



ORAL HISTORY COLLECTIONS

Interviewee: Doug Benson

Interviewer: Jo Kijas

Place: Royal Botanical Gardens, Sydney

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TRANSCRIPT

0.00 **JK:** This is an interview with Doug Benson and Jo Kijas on the 24th of April 2012 at the Royal Botanical Gardens for the Shared Terrain Oral History Project on behalf of the City of Sydney History Unit.

So, Doug, could we start; just for the tape give me your full name and your year of birth and we'll go from there.

DB: Douglas Howard Benson, 1949.

JK: Thank you, Doug. O.K, can we start with exploring a bit of your work background and personal background so that we can give some context to the work that you've been doing? So perhaps start with the work that you're now doing and how long that's been. Start with the work.

DB: O.K. Well, I've been a botanist with the Botanic Gardens here since 1972. I came in by way of a New South Wales government traineeship which I got while at university doing science. Indeed, I never thought of being a botanist back when I was at university. In those days if I thought anything of botanists it would have been from my school training with Joseph Banks as a botanist and Allan

Cunningham as a botanist and so at the time I would have thought botanists died out in the nineteenth century. But I've always been interested in plants and indeed from the age of five I think there are photographs of me bringing home plants on a little wagon from a local fete to grow in the garden.

2.02 So I always had an interest in living things, keeping animals, growing plants, not a background in bushland interestingly enough. When I was at school I grew a few native eucalypts that my father brought home from the Forestry Commission nursery but it was only when I got to university and into second year botany that I was suddenly confronted with acacias and boronias and gum trees. I'd never really even thought about them before because I was from an urban background. I grew up in Concord which at the time was very suburban and in fact the bushland in Concord then was mainly mangrove and saltmarsh swamps in the embayments of Sydney Harbour and indeed at the time these were being filled in. We went down in the car on Saturdays with loads of rubbish and tipped these into tips to fill in the mangroves and my father would say "Isn't this wonderful? We're cleaning out all these mangroves, filling this in to make lovely green playing fields". So that was my background. Interestingly enough, I instinctively didn't like filling in the tips. I liked the tips, I collected various odds and ends from them but filling in the natural areas somehow I didn't like it but at the time, of course, this was the general ethos and certainly my father's view so that by the time I was at university and came across botany that was my first interest in native plants. As I said, I got a traineeship with the Department of Agriculture and I was surprised when I got the letter saying "You will be a botanist at the Royal Botanic Gardens" because as I said, I didn't think these sort of things existed and I didn't realise that people were botanists at the Botanic Gardens.

4.08 **JK:** **So just to go back a little bit though, did you also say something about your father going to the Forestry Commission?**

DB: Yes. Well, my father, he was interested in the bush, actually. He had grown up in Gordon, adjacent to the bushland there, and he had spent quite a bit of time during the Depression, helping his father collect bush rock from the back creeks and ridges behind Gordon and bringing the bush rocks back into my grandfather's garden and building a beautiful garden there. My time as a child with gardens was going to grandfather's garden where you walked around all these paths between the bush rocks and so on and saw a beautiful garden there. My father also talked about – I mentioned that I was interested in wildlife and my father talked about my grandfather's aviary which

was full of finches of various sorts and so on and how people used to go and trap these finches down the back and so on and keep them in aviaries. So I suppose it was a bit of a feeling that the past was much richer in wildlife in a sense than the present because of what my father said about the bush and the birds and so on.

JK: And did you spend time out there as a family, would you go out into the bush?

DB: We did all the things that families did in those days. We went to picnics at Warragamba Dam and the other dams, Cataract, Cordeaux, Avon, Nepean; I think we ticked all of those off. We didn't really go for bushwalks.

6.04 My father saw the dams as being wonders of the modern age, damming up the water, providing improved water conditions for Sydney and so on. It was really engineering things that he was impressed by and so, yes, my interest in nature was really not really encouraged by him but not stopped by him. In effect, I took over the garden from him gradually and that's where he did buy me these trees from the Forestry Commission because I must have been interested in native trees because he brought some Tasmanian Blue Gum and a couple of things that were then really the only native plants you could actually buy. So I planted those in various spots and they got knocked over a few years later when we extended the house but that's all part of it. He brought home some blue-tongued lizards on occasion which he'd found crossing the road somewhere when he was driving around and in fact I kept those and they had babies and so on. I was very interested in that sort of thing; we had goldfish. We went and bought finches at the time and I realise now that those finches were obviously wild, caught at the time, because they were so flighty in the aviary and so on. So I suppose that was my part in creating the demand that led to the loss of that wildlife at that time. After all, this is the 1960s and I think nature had a pretty harsh time in the 1960s. People were still shooting birds and so on, trapping things, Australia unlimited was the way of the time so the mangrove, filling in the mangroves, as I say, for beautiful green playing fields really summed up what the general outlook was.

8.17 **JK: So once you got to university and you got your science degree and you found this new interest and whole new field, how did you actually come to be sent to the Botanic Gardens?**

DB: O.K. One day in second year university I happened to come across a form from the New South Wales government which talked about

traineeships and had various boxes you ticked off. One's agriculture, veterinary science, agronomy, forestry, botany. "Ah, Botany", I liked that so I ticked botany. I ticked forestry too, just to be on the safe side. A few months later I got an interview under botany and I went along to that and at the interview I was asked "Are you interested in plant ecology?" and I said yes. I genuinely was interested in plant ecology. I was interested in the landscapes by this time. In second year uni we started talking about the identification of eucalypts and so on and I'd started looking at the landscape eucalypts on slopes, ridges, valleys and so on, so I was interested in the landscape. So when they said plant ecology I genuinely said yes but at the time – people know about ecology these days – but at the time it was relatively unknown; in fact, we didn't even have it as a subject. So anyway that was my response to the interview.

10.07 Anyway, after Christmas I got a letter saying "You have got a traineeship to be a plant ecologist at the Botanic Gardens in Sydney" and this really amazed me, I was very excited about that. And I was to turn up at the Botanic Gardens in a couple of weeks or whatever it was and then I was to spend my vacation times working at the Botanic Gardens and then I was to get a job there. I don't think they guaranteed it but that was the plan. So I went down to the Botanic Gardens and they were a bit surprised to see me because the employment was being done through the Department of Agriculture and the Botanic Gardens hadn't expected someone. But anyway so they could see it was plant ecology and they did have one plant ecologist there, so I spent my holiday, university holidays working with him. And at the time his project was to map the vegetation of New South Wales and this was a pretty big project for one person but now we did have two, of course, with me. So I spent the next two years at university – one of the conditions of the traineeship, of course, was that I do honours in botany and to do honours I had to do reasonably well in subjects from then on, so I really worked at my botany and got the appropriate levels. And when I was doing my honours, which was on eucalypts and so on I had an eye to mapping the vegetation of New South Wales. I was always when I was out thinking about "Well, here we have a basalt soil. What sort of vegetation is here? Here we have a sandy soil".

12.05 Since then, I suppose, I've always thought in terms of landscape and vegetation and factors involving them. Yes, so I finished off university and started at the Botanic Gardens and we started on our project of mapping the vegetation of New South Wales, which there being two of us was quite simple: one person did the left hand half and one

person did the right hand side. So, my colleague, John Pickard, who had been at the Gardens for a couple of years was interested in far western New South Wales, so he was working on a map of virtually the left hand half of New South Wales and I got involved in issues around Sydney because the eastern half is a very complicated half, of course, and when you're starting off you start off with things close to home so there was a project to look at the vegetation along the Hawkesbury River. This was a project with Public Works and there was a gentleman there, Harry Scholer, who was interested in what the native vegetation had been along the river at the time of settlement. This sort of thing was a bit unusual in its time that anyone should be really interested in what things were like historically but Harry was interested in flooding regimes and how they have change. So he was interested in the history of the river over the European time and therefore wanted to know how the native vegetation fitted in. So I spent a lot of time driving around, looking for the remnant trees, patches of rainforest along the Hawkesbury River. And I think I spent about a year on that project and that stood me in good stead for subsequent work because the Hawkesbury River was a very impacted system.

14.05 It had been impacted by the flood plains and so on, which would have had the best forests, were cleared in the 1790s around Windsor, Richmond and Penrith to some extent for the crops and so on. The sandstone nearby, the sandstone cliffs had been left. They were not suitable for cropping or for running animals. The shale areas that make up much of western Sydney were grazed. Well, there was some cropping but they were largely grazing areas. So I was working in an area where there were severe effects on native vegetation of European development through to virtually very few effects. So the Sydney area really is a very interesting area to look at relationships between humans, vegetation and between vegetation and different soil types and so on and I spent a lot of time on it.

JK: So once you'd done a couple of years on the Hawkesbury, is that when you then become more focused on the Sydney region itself?

DB: After the Hawkesbury I then tried to move out. So they're wanting vegetation maps covering larger areas, so we worked on western Sydney, the Blue Mountains, up into the Gosford area, out towards Bathurst. The other thing that was happening at the time in the '70s is that there is the environmental impact requirements and laws come in and environmental impact surveys are required for projects and part of this is to look at the flora and fauna and the impacts on them.

16.06 And so we at the Gardens were approached by the Main Roads Department – the Department of Main Roads at the time, now the roads and traffic people. We were also approached by the Electricity Commission which was building dams and coalmines and so on for doing surveys of areas that proposed for new roads or for coalmines, etcetera, and so we were able to employ other botanists and assistants and so on to do these surveys paid for by other sections of government generally. So over that time we did work for the Newcastle motorways through Brisbane Water, we did coalmines up in the Hunter, we did coalmines out at Lithgow and so on, work there, dams proposed for the Colo area and so on. There were a whole lot of horrible projects that were planned that luckily didn't go ahead. There was dams on the Colo that we were involved in that got stopped. The original motorway to Newcastle was actually going to go right through the southern part of Brisbane Water National Park and we were able to get us – not just us, there were people from Macquarie University at that stage involved in doing animal sides and so on and there was public opinion as well, of course but we did manage to get the motorway pushed to the north through to northern part now of Brisbane Water National Park but at that stage it was vacant Crown land so it was better than actually impacting on the southern part of Brisbane Water National Park. So there was a lot of environmental stuff going on then which we were involved in, so we were getting information on vegetation from all these projects to put into our mapping work and so on. So it was really a time of building up a lot of information. Yes, that was really an expansive period up until the mid '80s, I suppose.

18.14 **JK:** **So is this a good time to ask you about – we've sort of talked off tape about looking at the pre-European landscape and then the changing landscape around Sydney but to find out more about what this broad local council area of Sydney would have looked like, what sort of vegetation patterns.**

DB: Yes, O.K. I suppose we did these environmental surveys and so on up until about 1985, '86 was the major ones and at the same time we've got the environmental stuff, mapping going on. There's also an interesting bush regeneration and this is happening at the local council at the individual level. So we've got, initially it starts off with the Bradley sisters who worked out of Mosman and they were interested in looking after their bushland parks and they were concerned about weed invasion so they were going out and pulling out weeds and so on. The council's response at the time was – well, firstly they didn't really regard these weeds in bushland such as

privet, lantana, ochona and various things, they didn't really regard these as serious weeds because at the time the serious weeds were things that affected agriculture, so you couldn't really get something that was a weed in bushland as a weed because it wasn't a paddock.

20.05 So they had problems in there in the sense that the weeds invading the bushland in urban areas around Sydney were not really seriously looked at weeds and therefore no one was putting money into controlling them. So the Bradley sisters promoted local weeding, that you walked out and cleaned, gradually working on a series of principles, working from good bush to bad bush and so on. At the time, councils, if they did control weeds at all it was a bulldozer or an intensive spraying or something like that which they were opposed to because it really just created conditions for more weeds. So that was happening particularly in Mosman, actually, which was where the Bradleys started out. There was also fire involved in that too because one complication with the Bradleys' work was that they did have a councillor there who was pushing for burning some of the areas at Bradleys Head to improve the bush. They were opposed to that because they said "O.K, after the fire all the weeds come up because the fires tend to be low and not very hot and the weeds survive those and just do better afterwards". So there were issues there of weed invasion and fire and so on in urban areas that are still major problems as we go through but this was the first time that these issues were actually recognised as issues. And we at the Gardens here were often asked to comment on what should be done or to go out and have a look, so I did various surveys in bushland. I met the Bradley sisters and so on and talked with them.

22.02 The National Trust actually took up the Bradley sisters' issues in a big way in promoting bush regeneration in the '80s, 1980s to 1990s and there they set up training for bush regenerators and then got work in other council areas, so they spread it out further than Mosman. So there was, yes, this big interest in bushland regen [regeneration] and in fact in 1988 we had the Bicentenary [Australian] and so that was important in promoting bushland and so on as well as historical things which I'll get to shortly. As part of that here at the Botanic Gardens we put on a display in the visitors' centre on Sydney's bushland and that's where I prepared maps showing the different sorts of vegetation around Sydney on the shale areas, on the sandstone areas, on the floodplains and so on and clearly in my mind worked out what the vegetation was like. Interestingly, up to that point I'd been a bit confused by the sandstone areas. If you go out into the sandstone areas you'll see that there are lots of species there,

complicated geomorphology and so on and landform and someone at an earlier stage had said to me “Map the vegetation of Sydney. Goodness, how will you deal with the sandstone areas? It’s so complicated” and I think that had sort of overwhelmed me for a while, I couldn’t quite know what to do. But through doing these little projects I’d sort of worked out, “O.K. Well, look, if we just divide the vegetation up into the ridgetop vegetation and the gully vegetation” - which is more or less major groupings of drier stuff on the ridge and wetter stuff in the gully - “maybe we can just work on that”.

24.04

And so for this exhibition we worked out the sandstone. Instead of saying how complicated it all was, we said “Look, let’s just make it all the one thing and divide it into two and deal with it that way” so that it gets one vegetation type and then we’ve got our shale vegetation, which is grassy woodland, for western Sydney, we’ve got our floodplain vegetation, we’ve got our swamps and various things, so we came away with about six or seven vegetation types. That was our exhibition and that was well received and so we’ve got the idea of perhaps we should write a book about vegetation. So by 1990 we came up with a book called ‘Sydney’s Bushland: taken for granted, the bushland of Sydney and its suburbs’ in which we had two things. The first part of it was dealing with vegetation, interactions with the historical side, fire and various things like that but the second part was because we could see that there was so much interest from a suburb from a council point of view that really, to make people appreciate – well, not so much to make people appreciate their bush – the fact that there was bushland in all sorts of places around Sydney but it tends to differ in different places and people are most interested in their own place. We divided the book into various chapters, each dealing with a council area. Well, I think there was about – I’ve forgotten how many council areas there were – thirty for Sydney, I’ve just forgotten, but anyway that forced Jocelyn and I – Jocelyn Howell, who was my co-worker – to look at each council area for Sydney to try to get some idea of the original vegetation there because in saying “O.K, your council area”, such as Mosman or Sydney or Fairfield, “you’ve got this remaining” but we tried to give a picture of what was there previously so that you get an idea of “O.K, well that’s why these two bits remain, because the rest of it was all cleared for agriculture but these bits remain because they’re a sandstone knoll” or something like that.

26.15

So to try and get the context right you have to go back into the history – not only the context, how to evaluate what remains you have to understand the history. So we got involved in trying to reconstruct

patterns of original vegetation, it all leads to that. So we did the book and subsequent to that we did some various other books on different parts of Sydney, the Cooks River and western Sydney in particular. I've always liked the work we did in western Sydney because at the time people had said there's nothing of interest in western Sydney. All the Bradleys and so on had worked in the Sydney sandstone vegetation on the harbour and so on and really the idea of Sydney bushland was banksias and grass trees on our headland with an angophora overlooking the blue water, so when you get out into western Sydney and you see that it's clusters of trees and it's sort of grassy understory with a few spiny shrubs it hasn't got the same appeal, shall I say. But what we did find in western Sydney, of course, is that the vegetation is, as I've just said, quite different but it has its own values, that there are very many species there, that these species are small, many of them are little herbaceous species and that they differed in different places quite considerably, so small remnants were different from one another and this was important.

28.04 So anyway we did the work on western Sydney to try and promote the idea that bushland differs in different places and has value wherever it is, really.

JK: And so was it all that the local council area of [City of] Sydney, was that all the sandstone or can you tell me if there are some different colonies, patterns?

DB: O.K.

JK: Because I don't know Alexandria before it was – was there anything different there than, say, Glebe which I assume is much more of the sandstone?

DB: O.K, yes. Well, as I've said, I was always interested in western Sydney, I always left the Sydney area behind, but I was forced to come to grips with it because of our position here in the Botanic Gardens. And the interest in history started off with "O.K, what was it like when [Governor Arthur] Phillip comes on, how do we deal with that? What's the harbour and Sydney area like?" The City of Sydney area immediately has pretty well been cleared of trees but there are some remaining trees in the Botanic Gardens. There are some forest red gums out on the Domain, Mrs Macquarie's Point and there are some casuarinas that remain within the Gardens that are descended from the original plants and, O.K, we have some first-hand evidence of that. Back in the 1890s to 1925, Joseph Henry Maiden was

director of the Botanic Gardens in Sydney and he was very interested in history as well as plants.

30.04 He was a really forward looking director and he wrote – well, at that time there was still bushland in the outer Domain, which I think is essentially Mrs Macquarie's Point, and he listed up all of the plants which growing without cultivation in the outer Domain in 1903, I think it was, in his annual report. So there is a good list of all of the plants, native plants native to that area and I presume he looked after that area as bushland through till his time till he retired in 1925. But subsequently in the 1930s the area was all cleaned up, a lot of fill put in, and instead of leaving the sandstone slopes with the bushland it was all filled and levelled and flattened to make it into lawn with a few trees, so most of that has gone. As I say, a few trees did remain; there's some blackbutt trees, forest red gum trees. The casuarinas I mentioned are marked or Maiden actually records them on one of his maps of the Gardens, I think in about 1920s, "original casuarina" – the casuarinas glauca, this is – casuarinas glauca is a long-lived tree and if you chop it down it will resprout from the roots and so on, so it's reasonable to think that "O.K, those trees that are there now and which in effect are little clumps have been there since 1788", shall we say.

32.09 If you look at the Gardens, the central lower part of the Gardens was reclaimed from the harbour by Charles Moore in the nineteenth century, so it was filled in and so on, the area beyond the restaurant and so on out towards the seawall. So you've got to imagine there being where Mrs Macquarie's Wall [Point?] is, just below that there would have been a little beach on the harbour and you can see that the casuarinas are a little bit around on the eastern side of that and so they would have been fairly close to the foreshores. So I've often walked 'round the Gardens, picturing it as a natural area. So we've got our casuarinas there; you'll see that there's Port Jackson fig trees further 'round on sandstone. Again, this would have been right on the foreshore although now it's a bit further back. As I said the tereticornis, we've been replanting them over the years using seed from the original trees.

JK: What were they called?

DB: Eucalyptus tereticornis. And I should also mention there are still surviving, a couple of them, some swamp mahogany trees that were planted along the garden, the wall within the Gardens, along what was at the time Mrs Macquarie's Road during Mrs Macquarie's time back in the 1820s. So there are a couple of those trees remaining. A

few of those died off in the drought of the 1990s and there have been some replacements. This was swamp mahoganies and we assume that they were probably grown from seed collected from nearby, so it's reasonable to think "O.K, there were some swamp mahoganies along that little creek that flows down into Farm Cove".

34.07 So you get a feeling these are tangible links with the past vegetation. So we've got the original trees, we've got accounts by Maiden in 1905 of the plants. From there you search around and say "O.K, well what was it like further back?" Maiden himself leaves a description of the valley of the Tank Stream. So he writes this – I think it's in the 1920 probably but it may have been a little bit earlier – and he talks about what trees he thought were along the Tank Stream, that the Tank Stream came from a little swamp where there were probably scribbly gums and so on and he gives a list of plants for that. So I've always relied on that because I feel that Maiden writing in the 1920s – he'd come to Australia, he was active from the 1880s onwards – so he would have known people that knew what Sydney was like back in the 1840s, let's say, so there is almost a connection right back from Maiden back to the earliest days, so I think he knew what he was talking about. Interestingly enough, Maiden's account is actually published after his death by someone from the Department of Agriculture called Campbell and he quotes Maiden's description word for word and at the end he says "And we can also imagine that there would have been cabbage palms in the Tank Stream". Now, I think if Maiden had thought there were cabbage palms he would have put this in his list and I think that this is Campbell actually making a mistake because I think that the cabbage palms were clearly from the historical accounts further downstream in the harbour.

36.14 So they came from 'round Rose Bay and the eastern suburbs there and there may have been some up in Middle Harbour but probably not in the Tank Stream, which was a little sandstone creek running down and it probably didn't have the right conditions for it. So I think it's interesting how mistakes can easily be made by thinking superficially, I suppose, really. First of all, Campbell made the assumption that Maiden left these out, whereas Maiden had gone to a lot of trouble to write his list as he wrote it.

JK: And have there been people then who have taken Campbell's idea further, thinking therefore that cabbage palms should really be in the middle of where the Tank Stream was?

DB: Well, I don't think – I hope not – but I think in 'Taken for Granted' we quoted Maiden and made sure that Campbell's comments were left out, so we did our bit to defend Maiden.

JK: **And I guess the reason I ask is because as a historian I've certainly come across a number of things at different times where a mistake has been made and then it is carried through and because it's in the documentation people go "Oh, it must be true". So that was why I asked whether or not.**

DB: Yes. It's very hard to deal with simple views that are wrong but are generally held. Yes, it's a hard thing. Anyway, we just have to deal with that as we can.

38.20 JK: **So where was the Tank Stream?**

DB: O.K, the Tank Stream rises – well, according to Maiden and I've also had a look at some of the historic maps myself and you can see that there is a little bit of a swamp up in the Hyde Park area of Sydney. So we imagine a swamp – this is all sandstone country, sandy soils, low nutrients. Remember, the native vegetation responds to the type of soil and the nutrients, very, very important. If you have low nutrients, sand, sandy soils, you have a lot of sclerophyll species, hard leaved species, typical Australian-type species, the proteas, the waratahs, bottlebrushes and so on. On the good soils, on very good soils, such as the basalt soils which we have in various places around New South Wales, you would have had rainforest and so on and where you have a buildup of silt and so on in creeks and so on you can get better soils and you can get rainforest there. On the intermediate soils with a bit of shaley clay soil, such as in western Sydney, you get grassy understory. So we've got that sort of gradient in soils, from low nutrient to high nutrient, relating to heathy shrubs through to rainforest.

39.53 So using that as a model, a sandstone creek with the Tank Stream begins in a bit of a slope, let's say, up in Hyde Park which would have had a shrubby sort of swamp in it, as we get in many places on the sandstone elsewhere around Sydney, runs down along, I think it's under Pitt Street, somewhere like that, and then comes out into Circular Quay which of course has been now filled in but would have been a bit further back. O.K, people say "Were there mangroves when you get down to Circular Quay?" and this is an interesting one because when we go back to Bradley, Lieutenant William Bradley of the Sirius in the First Fleet, leaves us a lovely account of his year or two in Sydney. The account that I use is a handwritten, published

account, so you've actually got to go through and read handwritten words – it's not easy to search it; it's probably been digitised now but anyway – and he's also got some nice handpainted pictures in it and in 1788 he's in on all of the early trips around Sydney. He goes down the harbour and so on - up the harbour, rather – up towards Parramatta and he has some little pictures there, one of which I think is up near Concord - I always liked that because of my growing up in Concord – and I think you can clearly see the mangroves and so on in his little coloured pictures there. In his pictures of the harbour, you don't see the mangroves but he does in his writings say that the mangroves are in the upper part of the harbour and by the upper part he means upstream from Sydney. So I think that that's pretty good evidence that the mangroves don't really start until we get into the upper parts of the harbour from, I suppose, Gladesville sort of up and they're mostly on the southern side of the harbour because we have the creeks feeding in with the shale soils on that side of the harbour and you have this silt coming in and the mangroves and salt marsh.

42.20 So I think there's a pretty good case that there weren't mangroves in the lower Sydney Harbour or Sydney Harbour below the bridge certainly. So the foreshores of Circular Quay are likely to have been a little sandy beach with a creek running in, casuarinas just on the sides or on the back of the beach, perhaps, and then back into the sandstone you've got your Port Jackson figs on the sandstone, up onto the scribbly gums and so on on the sandstone hillsides and the forest red gum as I mentioned, blackbutts a little bit back. Some of the ridges would have had a slightly better soil, a bit more clay, so the blackbutts would have preferred that, and in fact angophoras as well. There's a picture we used in 'Taken for Granted' showing Brickfield Hill and shows a tree that I think's clearly an angophora costata growing there with its twisted branches and pink trunk and so on. And Brickfield Hill was the site of brickfields and so on, so there would have been clay and so on around there, so you probably had the slightly bigger trees growing there. Yes, I think that's about the best we can do for the valley of the Tank Stream.

44.09 **JK: Found?**

DB: We can get information on history of vegetation from pollen and there was some work done collecting pollen from soils underneath historic old buildings and so on and they turned up a few interesting little ferns and so on in that because fern spores tend to last fairly well but the pollen also had pollen of weed species and so on by that stage so you can see that many weeds have established very early in the day. I should say that sadly Phillip and the First Fleet don't have a trained

botanist with them, which is a bit of a shame. After all, there had been Banks and Solander with Cook, and Banks later sends out various botanists, particularly Robert Brown with Flinders, to record the plants of Australia, so it's interesting that he didn't manage to get a botanist or botanically trained person on the First Fleet but when Robert Brown comes out and goes 'round with Flinders - it's about 1802 to 1805 - he actually lists up in his notes a list of the weeds that have already established around Sydney by 1802. So the impact of introduced plants starts very early on.

46.08 **JK:** **Yes, because it's one of my questions, I must say. And any familiar ones that we would know of?**

DB: The weeds at that stage were more garden weeds because they would come in with cultivation of garden plants and so on; they weren't bushland weeds and so on by that stage like and things like that - - -

JK: **They probably became so.**

DB: - - - some very cosmopolitan weeds. Look, just thinking about weeds, I shall have to put this in because *bidens pilosa*, which is cobbler's peg or farmer's friend or pitch-forks, various names, which is a common weed in bushland areas with its little seeds that stick into your jumper and clothes and so on and most people don't like, it's a fairly easy weed to deal with, you just pull it out and it tends to come up in disturbed sites but relatively short-lived. But when I was doing some work on specimens collected by Joseph Banks at Botany Bay - we have some of their specimens here at the Sydney Botanic Gardens - lo and behold there is a specimen of *bidens pilosa* collected at Botany Bay in 1770, so this is pretty good evidence that the species was actually native to Australia. It's actually accepted as a widespread, cosmopolitan species of Asia and so on but as far as I'm concerned, material collected by Banks at Botany Bay demonstrates that it was here pre 1788, so it really is a native species.

48.02 **JK:** **It might help me like it better then when I'm pulling it out of my jumpers. It's most fascinating. But even with the weeds and we understand weeds, ones that aren't indigenous, but why do you make the distinction between the weeds that were here early on as garden weeds compared to the bush invasion weeds?**

DB: O.K. Well, most of the early weeds come with garden plants and so on and they tend to remain in disturbed sites, so your plantago and so on grows in disturbed sites where people have bared areas and

tracks and things like that. Most of our bushland – at least certainly the bushland that remains – is generally on the poorer soils and so weeds tended not to invade, so I suppose for pretty well up until the end of the nineteenth century almost weeds tended just to be in disturbed areas rather than invading bushland. The next lot of weeds that come in, though, after the initial garden weed type plants are the garden plants that become weeds and we introduced many, many garden plants in horticulture over the years, lots and lots of different things and different varieties and so on, and what happens is that a very few of them, only a small percentage of them tend to produce seeds and so on that then regrow and spread.

50.02 They are spread by humans as well because anything that regrows and spreads easily tends to be moved into someone else's garden and anything that does well in a garden is moved to another garden and so on and often in the process the original form of the plant is lost and it goes a bit back, reverts a bit like a wild type and so it does even better in terms of seeding and so on. So, well, the classic one, perhaps, is privet which was introduced as a hedge plant and it's O.K. as a hedge plant or trimmed back and so on. It doesn't seed and so on if you keep it trimmed as a hedge or at least the seeds are cut off but when a few plants get going and spread and produce seed they can then get moved around by birds. So this is especially a problem with garden plants that produce fleshy fruits because birds, both native and exotic, will then spread the seeds around. And, as I've said, most of the weeds don't invade native bushland, particularly sandstone bushland, because it's so low in nutrients but we've also got disturbed sandstone bushland. So we're starting to get gullies in the late nineteenth century, twentieth century and so on, we're getting lots more housing and so on and we're getting cleared areas, sedimentation and silt building up in creeks and these are the sites where birds will go for water and so on, so they will also spread seeds into these areas. So we have plants like privet being distributed by birds into disturbed silty soil in creeks and so we have buildup of weeds, clusters of weeds, in creeks, they produce more seed and so on.

52.01 So what have we got? We've got privet. There's two species of privet, large and small leaved, there's camphor laurel, lantana falls into that category, there's a whole range, I mean, something like ten, twenty, thirty species which sounds like a lot but when you consider how many species have been introduced into horticulture in a city like Sydney it's only a small proportion but the problem is we don't know which ones are going to become weeds. So it's a difficult situation. If

we said “O.K, we can’t introduce anything”, there will be problems with doing that, so people have tried various ways to say “O.K, is this plant likely to become a weed?” and there are various things like “Does it produce copious amounts of seed, does it need to be cross-pollinated or does it set seed without pollination, does it spread vegetatively?” That’s a fairly important one. Things like wandering jew, tradescantia, fragment and grow. They don’t actually produce seed but they grow from fragments, so they can spread along creeks and so on so it’s difficult working out what’s going to be a weed.

JK: But that did actually help me understand because I was thinking about lots of those plants that came from gardens escaping and so that did actually really help me. And in this LGA, in this Sydney landscape, are there places – I’m thinking that there was a place along the gullies in Glebe and other places where perhaps the weeds were some of the only habitat that then remained. Can you tell me a bit about some places in the city area that either had some remnant native forest or took on weed populations that actually grew habitat?

54.07 DB: O.K.

JK: Because it’s a shifting landscape, isn’t it?

DB: It is. I mentioned the Botanic Gardens initially and one of the projects, I think in the late 1990s, was to regrow native species along the Woolloomooloo foreshores of the Gardens and so we collected seed – we wanted to use local seed as far as possible – so we collected seed from, I think, North Sydney side, Berry Island. No, no, sorry, I’m wrong, it was the southern side. We decided “O.K, we’ll use local seed from the southern side”, so we collected from Nielsen Park and so on which was a good source of native seed for planting along Woolloomooloo. So we planted that up and that works quite nicely as habitat. As far as other parts of Sydney, of the local government area, are concerned, mostly the bushland close into Sydney has been just outside, so we’ve got Berry Island and Balls Head in North Sydney across the harbour and we’ve got Cremorne and Mosman across the harbour there. We’ve got Nielsen Park downstream on the southern side. There was remnant vegetation in Cooper Park and a few places around Paddington. As far as Glebe is concerned, there was a lot of interest in a place called Glebe Gully which was actually out at Bronte, a little remnant gully there that had some rainforest species into it that had managed to survive and which has been protected.

56.15 And there was an ongoing campaign to protect it for many years, actually, back again, I think, in the 1990s. In the Glebe area there were places like Harold Park and Wentworth Park and so on and also in some of the original industrial sites there was – yes, when you take the tram [light rail] out through Pyrmont, it follows the old goods line out to Leichhardt, it's really interesting because you go through these cuttings which you never even dreamed of were there, quite deep cuttings, and I was surprised to see quite a lot of ferns and so on growing there and there are also some other remnant stuff along that track in various points. Yes, I think that the cuttings, the sandstone cliffs and so on, have provided habitat and these would have been largely undisturbed when the railway – well, it would have been disturbed when the railway was in use but there would have been a period when it wasn't in use and a lot of regrowth took place in that time, so, yes, those sort of places.

58.00 Now, those sort of places will have mixtures of weeds and there may be some native species there as well - I haven't actually looked around those ones.

JK: And what about the parks, like Hyde Park and Centennial Park? I mean, a bit of that's City of Sydney.

DB: Well, Centennial Park's got remnant native vegetation in it, as I say, with the swamps and so on. Hyde Park was cleared pretty much back even in the 1820s, I think, as a parade ground and has been planted back at different times. So when you look at pictures of it in the 1930s it's pretty well bare and there are these avenues of new plantings of the figs, the Hills fig that has grown up into the big trees that are there now. So it's changed in structure from an open area to a forested area and now it's partly opened up again; yes, change takes place all the time.

JK: But it would have been quite open?

DB: Well, certainly in the 1930s. Well, if we go back, originally it would have been probably a forest. Hyde Park, being a high part of Sydney there, would have had clay soils and probably had angophoras and blackbutts and so on so it was probably more a forest which would have been cleared to make a parade ground, I think. And, of course, you've got to remember all through the nineteenth and twentieth century trees have been chopped down to use as firewood; we forget that, that any timber is burnt in cooking fires. So the landscape, the urban landscape is quite different from now.

- 60.01 In fact, if I may go back to Concord, I had some aerial photos of Concord in the 1930s and you just see rows of houses, no trees, and then by the 1960s when I'm there they're starting to plant trees in the streets and now if you look at photos you'll see trees all over the place. Many urban areas of Sydney are now more treed than they were, certainly pre WWII, because as I say timber was used in those days for fires. People who grew their own vegetables didn't like trees because they cut out light so in fact where you've got an urban area that's growing its own vegetables you won't have many trees for that reason. So it's only when we get into improving our suburbs aesthetically and wanting trees that we get a lot more trees. So, yes, there's these changes and, of course, these changes are having impacts on the wildlife because we're going from in an open area you'll have different bird species for example to what you have with the trees. If we just go onto the impacts in the Gardens of the flying foxes, for example, the flying foxes didn't appear in the Gardens until the early 1990s – and I know that because I could observe it over twenty years before that – although interestingly enough there are records of flying foxes in the Gardens back in Joseph Maiden's time and presumably they were just shot at that stage to get rid of. So anyway they come in in the 1990s and they find it such a nice place to be in contrast to being out of Sydney where they're shot at and so on that they develop in large numbers.
- 62.12 Birds have changed, of course, over the time; the Indian Mynahs and so on have come in. Interestingly enough, the Noisy Miners – the Indian Mynahs is the introduced one – the Noisy Miners have also changed in abundance. That's a native species and that tends to defend its territory, so it drives other birds out, so where you have Noisy Miners you tend to have a loss of other birds, little birds particularly. And the Noisy Miner seems to like eucalypts because they tend to have lerps and a food source, insect food sources, rather like a grassy understory, open understory. So our planting of eucalypts in parks and so on tends to create really good conditions for Noisy Miners, whereas we've probably had in those parks or on the sides of those parks lantana, thickets and shrubbery and so on which is preferred by the Blue Wrens. So just a structural change in your vegetation and we would see clearing out the shrubs and putting in trees as being a positive thing because it looks nicer to us and, as I say, it looks nice to certain sorts of birds but not others. So I think the habitat for wildlife you have to think creatively about and sometimes you perhaps have to accept a sort of structure that you might not necessarily like because it is necessary for those elements of the wildlife.

JK: Yes, and we were talking about that, weren't we, off tape a bit about the challenges in a place like the Botanic Gardens between the botanical values of the plants and then the habitat that animals bring in.

64.08 **DB:** Yes.

JK: Should we perhaps go back to the Gardens specifically and tell me a bit about the original aims and intents of the Gardens and then some of the environmental influences that have particularly impacted. I think we're already doing that but take me through some of those.

DB: Well, the Botanic Gardens, of course, is about plants, so it's originally set up as a vegetable garden area - that's the original pattern of it, developed from Australia's first farm as we like to promote it as - and then it becomes a place in the nineteenth century for growing different species collected from various places around the world. In the twentieth century it becomes more a pleasure garden, with that being given priority, I suppose, and then in the late twentieth century we start to get into plants and education because we don't really have anything to do with education up until about 1975, something like that is when we get our first education officer. And from then on the Botanic Gardens are interpreted as places for plants and education and science - and beauty and we'll throw that in as well. So, I suppose the wildlife that we've had in the Botanic Gardens, we've always had possums and so on, lizards, blue tongues, you'll often see them around. The birds, Ibis came in, I think, in the 1980s, something like that.

66.08 The bats, flying foxes came in in the 1990s. Unfortunately, native species respond to conditions that you provide and build up in numbers when they can until some factor stops them. And unfortunately the buildup of the flying fox in the Gardens is a problem for many of the specimen trees. The tallest trees, the flying foxes like the high trees because they can sit in the sun up in the top and as a result they tend to defoliate these trees, which over the years causes death of trees and severe disfigurement. So we are proposing to try and move - there are a number of flying fox colonies in Sydney. There is one at Gordon which has been there for many years and there are various other ones, Wolli Creek, right out to Penrith, down at Kurnell I think there's another one - and we are hoping to move some of our flying foxes so that they encourage them by making conditions here a little bit unpleasant, moving them to these other

sites. So I'm not sure how this is all going to work out but it was done successfully in Melbourne Botanic Gardens. So that's the proposal.

JK: I'm going to talk to John Martin.

DB: O.K. You'll find out the whole history there. But really what it means is that flying foxes are part of Sydney and we really need a more a whole of Sydney approach which may involve saying "O.K, let's plant up some forest of these sort of trees that will only be suitable for flying foxes in twenty years' time" but we've got to plant the trees now or find the land now.

68.17 And it may be land, perhaps, that's unsuitable for other purposes because it's impacted in some way by industry or something like that, so a waste site might be good because we don't necessarily want people going in there, leave the flying foxes to themselves. But they're quite happy up in the trees; they're not worried about weed conditions underneath and so on. So I think it's a matter of thinking a bit ahead and thinking "O.K, flying foxes tend to move gradually", so you're disturbing some trees here and then move it a bit further along, so you've actually got to have a bigger area than they actually occupy at present.

JK: And so from your plant perspective, your vegetation and botanist side, there have been some suggestions that perhaps for example you could replant other parts of the garden and leave the bats to their own devices.

DB: They just tend to spread out, they will; if you plant up they will take that over as well. We've only got limited abilities to move them because we don't want to hurt them and so on; it has to be done at a certain time of year when there are fewer bats here and so on. So I mean obviously if you go in and then shoot all the ones that you might achieve something but, no, that's not the way. But I've just thought there's another issue for habitat and that is, is it worth growing local native species, plant species to create habitat.

70.09 And I mentioned things like Blue Wrens as disappearing because we've tidied up parks and so on disappearing because we'd tidied up parks and so on and so I think that I would actually encourage people wherever you have backyards, gardens, whatever, to put in some local plants. It's surprising how these birds sometimes find their way. People say "O.K, they can't move distances unless they've got shrubbery and so on" but they sometimes do, it seems to me, so I am very much in favour of using local native species. And the other thing is that – we've been talking about birds and bats but there's the

insects and insects are really the things that relate to plants because you'll have particular insects that feed on particular plants, that pollinate particular plants. Probably the relationship between plants and insects is stronger than birds and plants. And of course insects can move around remarkably well, even blown in the wind, eggs dispersed and so on and just amazing where you'll find insects. So by growing your native plants you are providing habitat for them and if you grow certain species in your garden at this time and even though you know your garden will be wiped out by the next person that buys your house and decides "O.K, I want to have just paving", let's hope that someone down the road is then starting their native garden at the time that yours is being wiped out. So in a sense in an urban area at any particular point in time with a bit of luck there will be native species growing in someone's garden so they're suitable for the insects and they can then move across to the other.

72.00 So it's sort of taking into account the fact that things do change over time but because in an urban place we can reproduce gardens with native plants and so on in different places we should have a sort of continuous sequence. At least that's how I would argue for that.

JK: And what do you want to say to people who would say "It's all very well to be doing all of that outside of the city, even in the suburbs but why do you need to have urban ecology and the sorts of things that you're describing inside the city boundaries?"

DB: Well, there are a lot of people now living in the city in apartments and so on where they have no connection with nature and, O.K, I must admit, I've admitted I'm a person that likes connection with plants, connection with nature. I would probably go mad in an apartment where I couldn't touch soil and grow plants but I'd probably find a way of growing things in pots and so on. So I can only think that there are a certain percentage of people living in the city in those homes that would appreciate connections with nature and so on so for them to be able to walk out into a park and see not just trees and grass but a wild garden of some sort. The whole point about nature is you don't quite know what you're going to come across and I think perhaps we sometimes get this when we see ponds which are a natural system, a pond with some shrubs around it and so on, and you walk up and you never quite know what's going to be there. Is there going to be a frog, is there going to be something sitting on the bank, are there going to be fish there, is it going to be different today and tomorrow?

74.09 I think appreciating nature is a little bit about the unexpected so that although a lot of plants are used in architectural arrangements such as hedges or nicely topiaried plants associated with paved areas or something like that, they're deliberately done to be absolutely static; there is nothing interesting about them. Nature is about wildness and so on, so it's really about creating places that have that little edge to them: you don't know quite what's going to happen, the plants aren't all obviously controlled, you don't know what insects are going to turn up there or when the plants are flowering you'll find beetles and things on them. And I think in a city, given that it's ninety per cent controlled, we do need these little uncontrolled areas so that's why I think we do need wild plants in slightly wild places, as we say. And, as I say, the scale of wild places, you know, it could be a hectare but obviously we can't get that but it can be very small but it's essentially got to have a wild element to it, so ponds and little natural habitats or semi-natural habitats, shall I say, provide that.

JK: And has that been a bit of a shift in the way the Gardens are designed, to have a bit more of that wild and slightly less controlled perspective?

75.58 DB: Well, look, the Gardens has just been undergoing a review. We've got a new director as of last year and we've had a peer review committee, a group of experts from overseas come out and talk about how we can improve the Gardens, of course, is really what it's about, and that's to give it focus on various themes. So, yes, I'm not sure how that fits in with the wild part of the Gardens. I'll have to say that in my experience there are two different sorts of gardening approaches: some gardeners like everything controlled and neat and others like a little bit of wildness and so on. A little bit of wildness people go for the wildlife; controlled, and go for the vistas and the views and the aesthetics and in a funny sort of way these are different sorts of people and there's always going to be some sort of – not conflict but perhaps there is conflict between those two views and hopefully we can resolve this by having certain areas for one and certain areas for the other. But it seems to be a fact of life, these two views, and we just have to deal with that.

77.34 JK: **Well, I was wondering in the way that you rapidly went through the different periods for the Gardens whether there was a time when, O.K, it was hedges and the aesthetics. Then I think you were saying from about '75 there's been a focus then more on education, perhaps. Has that been a time when those two different ways of viewing the same place have become more challenging in a place like the Gardens? Because even looking**

around now there are some places where you can walk in amongst sort of a slightly more messy look which is, I assume, deliberate compared to the lawns and the vistas.

DB: Yes, I think you're right. Certainly in my early days here there was a concern with neatness and tidiness and edges and control and we have by bringing in education and particularly, I think, through our volunteer guides and so on you start to take people around and therefore look at the Gardens in a different way to the gardeners and often the volunteer guides are motivated by connections with nature. So there is definitely much more appreciation now of the wild aspects and the historical aspects as well. The trees that I was talking about, really people only started taking notice of those when we pointed that out in the 1990s, that these were remnant trees. Previously Maiden had recognised it back in the 1920s but then in between there had been no interest.

JK: Well, biodiversity, ecology, as you said, it wasn't even a - - -

DB: It wasn't a subject. No, things have gone tremendously in biodiversity and conservation since the 1970s, I'll have to say that. Now, whether they're going to go tremendously in the future I do not know. They have come tremendously up until this point and I have faith that things will work out well.

80.18 I think Sydneysiders and Australians in general appreciate wildlife, nature. In fact, I was doing some work on Sydney Harbour National Park where you take a ferry ride to Manly and you go past the zoo and you see Mosman, Bradleys Head with the vegetation on it and you go 'round past Middle Head and down North Head and so on, you see vegetation around you. And most Sydneysiders have done this trip on the ferry and I think that most get a positive view out of this because the message is that we can have a city of millions of people on this beautiful harbour and we have still got just vegetation more or less the same as it was in 1788 which is more or less how it was hundreds of years before. So if we can live in an environment that's obviously got this sort of vegetation surviving, we must be doing the right thing. Yes, so there's a positiveness about it, yes, and I think that that's part of the Sydney ethos is that "Yes, we can do these things and it's generated out of our harbour and our city in the way in which we have wildness around". I think we're all really deep down proud that the flying foxes have come in, in a sense. It's a sort of sign, "O.K, they're still surviving in the city", it's good.

82.06 **JK:** **Well, do you have some comments about Barangaroo from the perspective of recreating or an attempt to think about recreating a naturalistic park right within the city? I'm wondering about the ethos.**

DB: Well, mixed feelings on that because I think it's arrogant for us to think we can recreate everything, so if we really think we're recreating nature and so on, it's not the real thing, it's a recreation that has some of the values of nature, there's no doubt about that. There will be wildlife there if you put some possums there and some foxes and things. You can get them and maybe transfer the flying foxes over there and some of the ibis. Certainly, yes, you can but it's not the same as going and standing up in heathland on North Head and saying "O.K, the vegetation here has been here for thousands of years. These plants, if we looked at them genetically, we'll find patterns here related to this site. These rocks and so on the Aboriginal people have walked across, this is the real thing". Barangaroo, artificial cliffs, plantings of trees, loads of topsoil, yes, it's a reproduction and reproductions have some value but it is not the real thing.

JK: **Fair enough, yes. And I'm just wondering about the work that you've done with all the vegetation surveying and what do you think are some of the important influences that some of that work can take back into strategies and policies that you would like to see the City put in place?**

86.13 DB: I'll have to think about that for a minute.

JK: **Just launched that one in there.**

DB: I think our work has always been about trying to show people what we've got and why it's worthwhile, either because plants are rare or these are particularly characteristic of Sydney as opposed to New York or why these things are worthwhile. How we go about building on saving that and using that information is up to people in the future. Thinking about the Barangaroo point is valid in that if we say "O.K, they've said there were these plants in Sydney Harbour, therefore it's O.K. All we'll do is we'll replant them over here and everything will be O.K.", it's missing the point. I think there's a graded response to the sites, I suppose. We've got to recognise what is really the best bits and really look after them and then create other sites that complement them in various ways so that for example North Head is being promoted as a sanctuary site, looking after the vegetation, the animals there, you've got endangered populations and so on, "O.K,

that is a key site". Bradleys Head, Middle Head are similar, they're sort of key sites. We need plantings in parks adjacent to those to improve those to increase the size because nature does need space; we've got to say that. There's no way in which you can take an area and say "O.K, we'll give you five per cent of that area and make all your vegetation that was previously in a hundred per cent of the area all work". You do need space so we really do need to think creatively and use all the space and that doesn't mean saying "O.K, we'll wipe out half this original, this nice bit, and create more of it elsewhere" because the creation is not equivalent to the original. We've had this problem over eastern suburbs banksia scrub in places where there are tiny remnants in the eastern suburbs and say "O.K, well, we'll bulldoze all of this for such and such development and we'll create three times as much somewhere else"; it's just not on. The authentic, original bit is important and the bit we want to retain for future generations so that they can experience what it is and there's a whole lot of, I think, values in the authentic as far as the imagination goes and so on. So our work has really been always to say "O.K, this is what you've got. Now, think about what you want to do", I think rather than say what should be done, because quite honestly I don't know necessarily how things will turn out, what areas of land come up for development. After all, who would have thought about Barangaroo ten years ago? Yes, it's hard to know the future, so really it's all about values and so on and trying to give nature a fair go, I suppose, because it's worth it.

JK: It is. We've ranged quite widely. Do you think there are other things that you can think of at the moment that you want to comment on?

88.14 DB: Well, I think I should bring in climate change and so on because we poor old scientists get bashed for thinking that such a thing might happen. Most people only see what's happening around them over a relatively short time; we don't realise the importance of long term patterns, cycles, changes and indeed long term changes. So for example the changes in wildlife such as the buildup of the ibis and so on and the flying fox have happened because of events outside of Sydney. Perhaps the ibis have been driven into Sydney by droughts, the flying foxes by shootings and so on and threats outside the area and they find a safe haven here. We've come through a major drought in Sydney between the late 1990s through to about 2006 and now we're going through a very wet period which we think is probably going to last forever – it's obviously not – but the effect on wildlife over that time is quite surprising, I think.

89.52 For example, in western Sydney over a few years many of the grey box trees in the Blacktown, St Marys, Richmond area, a big area of western Sydney, have been affected by particular lerps which defoliate the tree so that you get areas of extensive dying leaves and defoliated trees and people panic and say "What's causing all of this?" whereas in fact this is probably a natural occurrence resulting from the change from the drought we've come through, coming into a wet period, leaves growing very well and providing great feeding conditions for the lerps, which are little tiny insects that live under the leaves. And so the lerp numbers build up under those conditions and the trees are stressed. However, over a couple of years the trees recover, groundwater builds up, the lerps get attacked by birds and so on and so after three or four years the trees tend to recover and so we move on and don't think about it again. When you go back and look at historical records in newspapers and so on you find that these lerp patterns have occurred at previous times, certainly in the twentieth century, and it's probable, it seems to me, to be related to climatic conditions. Bird patterns may do the same sorts of things. We have been concerned about the Noisy Miners and in fact the Noisy Miners in the area where I live spread into our area in 2008 and I haven't seen any New Holland Honeyeaters which were common at that stage around since then; the Noisy Miners obviously have had some impact on them.

92.02 **JK: And insects, is that another one?**

DB: Well, of course we've got cicadas and so on.

JK: Sorry, other than lerps.

DB: The cicadas are related to conditions. Sometimes we'll say "O.K, it's a good year for cicadas", again we've got weather conditions relating to those things. And these events are happening over decades: ten years of drought, fifteen years of drought, perhaps ten years of mild, wet conditions, back into drought and so on and on a day to day basis we aren't aware of these things happening. So I think the story there is not to necessarily panic about what's happening with nature, to think, "O.K, these things have built up. But is there a reason, have we changed conditions so that they're changing or is it a cyclical pattern?" So I think in the case of the lerps, this may be the Bell Minter, bellbirds, in the Sydney area, that we need to take into account long term climatic effects. So when we get onto climate change we think "O.K, it is going to gradually get warmer", you can see that there can be impacts so at this stage it's not clear what's going to happen. My feeling is that native plants and so on will be

largely O.K. in changed conditions because many of the species have very wide tolerance and so just because the rainfall changes slightly or the temperature changes slightly, I think they're still going to persist quite well. So this is the majority of vegetation. Specific things like alpine stuff, of course, is different and saltmarsh stuff.

96.02 Saltmarsh vegetation is different because with a rise in sea level saltmarsh gets invaded by mangroves and normally the saltmarsh will then colonise further land but of course we generally have concrete walls and so on along there and in fact, thinking about it, I think where we do have remnant saltmarsh areas around Sydney, we should be thinking about trying to create landward expansion conditions for them so that for example instead of having a concrete wall at the edge of your saltmarsh you remove that and have a gently sloping gradient of a wall so that saltmarsh can actually colonise that new site. This could happen perhaps around Botany Bay, along the Cooks River where there's saltmarsh and the upper Parramatta River. So I think that is one aspect of climate change and wildlife management where we can actually make provision in the future for what's likely to happen.

JK: Right. It's really is just an enormous subject, isn't it, all of it?

DB: Yes, yes, yes.

JK: Well, any others? Thank you for the climate change. Insects is another whole - - -

DB: Yes, yes. The interest in native plants really took off again in the 1980s onward. I think a lot of this was due to better availability of books and identification material. Out at Mount Annan Botanic Gardens at Campbelltown where we've been monitoring sites there I have a colleague who takes photographs of all of the insects in the area and with the modern photography you can take beautiful pictures of insects without any effort.

96.15 Under the old photograph, of course, you had to get everything in focus and close, all this sort of stuff, but now you can do it very easily and you can look at the photos and you can see how wonderful these insects look in larger than life conditions. And I would hope that more people become interested in the world of insects because of this technology that enables to see that world much more clearly. I'd like to think that the work on insects, amateur interest in insects and so on will start to take off because I think people have gone into plants, people have gone into marine stuff, all that sort of stuff but insects is just out there and it's something you can grow, keep insects in your

own house in boxes and things like that if you the particular sort to be doing that, there's so much. And in fact one of the problems is that if you want to get your insects identified and you send them to a museum and so on they'll often say "Oh, we don't know much about that group of insects" or "We haven't done much work on that" so we need to be getting onto it. I think it really is a place where urban bushland and wildlife around the suburbs comes into its own because you can just go down to a bush near you and find jewel beetles or something like that.

98.06 And I must admit, in fact, I'm involved in the Bush Care, bush regeneration plantation project on the Cooks River near my place and we pull out all the weeds but there were some beautiful plants of *gomphocarpus fruticosus*, which is wild cotton bush or something, it's an introduced plant, but it's the food plant for the caterpillars of Wanderer Butterflies. And first of all the caterpillars are lovely little striped creatures that need this plant and secondly I really couldn't pull out plants that are going to provide Wanderer Butterflies with habitat and although people may argue "Oh, Wanderer Butterflies were probably introduced" at the same time as the cotton bush was introduced - actually spreading back in the 1930s; it's been around for a long time – but I think we deserve to see the Wanderer Butterflies and therefore we need the cotton bush for surviving. So in my little bushland area there is a large weed in the middle but I think I can defend it.

JK: Very good. Well, look, thank you so much, that's just been fantastic.

DB: If I think of anything else.

JK: Yes. Not for now. You will, of course.

DB: Yes.

JK: No, that has been wonderful, thank you so much.

Interview ends