we're extremely interested in the investments that we make reaching on ground activity, and also in that on ground activity coming back the other way and forming the reasons for the research that we do.

About four years ago Land & Water Australia really started to tune into the fact that a lot of its research was perhaps not getting to its target audiences, and that perhaps some of the research that it was investing in wasn't meeting the on ground needs of investors as well as it possibly could, and it was picking up a lot of sentiments similar to what's being expressed today about a lot of research that's been done over a long period of time that perhaps isn't getting its way into important policy decisions. So it looked at what it might be able to do about that, and developed this particular program that I am currently involved in, called the Knowledge for Regional NRM Program.

It was actually an initiative of the then Director of our organisation, Andrew Campbell, who has had a long involvement in Landcare and who some of you may know or may have seen speak at various events over time. He initiated this program which is getting towards its major completion now, and I think has really developed some good products and services to assist the sorts of issues that we've been talking about with the transfer of knowledge.

Just a little bit more background about our organisation. We've been around for about fifteen years. We were originally called the Land and Water Resources Research and Development Corporation, or LWRRDC. A briefer trade name was decided on a few years ago of Land & Water Australia because people generally resorted to the acronym LWRRDC and that didn't really mean a whole lot to a lot of people.

Land & Water Australia invests, as I said, quite a lot of funds into research, and earlier Teresa mentioned that part of her study work in the Mulga Lands here is a Land & Water Australia investment. We sit alongside a number of other research and development corporations.

For example, the Rural Industries Research and Development Corporation, that were all established at the same time, to assist rural industries with research funding into the future and hopefully Land & Water Australia will be around for some time to come.

This Knowledge for Regional NRM Program has had two major phases. The first phase concluded in the middle of 2006, and was an investigation and study phase. The second phase concludes in June 2008, and is a product and service testing and implementation phase.

(Slide 2) We've arrived at three packages of products and services that we're in the process of developing and rolling out. The first of those is called 'better practice in knowledge management', and it's a people type process. There's been a lot of discussion today about the social aspects of NRM, and any sort of program that we implement now has to have a people aspect. If we just focus on policies or information technology or other mechanisms, its not going to work. We have to have a people aspect. So this package actually has two packages that are focused very heavily on people, they are package one and package three. The second package is an information technology enabler called the NRM toolbar. The third package is about direct facilitation of research connections to on ground outcomes. I will be talking about each of these packages in a bit more detail in a moment

The first package is better practice in knowledge management is a people process package, and the key focus is on regional knowledge strategies with the fifty six natural resource management regions across Australia. You may or may not be aware that South West NRM is one of fifty six such regions established right across Australia through joint Commonwealth - State arrangements. The arrangements are slightly different in each state, but there's a common element. Each of those regions has a natural resource management plan that guides investment in on ground outcomes, and that investment is made by both the Commonwealth and the State governments. Some of the bodies are community based, which is the case in Queensland, others are statutory authorities for example in New South Wales and Victoria, where they have roles in the delivery of government policy. For example in New South Wales the regional bodies implement vegetation management policy, whereas in Queensland the bodies have an independent community type structure. So there are differences across Australia but there are common elements as well.

These regional knowledge strategies that we hope eventually every natural resource management region will do take them through a process from their current situation to an end point where they will be able to much better manage their knowledge and information for natural resource management outcomes.

South West NRM is one of five pilot regions for the regional knowledge strategy process that we're developing for regions across Australia, and through the pilot region approach we're actually real world developing the process. It's not something that we've just cooked up in Canberra and said righto, here you go, do this.

It's a process that's been integratively developed through the five pilots that are scattered right around Australia, so that we're developing a process that will actually work, and will actually achieve outcomes. South West NRM is about two thirds of the way through their regional knowledge strategy process, and that will be drawn to a formal conclusion in about a month and a half's time, and then an implementation phase will follow.

(Slide 3) There's a resource that will back the process up, called the Regional Knowledge Resource Kit, which will be an online resource that other regions will be able to use to both develop a regional knowledge strategy, and also access a lot of data, knowledge and information resources. The process that we have used for regional knowledge strategies has actually drawn heavily on information and knowledge management expertise from outside the NRM sector. In the earlier stages of this program it became very apparent that within the NRM sector, there wasn't a high level of expertise in information and knowledge management.

Yet in business, and other parts of government, they've actually had a specific focus on information and knowledge management for many years. So we felt it was desirable to draw that expertise in, and two thirds of our team actually come from other sectors where knowledge and information management is heavily embedded and that has meant that we really have been able to come up with a much better process than if we'd just focused within the NRM sector. So these regional knowledge strategies involve basically a process that has been used in business and other government sectors for many years, and very successfully but had never been seen in the NRM sector. So we feel that we, through the involvement of that external expertise have developed something that will be really good.

The Regional Knowledge Resource Kit resource is just about complete and South West NRM will have access to it in about a week's time, and then it will be more widely available in about a month, when the next item that I'm going to talk about, which is the NRM toolbar, will be released in its first version.

(Slide 4) The NRM toolbar is similar to the thinking of the Google toolbar you may have on your computer desktop. Rather than create another website, to assist people to access NRM information, we decided that the best contribution that we could make would be to create an NRM specific toolbar that can sit on anybody's computer desktop, and can become an enabler to assist them to better access NRM knowledge.

If you have a look, on the left hand side of that green toolbar, the first item there is an NRM specific search engine. We heard Ian earlier talk about his experiences with Google, and of how in a Google search on his name he ended up with an awful lot of stuff that he really didn't want to see. Just a lot of stuff that you get every time you try and do a search for NRM information using these generic search engines.

So we felt that there was a need for an NRM specific search engine, so we've developed one that will look at only a series of Australian NRM related sites. One of those will be AANRO, we'll talk about what AANRO is in a moment, for those of you who are not aware of it.

The NRM Toolbar also has state agency data bases, university data bases etc. That will mean that you can go to this tool, or you can download this tool bar and use this search engine to find just NRM information about Australia that is going to be relevant to your needs, not the whole lot of other information that you don't need.

Also on there will be direct access to those data bases, which is the next item along. There's an alert system so if new material is added to any of those data bases that is in a particular field of interest that you will be able to set up the alerts to say that you will select fodder harvesting or something like that and you will only get alerts when a new piece of research about fodder harvesting is added to one of those particular data bases. So it will narrow down the information flow, making it so that you can get specific things that you need.

One of the biggest issues in the NRM sector, as with just about every other sector, is information overload. And if you just pause to think about how much information we generate now, compared to say a hundred years ago when it was possible to have one expert that probably had a knowledge of just about all Australian biodiversity. If you think about the volume of information that we generate even just in one year now, its going to be more than what one person knew a hundred years ago. We don't realise that the volume of information has grown exponentially over time. And next year there will be even more information generated than there was this year, and its just an upward curve.

If we don't find ways of filtering and providing specific information to people, people are just going to get buried, and that's what's happening. There's a massive amount of information out there and people are getting completely overloaded.

Moving along, there's another item that you will see that is called my library. That's where you'll be able to identify specific pieces of research, and mark those, in your favourites list, and you'll be able to share that with other people. So you'll be able to identify a whole lot of research findings that are relevant to your work, and then share that with others so that they can then benefit from your expertise. And similarly, you can benefit from theirs.

Moving along, is librarian support which we've changed to a product called 'Gotta question'. For NRM people who are unable to find a particular bit of research that they need, we're actually providing a human service where we try to connect you with particular research, and we'll also try and broker research where its needed, and set up new research activities if there's a research gap identified.

The next bits along are simply functional parts of the tool bar to do with registering a profile of what you might want to get in your alerts etc.

The NRM Toolbar, in its first version, will be released in the first week of October 2007. It will have about three quarters of the functions that the final tool bar will have. The first version will have the NRM search engine, and that's being set up at the moment. So look for that at www.nrmtoolbar.net.au, and also the Regional Knowledge Resource Kit that I spoke about before will also be available at the same time at www.rkrk.net.au.

(Slide 5) Also being made available through the NRM Toolbar is a linkage to a revamped AANRO. AANRO is the Australian Agriculture and Natural Resources Online database. It's been around for a little while, but it's been around in what's called a gateway type format where it's been just a library listing of research that's been done in the agriculture and natural resources field. If you went onto AANRO and you followed through and you found a particular bit of research, all you got was a summary of it. You couldn't actually access that research although sometimes it would give you a web link.

So Land & Water Australia is revamping AANRO, and AANRO will actually become what's called a full text repository, where full research will be deposited into AANRO. So when you go to AANRO, or use the NRM Toolbar to access AANRO, you'll actually be able to go directly to full text items of that particular research.

The aim of AANRO was to stop the loss of research that's been occurring over many years. We've had a number of people talk today about a lot of published and unpublished research on this geographic area that people seem to not know about. Well, AANRO was designed as a place to deposit that research, and it's a collaboration across Australia and includes Queensland government agencies who are co-investors in AANRO. Its there for your research, so please use it as a place to permanently put your research outcomes and also your research in progress so that people can actually get access to it. Not just this year when you may produce a CD ROM or something like that, but in ten years time or twenty years time. The collaboration that's gone into AANRO means that it will exist for quite some time, and become a preserver of legacy of science.

One aspect of that AANRO revamp will be the establishment of Evidence Bases. And you may have heard mentioned here today, or been otherwise aware of South West NRM's information hub. South West NRM is one of a number of regional bodies around Australia that have started to establish regional information hubs or Evidence Bases, where they are storing their research into AANRO, but having their own regionally specific access point into AANRO. So when you go to South West NRM's website, or one of these other region's websites, for all intents and purposes you are on their website, but you are actually accessing the AANRO databases behind it. And the benefits of storing the region's information in an Evidence Base are that it provides a greater security of that legacy in the longer term, but it also means that other people beyond your region can access it as well far more easily.

The Evidence Base software is expected to be available in December 2007, and the revamp of AANRO is anticipated for completion in mid 2008

(Slide 6) The third package is knowledge brokering for the NRM sector. There are a number of activities in there that we're doing, including communities of practice where we're assisting people to set up knowledge exchange networks.

One of those was actually mentioned earlier by Phil, with the Queensland Department of Natural Resource and Water's knowledge systems. We've been working with them to assist them to set up a knowledge systems network, and part of that is now up and running. If anyone would like any information on that I can give you the contact details for the Natural Resources and Water person later. I would very much encourage you to tap into that group as it will become a platform for sharing information about these types of initiatives that are aimed at knowledge sharing. It's not a science sharing group, it's a group that's sharing information about ways in which to share information. So it's open to for example CSIRO people and other research organisations involved as well. Natural Resources and Water has set it up, and we've provided some assistance in doing that, but its open to anyone and I'd encourage you to get involved in that because it's a really good initiative.

Another aspect of the third package is trying to stimulate systematic reviews in research in Australia. We've heard quite a bit about journal articles that have been produced that are not relevant to the user audience, we've talked about information overload and masses of information that are available and out there, and we've talked about the need to actually distil that into useable products that people can actually do something with.

Well the NRM sector is not alone in having to deal with these particular issues. To get some guidance on this we've actually looked at medicine and education. In order for a medical practitioner to keep abreast of the whole movement of information in the medical sector, a GP would have to fully read, two journal articles every hour, twenty four hours a day, seven days a week, for their whole life. That's just to keep up with journal articles, not everything else that a doctor has to keep up with.

So medicine has had a very substantial focus on just how it can take that huge volume of information that a GP has to try and take in, and turn that into specific answers to the issues that a GP needs to address. Systematic review is the tool that they have developed to do that. A systematic review is a way of synthesising a whole range of research into a product that is much more than a literature review, and there's a key aspect of systematic review that distinguishes it from other synthesis or literature review, and that is its objectivity. Its genuine science, a way of distilling science into a usable product that keeps the science in there.

So for the sort of issues you've been talking about in the Mulga Lands, you may want to look at systematic review as a way forward. It hasn't been used in Australia to date, with the exception of one project. But systematic review has been widely applied to conservation overseas.

(Slide 7) The Centre for Evidence Based Conservation in the UK is the pioneer of that, and you'll see in that information on the screen there, that its objective was to use systematic reviews in conservation and the environment and natural resource management. To date, there is one Australian project that has appeared on the website, and that is a project by the Department of Primary Industries in New South Wales looking at fox control. So from the appearance of this in 2003, which is only four years ago, it has expanded considerably in the UK and the first project is up and running in Australia. Our program is investing in another two trials, and hopefully, in ten years time, systematic reviews will be a matter of fact in our sector.

I would encourage all of the researchers in this room to go away and have a look at the Centre for Evidence Based Conservation website www.cebc.bangor.ac.uk, and have a think about how you may be able to use systematic reviews to deal with that information overload, and to produce things that are genuinely scientific for a user audience.

(Slide 8) So just to wrap up, here is the website for the Knowledge for Regional NRM Program where you can find out more about the products that I've spoken about. In particular the NRM Toolbar and Regional Knowledge Resource Kit .

(Questions and discussion)

Open Forum Discussion
Facilitated by: Geoff Edwards, CEO, South West NRM
Topic: How can our understanding of science and change in south west Queensland assist us in determining priorities for natural resource management?

I'm absolutely amazed at our selection of speakers, all of whom have given us in depth insights ... and I'm just delighted that we've had such positive presentations. The program allows us to go for another fifteen minutes or so with an open forum. We also have time available tomorrow morning before the plane's go, and we had intended to just have a fairly informal session, upstairs I think in this building, for those who would like to stay and talk about these issues in a more informal setting. …

Because we do have a challenge of taking the kinds of knowledge that we've got and put it into regional NRM plan language that will guide investment for the next five years so we will proceed with that at nine o'clock in the morning. … How's everyone feeling have you got another fifteen minutes stamina left to go to that time or what would you like to, would you like to round table some of these issues? …

Would anyone like to open up with a discussion now or have you had enough for today? Would anyone those who haven't been speakers like to make a presentation?

(Open forum discussion commences)

I think that everything that I had optimistically hoped might be able to be achieved today has been achieved. Disappointing numbers of members of the Charleville public but other than that, we've made some connection with some old timers who'd dropped out of obvious sight in this town or in this region but who are very much still a part of the research network. We've had quality presentations from everyone here … they'll go on the website … but all of those will go on the website and they'll also be contributions to knowledge.

We've received some interesting leads that we will develop and implement into our NRM plan, and we have revitalised our optimism that science is alive and operating in our region as well. There are some capable people around here who are doing some very competent science and science related investigations. We haven't as yet got a distilled list of headings that we will put into our Regional NRM Plan, but that is something that we can focus on and the subjects that have been presented haven't been presented under the same headings as our table of contents in our Regional NRM Plan, but that's something that we can work on and maybe attack the issue of today. I'd rather not focus on the plan as the end product of this as the aim of today, as it is only one document. But it is important for scientists to come together to inform policy and decision making, and all of you here as a group of strategic people we can work with for a long time. And also, use the plan as a vehicle for policy and science such as been discussed here today can be included … and may become a major program. So I'm seeing the plan as a vehicle for taking some of these ideas forward and putting them on policy agendas and on finance agendas.

(Open forum discussion continues)

I would like to just say an enormous tribute to Rachel who has organised this Symposium from a distance with only about three weeks notice, and I can't think of any part of the logistics that haven't gone according to plan. So I really would like you to put your hands together and give a warm thank you to Rachel.

Can I also just thank you all once again. Everyone who has attended her has made this a success. Particular thanks to the speakers, some of whom have come a long distance, and for their time and preparation. I wish you a safe journey for those who leave tonight, and for those who are staying we invite you to proceed with some more discussions tomorrow.

Peter McRae
Queensland Parks and Wildlife Service/ Environmental Protection Agency
Save the Bilby Fund

Just a special thanks to you Geoff for the support that you've thrown into this whole thing and to South West NRM. To me its good to see someone with the drive to make positive changes to the future out here in south west Queensland, so thanks very much.

Conference close