



Fw: Chief Scientist investigation

CSG Review

to:

Roxanne MacLean

06/06/2013 09:30 AM

Sent by:

Rebecca Radford

Hide Details

From: CSG Review/DII/NSW

To: Roxanne MacLean/DII/NSW@NSW

Sent by: Rebecca Radford/SRD/NSW

6 Attachments



Sub Legislative Council letter 20110908.pdf PAC MEETING.doc



Sign 10B Management Trail DNP 20130512.doc Sign Darkes Forest DNP 20130526.doc IMG_3406.JPG



CSG article.pdf

CSG submission for action.

----- Forwarded by Rebecca Radford/SRD/NSW on 06/06/2013 09:29 AM -----

From: "Adrian Ingleby" <rufusy@bigpond.com>
To: <csgr.review@chiefscientist.nsw.gov.au>
Date: 05/06/2013 02:09 PM
Subject: Chief Scientist investigation

From: Adrian Ingleby, 65 years old, 67 Station Road, Otford NSW 2508 – Tel: (02) 4294 3047

Hi,

I live at Otford near Helensburgh, NSW and I first became alerted to CSG mining after permission

was given to Apex Energy for 16 CSG exploration drill bores, by the NSW Government (Labor I think) to do exploration drilling at DARKES FOREST and surrounds in our local Woronora Water Catchment area. Otford is about 10 klms from Darkes Forest but closer as the crow flies.

This area supplies Sydney's drinking water. Like everyone else I didn't know anything about CSG mining or how it was done until I saw the American video "Gasland". From that point on I had concerns about it going ahead without independent scientific proof that it was safe.

I have attached documents prepared and submitted by me to State Government in regard to the issue. They outline my concerns about the local proposed CSG project, and they would be the same concerns as everyone else in NSW have.

The suburb of Darkes Forest is in the Sydney Water Catchment Authority area and it also contains the Dharawal National Park. Please take note of the comments made by the National Parks and Wildlife Service NSW on the signs they have erected at each end of the park ie (1) Appin Road and (2) Darkes Forest Road. And specifically:

HUMAN INFLUENCES

The upland swamps help maintain regular, high quality flows within the creeks in the reserves. However human influences such as **underground mining**, or excessive water extraction can damage these sensitive upland swamps.

Subsidence following underground mining can result in fracturing of the sandstone underlying the creeks, diverting water flows underground. Loss of surface water may be temporary or permanent. This is why in early 2012 the NSW Government gazetted Dharawal National Park to prevent mining in this naturally and culturally significant area.

Upland swamps are susceptible to erosion after disturbance including trampling by feet, resulting in stream siltation, reduced water quality and inability for the swamps to continuously supply water. Development of a raised walkway near Maddens Falls minimises visitor impacts to this upland swamp.
National Parks & Wildlife Service (insignia) NSW

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Design, mapping and colour illustrations by Jane Smith, Artsmith

The documents attached above are:

Sub Legislative Council 20110902.eml
Sub Legislative Council 20110902 (2nd).eml
Sub Legislative Council letter 20110908.pdf
PAC MEETING.doc
Sign 10B Management Trail DNP 20130512

Sign Darkes Forest DNP 20130526

Regards,
Adrian Ingleby

----- Message from "Adrian Ingleby" <rufusyb@bigpond.com> on Fri, 2 Sep 2011 13:28:36 +1000 -----

To: <Gpscno5@parliament.nsw.gov.au>
Subject: Submission
From: Adrian Ingleby - 67 Station Road, OTFORD NSW 2508. Tel: 4294.3047

An article in the Daily Telegraph (see attachment) Friday, 19.08.2011, quotes Energy Minister Chris Hartcher as saying to "Coal Seam Gas protesters" ; " Offer, "scientific" proof or make way for exploration and mining on Crown land across the state."

I submit the following view to your inquiry:

+ All State Governments have a 'conflict of interest' in that A. they reap the monies from mining the gas and have a strong interest to support it, no matter what, so as to help their budgets, B. CSG is happening on the east coast and will no doubt be national in the not too distant future. Therefore the mining of CSG should be made the responsibility of the Federal Government under Federal Legislation so that every State's rights can be looked after in the SAME WAY and at the SAME TIME. This is a National problem and should be dealt with nationally.

+ It is the responsibility of STATE and FEDERAL governments to protect our state and national environments. IT IS NOT, as Mr Hartcher is alleged to have said, (the people's or), PROTESTERS RESPONSIBILITY "TO OFFER SCIENTIFIC PROOF"

It is governments (State & Federal) first responsibility to look after the Australian land and it people NOW AND FOR THE FUTURE. At great financial expense we send people to war, some of whom die and many more who are seriously wounded to protect this country. Mr Hartcher and other State and Federal Politicians are well paid and well looked after with pensions other benefits to TAKE ON SUCH RESPONSIBILITIES. So don't try to put the RESPONSIBILITY of

"scientific proof" onto people who are genuinely concerned and are raising those concerns. It is clear that Mr Hartcher and the new Liberal Premier are keen on the idea of receiving a 'new revenue source' to get this State moving again. But at what potential adverse cost to the environment now and for future generations.

+ What RISK ASSESSMENTS were done in regard to possible/probable ADVERSE AFFECTS of CSG before the CSG Licences were issued?

+ Who prepared the RISK ASSESSMENTS and what are their qualifications? Were they independent?

+ A RISK ASSESSMENT prepared by an APPLICANT for a CSG Licence IS NOT INDEPENDENT.

+ The documentary "Gasland" in regard to the American experience should be a good warning. Has an 'independent review' of the American experience been conducted in America and if so do we have a copy. Has the NSW State Government or Federal Government done a review of the American experience. If not, then we should pay to have an independent professional scientific review of the Gasland experience AND LEARN FROM IT. Dick Chaney changed the law (one

paragraph) to allow CSG mining, all for the love of the AMERICAN DOLLAR; but at what devastating cost to the American environment now and into the future. The Americans also reduced the staff of their Environmental Protection agency staff. Was this done so that no one could RAISE THE ALARM, and therefore stop the money rolling in.

+ Is CSG clean, greenhouse reducing energy? Not if methane is leaking into the atmosphere! Something else for the experts to look at.

+ A team of Australian and World Scientific experts are needed to examine the risks. Any present leases should be stopped before their finding is released. No further licences should be issued until such expert finding are released.

+ I suggest the RISK is high. Why? You drill down 200 metres to 1000 metres, then horizontally across coal seams. You pump water and sand and chemicals in etc., then pump the gas out. If any of the material finds its way into aquifers, the water table or rivers how do you FIX THE PROBLEM AFTER IT OCCURS. I don't think you can. Water and liquids move where ever they can move continuously (for all time ie long after mining has ceased) through cracks in the subsurface picking up contaminants (as it did to form our aquifers) and it will travel along these MAN MADE drilling holes that are used for CSG for ever.

+ Our water supplies and our limited Agricultural land are our FUTURE. Planet earth is over populated and in the next 20 to 50 years; billions of people will be dying from starvation due to the world's inability to grow enough food to feed it's people's. That's when agricultural food/land will be far more valuable than Coal Seam Gas or gold for that matter. So don't stuff the LAND up now for the short term gain of dollars for the bottom line of our State budget.

+ Do the CSG operators, have INSURANCE? to cover if a "catastrophic" adverse event occurs. Do the CSG operators have to pay into a "Trust Account" so that there is money available in the event of a 'catastrophic event' that has to be fixed, that is if it is at all possible to fix the problem of contamination of our land and water. Who pays for 'repatriation' if they go broke and declare themselves bankrupt or if they paid all their share holders dividends but there's no money left in the bank. I'll take a guess, they close down; then open up a new company under a different name and start again. ALL THEY CARE ABOUT IS MAKING A PROFIT, AS LARGE AS POSSIBLE AND WHEN THERE'S NO CSG LEFT, THEY WILL LOOK TOWARDS THE NEXT MONEY MAKING VENTURE. YOU SEE IT'S THE GOVERNMENT WE RELY ON TO PROTECT OUR ENVIRONMENT. Tell that to Mr Hartcher.

+ How long do the CSG site's last for. What happens when they close because they have taken all the gas available, and they're no longer making money. What happens to the pipes and infrastructure above and below the ground. Can the surrounding land that has been damaged during the life of the mining, be repatriated. Will a company that no longer operates there want to spend money trying to fix the flora and land. If they do want to repatriate the large land area; will they have any money, or desire to spend money on a mining operation that has closed and is not making money for them.

+ The legislation written and in place for Coal Mining is not SPECIFIC to the potential long term inherent environmental problems associated with this new and untested Coal Seam Gas mining and it requires it's own specific legislation.

+ I suggest that the staff working on this inquiry liaise with Queensland communities affected by CSG mining, where it is well established, to get a better view of its affect on them and any potential

long term effects. The Queensland Government will automatically give it a green environmental tick, because they're making money from it.

Regards,

Adrian Ingleby. (See attached file: CSG article.pdf)

----- Message from "Adrian Ingleby" <rufusyb@bigpond.com> on Fri, 2 Sep 2011 18:01:57 +1000 -----

To: <Gpscno5@parliament.nsw.gov.au>

Subject: Submission (2nd this date)

From Adrian Ingleby - 67 Station Road, OTFORD NSW 2508. Tel: 4294.3047

Two additional points in regard to my submission sent to you at 1.28pm Friday, 2 September, 2011.

+ When CSG companies enter into contracts with land owners in regard to CSG Mining on their land, AND/OR when CSG companies pay compensation to land owners in regard to compensation to land owners for whatever reason, MAKE IT ILLEGAL FOR any associated CONTRACT to be "CONFIDENTIAL". That is all contracts MUST be available for the general public to read and know about. This will stop the CSG Mining companies AND GOVERNMENT, from trying to keep a lid on adverse environmental effects that may occur.

+ Set up a CSG Mining Ombudsman with powers to 'authorise expert scientists' to enter onto CSG Mining sites to examine and test anytime they like without warrant, and also to examine all company records, computers and documents in regard to the CSG mining practices and day to day operations. And further to independently investigate and act on any community concerns. Also give the Ombudsman the power to examine any CSG Mining companies financial records to assess their ability to "financially compensate and repatriate land, waterway, aquifers etc.," should and ADVERSE ENVIRONMENTAL EVENT occur and the power to cancel any licence if they do not have sufficient assets to fix problems.

Regards,

Adrian Ingleby.(See attached file: Sub Legislative Council letter 20110908.pdf)(See attached file: PAC MEETING.doc)(See attached file: Sign 10B Management Trail DNP 20130512.doc)(See attached file: Sign Darkes Forest DNP 20130526.doc)(See attached file: IMG_3406.JPG)

Invited to start digging

NSW wooing miners

Geoff Chambers

ENERGY Minister Chris Hartcher has told mining executives that the state government is "open for business" — unveiling a map showcasing NSW's resources and inviting them to dig in.

Mr Hartcher yesterday confirmed that he met with international mining companies, which are eyeing off the state's untapped mineral resources.

There are major resources of iron ore in the west, copper in northern NSW and coal being developed in Orange.

"I know that in my office I have a continued parade of visitors from overseas, principally from People's Republic of China, India and Republic of Korea, all anxious to find out what minerals opportunities there are in NSW," he said.

Mr Hartcher — under pressure from farmers and green groups over coal seam gas exploration — said he would back mining growth to drive the state's lagging economy.

Speaking at the Mineral Exploration and Investment Conference yesterday, Mr Hartcher warned protest groups they would not stand in the way of the government's plan to reboot the state.

He told mining executives and government officials that the mining industry could "stimulate activity" and inject funds for the "restarting of the

state's economy". In recent months farmers have expressed concerns about exploration and mining methods, including the controversial process of "fracking".

Hydraulic fracturing involves the injection of water, chemicals and sand at high pressure into rock. It has been banned in some countries over water contamination fears.

Mr Hartcher said the government would work through the strategic land study to ensure some land is protected.

But he is keen to push ahead with projects.

"I had no idea, and the Premier didn't know until I told him, of the extent and potential for iron ore deposits in western NSW," he said.

"I had no idea of potential for tin mining and the resources in tin up in northern NSW. We have enormous opportunity and we need to do that in a consistent and rational way. That does not mean that everywhere in NSW is open for mining."

✕ Mr Hartcher told coal seam gas protesters to offer "scientific" proof or make way for exploration and mining on Crown land across the state. ✕

Lock The Gate president Drew Hutton, the Greens founder who was arrested in Queensland this year at a coal seam gas protest, said he opposed the land-based gas and coal options.



LEGISLATIVE COUNCIL

GENERAL PURPOSE STANDING COMMITTEE No. 5

8 September 2011

Mr Adrian Ingleby
67 Station Road
Otford NSW 2508

Submission No 169

Dear Mr Ingleby

Inquiry into coal seam gas

On behalf of the members of General Purpose Standing Committee No. 5 thank you for your submission to its inquiry into coal seam gas.

Submissions received by the Committee cannot be published or disclosed unless authorised by the Committee. Anyone who republishes a committee document apart from the Parliament or its committees is subject to the laws of defamation.

To aid the inquiry process the Committee may decide to make public some of the submissions it receives. Submissions are usually published by the Committee and placed on the Committee's website. If you wish all or part of your submission to be kept confidential, or you want names and identifying details suppressed, and you have not already indicated this, please telephone the secretariat on 9230 3504 as soon as possible. The Committee will be advised of your request, and will usually agree to it.

After the report has been tabled in the Legislative Council, it will be made available on the Committee's website at www.parliament.nsw.gov.au/gpsc5. An executive summary, if available, and summary of recommendations will be sent to you. You may also request a copy of the full report from the secretariat on the above number. You will be advised of the Government's response, which is due within six months of the report being tabled.

Further information about the inquiry, including hearing details, can be found on the Committee's website. Thank you for taking the time to bring the issues raised in your submission to the Committee's attention.

Yours sincerely

Madeleine Foley
Principal Council Officer

*Two glass framed 'visitor information' signs are erected
at the Appin Road entrance to the
10B Management Trail
of the
Dharawal National Park.*

The information is dated Jan, 2012

Dharawal National Park
& Dharawal Nature Reserve

A CATCHMENT AREA WITH LUNGS !

Dharawal National Park & Nature Reserve form part of a larger protected forested area from Royal National Park in the north, Morton National Park in the north and Nattai and Blue Mountain Reserves in the west. Combined with adjoining catchment special areas, these lands form **one of the largest contiguous** protected areas in the state.

Situated in the upper reaches of the creeks, the upland swamps are the life-blood of not only the reserves, but the entire Georges River catchment. Acting like giant sponges, the upland swamps collect water and sediment, absorb and filter any impurities, and constantly release water during dry conditions.

Occurring on poorly draining Hawkesbury Sandstone on which sediment and water accumulate, the sediments become sodden and oxygen-poor, making it difficult for trees to grow, but creating ideal conditions for a wide range of heath plants and sedges. Some 26 swamps have been recorded within the reserves and are amongst the most species-rich-sedge-heath communities in the world, rightly earning its listing on the Directory of important Wetlands of Australia.

UNIQUE ABORIGINAL HERITAGE

Dharawal refers to the language group of the local Aboriginal people who have continued to have a close relationship with the area for over 15,000 years. Dharawal National Park & Nature Reserve lie in the centre of the area occupied by generations of Dharawal people. Their long occupation is evidenced by the number and range of Aboriginal sites making the reserves amongst the richest in Aboriginal heritage in the Sydney Region.

The Hawkesbury Sandstone of the area has weathered to form numerous shelters and large flat expanses, allowing for the many identified Aboriginal sites including: camping places, overhang shelters art shelters (with rock art styles and techniques unique to the area), axe-grinding grooves and a well. The majority of the sites remain undisturbed and in excellent condition.

FROGS, SWAMPS AND CHRISTMAS BELLS . . . AN ABUNDANCE OF LIFE

Dharawal National Park & Nature Reserve retain a remarkably diverse range of flora. The poorly draining Hawkesbury Sandstone plateau shale-capped ridges at Darkes Forest and sandstone gorges create diverse conditions to support over **500 native plant species** including rare and threatened plants and shale forest. Other vegetation communities include eucalypt and ironstone woodlands of the plateaus, windswept heaths and upland swamps.

Upon first glance they may appear to be quiet reserves, however the fauna present reflects the diverse vegetation, with over **250 species of birds, reptiles, frogs and mammals** including **24 frog species** alone !

Of significant value are endangered animals including the Broad-headed Snake of Sandstone habitat, the Green and Golden Bell Frog and the vulnerable Koala, surviving on select eucalypt species.

A CLEAN CATCHMENT FOR A MILLION PEOPLE

The adjoining reserves of Dharawal National Park & Nature Reserves are located on the large Woronora Plateau comprising of Hawkesbury Sandstone. The steep gorges of O'Hares and Stokes Creeks' below the plateau have been incised by the action of creeks for millions of years.

The shale and ironstone capped ridges of Darkes Forest and Wedderburn produce shale forest and ironstone woodlands respectively, contributing to the 13 vegetation communities within the sandstone dominated reserves.

The horizontal sandstone layers on the plateau provide poor water drainage, and organic materials and water in the creek headwaters have resulted in the treeless **upland swamps** these swamps act like giant sponges, with plants all working together to absorb and filter impurities from the water-run-off and rain.

The flora and fauna of the waterways have adapted to this year-round source of flowing water an interesting aquatic resident is the **Climbing Galaxid Fish**, whose origins date back to the ancient supercontinent Gondwanaland, The Galasias share waterholes with yabbies, freshwater eels, shrimp and other small native fish.

HUMAN INFLUENCES

The upland swamps help maintain regular, high quality flows within the creeks in the reserves. However human influences such as **underground mining**, or excessive water extraction can damage these sensitive upland swamps.

Subsidence following underground mining can result in fracturing of the sandstone underlying the creeks, diverting water flows underground.

Loss of surface water may be temporary or permanent. This is why in early 2012 the NSW Government gazetted Dharawal National Park to prevent mining in this naturally and culturally significant area.

Upland swamps are susceptible to erosion after disturbance including trampling by feet, resulting in stream siltation, reduced water quality and inability for the swamps to continuously supply water. Development of a raised walkway near Maddens Falls minimises visitor impacts to this upland swamp.
National Parks & Wildlife Service (insignia) NSW

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Design, mapping and colour illustrations by Jane Smith, Artsmith

Planning and Assessment Commission Meeting
Wednesday, 13.02.2013 2.00pm Helensburgh Workers Club

I'm here to talk about three (3) things:

1. The security of our clean drinking water
2. The security of our clean drinking water
3. The security of our clean drinking water

In particular safe drinking and agricultural water for Today, Tomorrow and 200 years from now. That is **long after** every person on planet Earth today is just a note in an archive at the office of Births, deaths and marriages.

I live at Otford which is in the Royal National Park an area known for its abundant wildlife, natural bushland beauty and beautiful beaches and it just happens to be next to a water catchment area. A water engineer in the early days of settlement probably thought, "We'll preserve this pristine bushland area for water catchment to make sure that it is not disturbed in any way so that we have water supply for future generations." He was no dummy. But to be honest, I'm not here talking because I am a local. I am here because I am concerned for ALL AUSTRALIANS. If you stuff up our water supply, then a line on a map of Australia dividing the States and Territories means nothing. It will affect everyone. So wake up Victoria, South Australia, Western Australia, Tasmania, the A.C.T., and the Northern Territory. CSG mining may soon be coming to a suburb, water catchment area or farm near you.

**NOT ONE CSG HOLE SHOULD BE DRILLED IN NSW
OR ANYWHERE ELSE IN AUSTRALIA UNTIL**

**AN INDEPENDENT WORKING GROUP OF RESPECTED QUALIFIED
EXPERTS IN THE FIELD OF HYDROGEOLOGY, AGRICULTURE AND
GAS EXPLORATION EXAMINES AND REPORTS ON:**

Any potential subsurface adverse impact that may have already occurred
through CSG mining in Queensland

Any potential subsurface adverse impact that may have already occurred
through CSG mining in the USA and other countries

The potential contamination of ground water through CSG extraction

The release of methane into the atmosphere

**THE INTERACTION BETWEEN GROUNDWATER MOVEMENT
AND GEOLOGY CAN BE QUITE COMPLEX.**

**BUT PUT SIMPLY GROUNDWATER FLOWS PRESSURE GRADIENTS, FROM
HIGH PRESSURE TO LOW. FOLLOWING FRACTURES IN THE SUBSURFACE
AREA.**

WATER MAY FOLLOW THE SUBSURFACE DOWN-HILL, BUT WATER ALSO MAY FOLLOW THE PRESSURE GRADIENTS FROM HIGH TO LOW.

Q. WHAT HAPPENS IF CSG MINING CHANGES THE EXISTING ‘PRESSURE’

IS IT POSSIBLE TO FIX THAT “PRESSURE” PROBLEM?

Q. HOW DOES A MINING COMPANY UNPOISON AN AQUIFER THAT HAS BECOME CONTAMINATED

IS IT POSSIBLE TO FIX THAT ‘CONTAMINATION’ PROBLEM?

STATE GOVERNMENT TREASURIES WANT TO COLLECT MILLIONS OF DOLLARS FROM CSG MINING ROYALTIES. IT’S MONEY THEY SAY THEY DESPERATELY NEED TO RUN THEIR STATE.

THERE IS NO DOUBT THAT **THE NSW STATE LIBERAL PARTY AND THE NSW STATE LABOR PARTY** - WANT TO GET THEIR HANDS AROUND THE NECK OF THE GOOSE THAT IS LAYING THE **GOLDEN CSG EGGS.**

BUT IT’S NO GOOD ROLLING IN MONEY- IF YOU ARE DYING OF THIRST

THE STATE OF NSW HAS THE SAME RESPONSIBILITY TO **PROTECT OUR LAND AND WATER RESOURCES** AS DOES THE FEDERAL GOVERNMENT.

WHAT IF, IN 50 YEARS TIME WE FIND WE HAVE A –
“NO GROUNDWATER FUTURE” DUE TO THE CONTAMINATION OF OUR AQUIFERS AND / OR THE LOSS OF PRESSURE; WHICH HAS CRIPPLED OUR AQUIFERS.

**WHAT THEN FOR FUTURE AUSTRALIANS.
THE “IN HINDSIGHT” DEFENCE
WILL SOUND PATHETIC TO THEM**

I CALL ON THE CHAIR OF THIS PLANNING AND ASSESSMENT COMMISSION TO RECOMMEND A FIRM **STOP** TO ANY CSG DRILLING UNTIL AN **“INDEPENDENT”** WORKING GROUP OF RESPECTED EXPERTS THOROUGHLY INVESTIGATES CSG MINING AND STIPULATES THE **EXACT POTENTIAL RISK TO OUR WATER RESOURCES.** PLEASE PUT LONG TERM WATER SAFETY BEFORE SHORT TERM CSG MINING MILLIONS.

FURTHER, THROUGH THE MEDIA HERE TODAY:

I CALL ON PRIME MINISTER JULIA GILLARD TO INTERVENE ON BEHALF OF ALL AUSTRALIANS - BY ENACTING FEDERAL LEGISLATION TO ALLOW THE FORMATION OF A **“COMMONWEALTH INDEPENDENT WORKING GROUP OF EXPERTS”** TO EXAMINE THE WHOLE CSG MINING ISSUE BEFORE ANY NEW DRILLING COMMENCES IN THIS STATE OR ANY OTHER STATE OR TERRITORY OF AUSTRALIA.

Adrian M. Ingleby – Resident – Otford NSW 2508 11.02.2013

*Two glass framed 'visitor information' signs are erected
at the Darkes Forest Road, Darkes Forest
entrance to the
MADDENS FALLS walk
at the Dharawal National Park*

A CATCHMENT AREA WITH LUNGS !

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The Hawkesbury Sandstone of the area has weathered to form numerous shelters and large flat expanses, allowing for the many identified Aboriginal sites including: camping places, overhang shelters art shelters (with rock art styles and techniques unique to the area), axe-grinding grooves and a well. The majority of the sites remain undisturbed and in excellent condition.

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THE MADDENS FALLS EXPERIENCE

The rich scenic walk will guide you past a **revegetating quarry**. Ironstone aggregate was previously mined in this area. Strolling past the red soils of the **dry ironstone forest** on your left, dominant vegetation includes Silvertop Ash and an understorey of Myrtle, Wattle and Geebung. A unique feature is the Cypress Pine growing at the base of the slope on the left.

On your right **sandstone woodlands** displaying Scribbly Gum, Tea Tree and Hakea will be encountered. Sweeping through the forest and feeding on a variety of grubs, bugs and nectar are the Red Wattlebird, Silvereye, Brown Treecreeper, Golden Whistler and Honeyeaters.

The dry woodlands have **adapted well to fire**. The Scribbly Gums may display epicormic “emergency” shoots sprouting up the tree trunk or lignotubers shooting from the base of the tree. The burnt Banksia trees respond to fire by releasing seeds from their woody cones. If you look closely you will observe Banksia seedlings earlier supported by fire ash acting as a source of nutrient to the scorched soils.

The raised walkway beyond is protecting the sensitive **upland swamp** vegetation. Observant eyes may notice the burrow of a Swamp Rat amongst the Pink Swamp Heath and Swamp Banksia, or you may hear the thump of a departing Swamp Wallaby. You will catch glimpses of the creek until you reach the Maddens Falls viewing platform.

The **waterfall** cascades to the sandstone boulders below. These boulders were once part of the horizontal sandstone layer above. The deeply incised gorges drain into the Georges River for approximately 100 km to Botany Bay.

The more fertile **riparian (river) scrub** below is supported by the constant flow of water, Watergums, Coachwood, Red Spider Flower and Acacia species thrive in the creek below.

