

# Nature & Society

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## Editorial

Well, Earth Hour has come and gone. Millions of people have turned off their lights for an hour in thousands of cities world wide. To what purpose? As a means of reducing power use, practically nothing, but as a way to let politicians know they care, maybe it is very useful. After all, elections are blunt instruments and politicians can pick out dozens of different messages from any election result: Earth Hour carries a single message.

Indeed politicians are getting the message that human-induced climate change is something they need to take seriously, although how seriously they do not know, among a plethora of other concerns. At present they are scared that doing something worthwhile (like phasing out coal) will cost jobs, and jobs are precious they say. It does not seem to occur to them that while they care about certain jobs, lots of other ones are vanishing. They do not realise that this provides an opportunity to retrain people in major new industries. Nor do they realise that not doing anything worthwhile about climate change will cost more than jobs; it will put billions of lives at risk.

So it is time to talk about climate change, electricity, jobs, and also population, forests, water, food and other things.

Trying to pinpoint one cause for climate change is difficult. From the days of the first farmers, ten thousand or so years ago, we have been changing the landscape, land use, air composition and climate. The first cleared land, the first few farms, the first towns hardly had an impact. But ever since humans discovered their preferred habitat was cleared land they have been hard at work in creating an Earth cleared to their satisfaction.

As with all things that start small but keep growing (like cancer), the impact keeps growing until it becomes too big for its support base. It is only towards the end that the problem even becomes visible, in many cases. Our support base is the whole planet and our

doubling times have got shorter and shorter especially since we discovered uses for the energy stored in fossil fuels. We have reached the point where suddenly we see collapse all around. We can take credit for dead zones in the ocean and ocean acidification that could put paid to corals and other important marine life. We have distributed poisons to every environment on the planet, we have created a shortage of fresh water in country after country, depleted aquifers, ruined soils, destroyed ecosystems, extinguished species and changed the climate. Yet we argue about whether we should do something about it!

In the face of all these problems politicians do not know what to do, so they take symbolic steps that they counter with ones in the opposite direction. The Australian Government chooses a small target for greenhouse gas reductions, to be achieved by dubious means, and then says that our growing population will make it difficult for us to achieve even this trifling result. The southern states are all worried by water shortages, yet all plan for an increased population.

At least the current recession has prompted a cut in immigration to Australia. This has elicited an immediate response from business sectors, demanding a quick return to high immigration levels.

So what should any government do? It must wake up to the fact that it is high consumption and high population together that are causing all the environmental woes. For starters, the

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Australian Government should cut out the baby bonus, and in word and deed it should rescind the idea of one baby for Mum, one for Dad and one for the country. Any country in the world where the population is stable or declining should celebrate that fact.

To supply the need for a skilled workforce, governments in every country should retrain their unemployed workers and ones who will be out of work as a result of changes in employment. There will not be any quick reduction in population, but at least work towards a slower rate of growth and plan for a reduction in population in the future.

In the short term there are some things Australian Governments should do as a matter of urgency, as well as retraining workers. As a sample of what they could do I have prepared a little list. It should be noted that most of these actions have multiple benefits. For example phasing out coal in the near future would not only reduce green house gas emissions, but would also help to prevent further acidification of the oceans, a very important goal in its own right.

Architects, builders and developers should be required by law to construct the most energy efficient buildings they can. Five star ratings would be the barest minimum, and well insulated buildings which supply their own energy and water, and which are comfortable all year round, should be the norm. This would greatly increase the comfort of occupants and improve their health and safety in extreme weather.

People should be encouraged to grow some of their own food, and source food from the local region as much as possible. This would make their food supply safer in the event of disruptions to long distance transport.

Car travel should be replaced wherever possible, by public transport, cycling and walking, leading to a healthier population.

The Government should declare all old growth forests protected areas in the national interest.

This would help to store carbon and keep the area cooler.

The Government should encourage farmers who move away from the bare earth policy so beloved by our forebears, and who farm in a way that increases tree cover, protects the soil, sequesters carbon, retains soil moisture, and generally produces food in a sustainable and humane way.

Energy grids should source power from a wide range of renewable sources, and coal fired plants should be phased out. This would not only reduce GHG emissions, but would reduce mercury and other toxic elements in the environment.

Governments should embrace a policy to stop mining coal. It is far easier to leave it sequestered underground, where it has been for millions of years, than try to capture the carbon released and force it back underground – itself a very energy intensive activity.

And, as a first, quick and easy measure the government should encourage the painting of all roofs white, thus reducing the use of air conditioners. This by itself would probably reduce our GHG emissions by the five per cent the government is aiming for.

It is time we realised we are all in this together. It should not be a case of 'I will, if you will'. This is one world. The air, water and climate do not stop at political boundaries. Famine and war do not either. If some countries show that they can reduce fuel needs and provide satisfactory living standards, other countries will follow suit.

We need to realise that if we want to find one cause for climate change it is humans and their actions, especially their totally absurd notion of continuous growth, continuously increasing consumption. We need to look at all our actions, our economic assumptions, our culture of domination and possession.

**Jenny Wanless**

*Another reason evolutionary theory may sometimes seem less bedrock-solid than it is stems from some of the internecine haggling among evolutionary biologists over details – the sort of squabbles that for almost any other scientific discipline would be of interest only to the contestants and their listservs; but with Darwinism as the national blood sport, everybody wants to be cc'd.*

*Natalie Angier*

*The Canon: a whirligig tour of the beautiful basics of science.*

*[This applies equally to climate change science, so doubters can delay taking any worthwhile action - JW]*

# Nature and Society

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## Where we are

Room E-319-A in the old building of the John Curtin School of Medical Research at the Australian National University in Canberra.

From the entrance use the intercom phone to call the NSF office on extension 52526.

**By car:** There is a two-hour car park in Balmain Lane, 300 metres to the south of the office.

**By bus:** The route 3 bus from Civic drops you off at the foot of Eggleston Road. Walk 250m south up the hill and turn right; from there the entrance to the building is visible.

**By bicycle:** Plenty of bicycle parking on the ANU campus.

## Albedo mirror

As the Arctic ice melts, less summer sunlight is reflected back into space, and the dark ocean absorbs more heat. A study at the Lawrence Berkeley National laboratory in California reported that whitening the roofs of all the buildings in the world's one hundred biggest cities, along with using more reflective pavements, could reverse this additional warming. Globally roofs account for 25% of the surface of most cities, and pavements cover 35%. If these areas were made reflective in 100 major cities, that would offset 44 gigatonnes of greenhouse gases. Additionally, whitening roofs worldwide could save \$600 billion by reducing energy consumption.

SPA Newsletter No 82, October 2008

## Coming NSF meetings

For the latest information visit our website and click on 'What's On'.

### Wednesday 15 April 2009 - Easier deaths and natural burials - a greener way to leave this life

We have two speakers this evening: Bryan Furnass will focus on the 'easier deaths' and Hamish Horne, CEO, ACT Public Cemeteries will let us know – in the light of the ACT Government's proposal to build another multi-purpose cemetery – of the various options which will be open for body disposal, particularly those which leave a small (or even negative) carbon footprint. There will, as usual, be time for questions and discussion from the audience. (See page 13)

**Venue:** the CSIRO Discovery Centre, off Clunies Ross Street, Acton (turn up the hill at the roundabout and follow the signs to the Discovery Centre)

### Wednesday 20 May 2009 - What is replacing No

**Waste 2010?** This talk will survey the future of waste in the ACT (and surrounding shires). The venue will be the Discovery Centre (see above).

### Wednesday 17 June 2009 - Plants to Grow in the current climate.

In this talk Ian Anderson will consider plants to grow in Canberra gardens as well as the surrounding rural landscape. although principles raised could have application in the wider Australian landscape. Emphasis will be given to growing food plants in the suburbs, blended gardens of native plants (mainly for wildlife habitat) and such food plants, as well as the potential of tree crops in rural areas. There will be reference to the significance and potential of native grasses and associated forbs for gardens as well as in rural landscapes.

[Forbs are herbaceous flowering plants that are not graminoids (grasses, sedges and rushes). Forbs represent a guild of plant species with broadly similar growth form, which in ecology is often more important than taxonomic relationship. Examples of forbs are clover, sunflower and capeweed.]

The venue will be the Discovery Centre (see above).

The 'What's on' page of our website also includes a summary of NSF events back to 2006 and web links to further information about them.

## NSF news

### Scarred Lands and Wounded Lives

About 150 people came to the screening of the Days' film, *Scarred Lands and Wounded Lives*, in February. We were fortunate to have Alice and Lincoln Day present at the film, and it gave them a chance to talk to the gathering. After the applause at the end the Days were prepared to answer questions and lead a discussion, but really the film had said it all. The horror, the stupidity and the environmental damage were all plain to see. If we want to live in harmony with the environment, if we seek a biosensitive society, or anything approaching that, if we want humans to have something better than a miserable future, we must recognise war for the evil it is, and seek peace between all the people of the globe.

This is, of course, the Days' mission, so they asked the audience to suggest ways their film could reach a wider audience. If you have any suggestions as to how they could get it more widely distributed, please contact the NSF office, and we can send your suggestions on to Alice and Lincoln.

*Cannibalism at least provides a reasonable motive for killing a man, which is more than you can say for civilised warfare.*

*PH Fawcett, English adventurer and explorer of the Amazon*

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### Low energy affordable housing

NSF member Derek Wrigley writes:

My latest book, *Low energy affordable housing*, has been delivered and now I have 400 copies to distribute.

I have self-published because it didn't feel right to use NSF to publish something that appears to be 'advertorial' in character. It is really describing a low energy residential system - an integrated way of making everything do double duty by using natural resources instead of polluting non-renewable energies. The savings in running costs are quite remarkable (12 times less than a builder's house and 90% less pollution); John Sandeman and I collaborated on that section. But it's the old story that the initial cost of a house is the criterion - not the running costs - but surely saving \$4000/year in running costs is significant enough?

I wrote *Low energy affordable housing* because politicians, developers, bureaucrats, builders and the like need waking up to their housing responsibilities in the environment. They are carrying on in the traditional, business-as-usual way without any real

consideration of the long term consequences of their failure to acknowledge either climate and economic change and it's just not right.

Developers and builders, also, are taking the easy way out while they can: keeping their heads in the sand and ignoring the small amount of criticism there is.

What amazes me is that we in the NSF solar housing group seem to be the only ones (that we know of) who are speaking out - why? Now I hope this latest book will provide the information to enable others to join with me in stirring the possum.

I have recently seen an approved house plan which has *no* northern windows, the redevelopment of Burnie Court at Lyons has 11 houses with no northern windows and 75% of the other housing units have little or no effective solar access - it's just not good enough. Yet, despite making our case to the ACT government (politicians and planners) construction is proceeding as if the Woden Valley Community Council had never protested or I had not written anything about it.

The new Bonner subdivision has 89% of its blocks unsuitable for solar effective houses - despite ACTPLA issuing new subdivision guidelines last year.

We will have a review in a future edition of *Nature and Society*. Meanwhile copies are available from: Derek Wrigley, 2/72 Shackleton Circuit, Mawson, ACT 2607 for \$20 or \$27 including postage and handling. Derek can be contacted at [dwrigley@cyberone.com.au](mailto:dwrigley@cyberone.com.au) or Ph: 6286 6134.

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### Can the Murray-Darling Basin be saved from collapse?

John Sandeman addressed the first meeting at our regular new venue, the CSIRO Discovery Centre. His topic was the Murray-Darling Basin and he is writing an article for the next edition of *Nature and Society*. On 18 March John described the droughts, changing weather patterns due to climate change, unsustainable state and federal government policies, parochial self-interest and blatant diversion of wetland water to agriculture - all of which have brought the major irrigated agricultural region of Australia close to collapse. He discussed the present state of the Basin together in relation to the existing attitudes of vested interests and the various policies now being undertaken by governments to address the major problems.

## Letter to the Editor

# Climate Change: Causes and Cures?

I refer to the fascinating and important Boyden/Jehne discussions on climate change that have been featured in a number of NSF Journals including the most recent (Feb– Mar 2009). I was unable to attend the Forum Meetings where these issues came up, but, if I may, I would like to join the discussion from afar through your columns.

As I understand it, the key point of difference between Walter and Stephen is the causative role attributed to CO<sub>2</sub> in the climate debate. I would like to comment on this issue and shift the focus of the discussion from causation to potential solutions. These centre, in my view, on the way we manage vegetation (including cropping, pasture management and forestry). Rather than using the oceans as carbon sinks (as some influential ANU academics are suggesting) or burying it deep in the earth's crust (as the Commonwealth and some State

Governments seem to prefer) I argue that land managers, especially farmers (who are responsible for 70% of the Australian landmass) hold the key to both mitigating and adapting to the climate issue.

Before turning to these management challenges, let me sum up my understanding of the respective positions so far.

### Walter's position

Walter's position is drawn from an extraordinarily wide range of scientific sources that extend well beyond the climate science literature, including the geosciences, palaeobotany, evolutionary biology and basic physics and chemistry. He observes that:

1. Actual CO<sub>2</sub> emissions have been increasing since the beginning of the industrial revolution (ie 1750) as a result of:

- a. deforestation and land clearing
- b. the burning of fossil fuels (especially since the 1950s)
- c. the oxidation of methane (CH<sub>4</sub>) (particularly in recent years as CH<sub>4</sub> emissions increase and the globe warms).

2. In the long term the emissions from (a) are the most serious because they also impact on the biosphere's natural ability to bio-sequester CO<sub>2</sub> from all other sources.

3. The emissions from (c) are potentially the most immediately dangerous because CH<sub>4</sub> is a particularly virulent greenhouse gas in itself (before it is oxidised to CO<sub>2</sub>) and can potentially be released in huge quantities if the northern tundras melt.

4. Emissions from (b) while important, are puny compared to the effects of (a) and the potential danger of (c).

In my view the way to think about the impact of CO<sub>2</sub> is to think of it as a *trigger* that sets in train a whole raft of potential positive feedback loops (some of which I refer to below). But the conclusion Walter draws from these observations is that cutting back on (b) as our **primary** strategy is not enough. In his view it is already too late to avoid the dangers inherent in (c) and he argues that a more radical approach is needed.

In outlining his suggestions as to what this approach might involve he shifts his thinking from the role of CO<sub>2</sub> to that of the dominant greenhouse gas (that is largely ignored in the current debate): water vapour. He argues that:

5. Understanding the hydrological processes that have been primarily responsible for governing the earth's climate for 4 billion years (when life first began and long before vegetation as we know it came into existence) gives us the best framework for addressing climate change.

6. These hydrological processes govern 90% of the Earth's heat dynamics through:

- a. cloud formation and cloud albedo
- b. evaporative cooling, and
- c. condensation as dew and precipitation as rain, hail and snow.

7. The science underpinning these processes is less well understood than CO<sub>2</sub> dynamics and more difficult to measure, but Walter claims (and I agree) that it can be managed through the way vegetation has managed these processes on the Earth's surface for the past 400 million years or so.

8. Now that we are interfering with the way nature managed these processes in the past, we need to understand these processes and imitate them in the way we manage land. Engineered solutions that do not work with these natural systems can only make the situation worse.

What is particularly nice about Walter's proposal is that vegetation management will also accelerate the

*There are many painful questions to which there are no satisfying answers, just a series of 'least worst' options.*  
Sholto Byrnes  
New Statesman, 12 February 2009

removal of CO<sub>2</sub> from the atmosphere and, by biomimicking nature, we can also meet urgent food security, sustainability and biodiversity imperatives.

### Stephen's position

Stephen's position appears to be based on the current consensus among climate scientists. Unfortunately, consensus views in science are typically 20 to 100 or more years behind cutting edge ideas. For example both atmospheric and oceanic climate scientists have yet to understand the full implications of Darwin's evolutionary ideas.

Politicians, being risk averse, only go with the consensus view and then only if they are forced to act in response to some sort of calamity or disaster. This is the problem with climate change. It is sneaking up on us (albeit rapidly) and expecting politicians to address these issues in the context of the myriads of other economic, scientific and policy issues clamouring for attention, is unlikely to be successful. I will come back to this.

The consensus view that Stephen draws on (and everyone agrees with) is the idea that the Earth would be 34° C cooler if it were not for the greenhouse effect. Estimates of the contribution made by CO<sub>2</sub> in offsetting this cooling, he says, vary from 9% - 26%. Linacre (my trusty 1977 text book on Australia's climate) puts it at 20%. Stephen refers to CSIRO's estimate of 15%. Whatever number you prefer, it is important to remember in this context that water vapour is roughly responsible for the bulk of the warming (around 60%) and the other greenhouse gases such as CH<sub>4</sub> and NO<sub>x</sub> are responsible for the remaining 20% or so.

Stephen also draws attention to work done by Dawson and Spannagle who see a maximum potential for biosequestration from reforestation at around 17 billion tonnes of CO<sub>2</sub> per annum (4.7 billion tonnes of carbon). He points out that CSIRO is also looking at the potential of forests to biosequester greenhouse gas emissions. He quotes Walter's submission to Garnaut where he (Walter) thinks 10 tonnes per hectare per year is possible for Australia's rangelands, a rate that dwarfs other documented estimates if broad areas are taken into account but certainly possible in certain situations.

I prefer to focus on individual land managers and point out to them that, on the basis of small scale

trials, 3 tonnes per hectare per year is achievable in a cropping situation, up to 10 tonnes per hectare per year in well managed pastures, and 20 tonnes in a forestry situation. I stress these are averages. In good years with better rainfall much higher levels are achievable. With poor management they can be less and even negative, ie more carbon is burned off than sequestered.

Of course it is unwise to scale up from these small achieved results to what whole countries and the whole globe might achieve given the different policy and cultural settings that operate.

In any event, Stephen acknowledges that reforestation and soil improvement have a place and he puts his overall priorities for action as:

1. reduce greenhouse gas emissions
2. focus more on reforestation and soil improvement
3. plan for climate change.

He also sees as an immediate priority, a need to educate our politicians.

### My perspective

I turn now to my own perspective on these issues. It is based on two key pieces of information both missing from the Boyden/Jehne discussion. They are:

1. For the last 50 years, while the Earth's surface has on average warmed, the measured rate of evaporation has been falling.

At first this seems counter intuitive. If the surface is getting hotter one would expect it to get drier, ie evaporation rates would increase. But a moment's reflection shows the flaw in this reasoning. The rate of evaporation is critically dependent on the amount of water vapour already in the atmosphere. The higher the humidity the lower the evaporation rate, and conversely, when humidity is low evaporation rates increase. The extent that measured evaporation rates are falling is also a measure of the increased levels of water vapour in the atmosphere.

And as we have seen water vapour is a more important greenhouse gas than CO<sub>2</sub>.

2. Over the last 50 years, the measured rainfall in Australia has been changing, generally getting wetter in the north and drier in the east and south-west.

What is particularly significant is that these changes are not uniform. There are marked anomalies.

*The supporters of shallow ecology think that reforming human relations toward nature can be done within the existing structure of society.*

*By and large, it is painful to think.*

*The earth does not belong to humans.*

*Arne Naess (1912-2009)  
Norwegian eco-philosopher,  
regarded as the father of  
'deep ecology' died on 12 January*

Getting wetter for example are large patches west of Atherton, and around Quilpie in Qld, around Broken Hill and Moree in NSW, around Adelaide in SA and across the Goldfields districts of WA. There are also a few areas getting drier. When you examine these areas on the ground they have all experienced vegetation changes over the last 50 years.

Both the evaporation rates and rainfall data, like the CO<sub>2</sub> data, to which both Walter and Stephen refer, are based on direct measurements. How they relate to each other is a complex question and I see no benefit in speculating as to what causes what. I leave that to climate modellers who love nothing better than using big powerful computers to speculate. As a practising scientist, I look for empirical evidence on the ground and find the direct observation of a close relationship between rainfall and vegetation beyond doubt, especially as it is backed up by historical as well as local experience.

Since 2000 when we bought a small property near Binalong NSW I have been experimenting with the relationships between vegetation cover, soil moisture, evaporation rates and vegetation growth. It is too early to publish any of these observations, but notwithstanding some 5-6 years of abnormally dry weather some interesting patterns are emerging.

One of these has to do with rates of growth, which everyone knows has to do with soil moisture. What is becoming clear is that trees, as living organisms, can manage their own soil moisture and their own nutrient cycling, and so can our native grasses.

Of course they can't do this if we chop them down or graze them out, but how we can stimulate vegetation to manage itself is an interesting story for another occasion.

In the meantime, I have some sympathy for our politicians and policy advisers who are overloaded with unrealistic expectations and demands from vested interests. It is time we stop the blame game and look to what we are doing in our own backyards and life styles.

**John Schooneveldt**

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Men argue, nature acts.

Voltaire

## Talking about fires 1

### We have still not lived long enough

We should have seen this coming. We *did* see this coming. Yet we failed to save lives. We have still not lived long enough.

*They had not lived long enough* were the words that Judge Leonard Stretton used to describe the people who lived and worked in the forests of south-eastern Australia when they were engulfed by a holocaust wildfire on 'Black Friday', 1939. The judge, who conducted an immediate Royal Commission into the causes of the fires, was not commenting on the youthfulness of the dead: he was lamenting the environmental knowledge of both victims and

survivors. He was pitying the innocence of European immigrants in a land whose natural rhythms they did not yet understand. He was depicting the fragility and brevity of a human lifetime in forests where life cycles and fire regimes had the periodicity and ferocity of centuries. He was indicting a whole society.

In 1939 Australians were deeply shocked by what had happened in their own backyard. Rampant

flame had scourged a country that considered itself civilised. As well as shock, people sensed something sinister about the tragedy and its causes. Judge Stretton tried to find the words for it in his fearless report. Of the loss of life at one sawmill settlement, he wrote: 'The full story of the killing of this small community is one of unpreparedness, because of apathy and ignorance and perhaps of something worse.' The 'something worse' that he tried to define was an active, half-conscious denial of the danger of fire, and a kind of community complicity in the deferral of responsibility.

There is something sinister also about this dreadful tragedy of 2009, although the character of it is different. Those of us who know and love these forests and the people who live in or near them are especially haunted. In 1939, some of the ignorance and innocence was forgivable, perhaps. 'Black Friday' was a late, rude awakening from the colonial era of forest exploitation and careless fire use, and it demanded that people confront and reform their whole relationship with the bush. When the 1939

*We believe that there will be no significant move towards a biosensitive society until there comes about a basic understanding, right across the community, of the processes of life, the human place in nature and the main ecological and health issues of the present day. We call this biounderstanding.*

*Stephen Boyden  
Soon to appear on  
[biosensitivefutures.org](http://biosensitivefutures.org)*

fires raged through the forests of valuable mountain ash (*Eucalyptus regnans*), settlers did not even know how such a dominant and important tree regenerated. In the seventy years since 1939, we have lived through a revolution in scientific research and environmental understanding and we have come to a clearer understanding of the peculiar history and fire ecology of these forests. We have fewer excuses for innocence. We knew this terrible day would come. Why, then, was there such an appalling loss of life?

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Victorians live entirely within what the international fire historian Stephen Pyne calls 'the fire flume'. It is the most distinctive fire region of Australia and the most dangerous in the world. When a high pressure system stalls in the Tasman Sea, hot northerly winds flow relentlessly down from central Australia across the densely vegetated south-east of the continent. This fiery 'flume' brews a deadly chemistry of air and fuel. The mountain topography of steep slopes, ridges and valleys channel the hot air, temperatures climb to searing extremes, and humidity evaporates such that the air crackles. Lightning attacks the land ahead of the delayed cold front and a dramatic southerly change turns the raging fires suddenly upon its victims.

*What is the right balance between modifying forests and modifying the way people live in forests in order to improve public safety? Australia needs to have this conversation.*

*It concerns me that a disproportionate focus on fuel management in our forests will not guarantee life and property under extreme weather events such as February 7 and create a host of other environmental problems instead.*

*Philip Gibbons  
Canberra Times, 23 February 2009*

There is a further ingredient to the chemistry of the fire flume. Across Australia, eucalypts are highly adapted to fire. Over millions of years these trees have turned this fragment of Gondwana into the fire continent. But in the south-eastern corner – especially in the forests of the Victorian ranges – a distinctive type of eucalypt has evolved. Ash-type eucalypts (the mountain and alpine ash) have developed a different means of regeneration. They do not develop lignotubers under the ground like other eucalypts and they rarely coppice. They are unusually dependent on their seed supply – and, to crack open those seeds high in the crowns of the trees and to cultivate the saplings successfully, they need a massive wildfire. Ash-type eucalypts generally grow in even-aged stands. They renew themselves *en masse*. These particularly grand and magnificent trees have evolved to commit mass suicide once every few hundred years – and in European times, more frequently. Not all the

communities that were incinerated in 1939 and 2009 were in or near the forests of ash, but many were, and the peculiar fire ecology of the trees is another deadly dimension of this distinctive fire environment. These are wet mountain forests that only burn on rare days at the end of long droughts, after prolonged heatwaves, and when the flume is in full gear. And when they do burn, they do so with atomic power.

The 2009 fires were 'unprecedented', as many commentators have said. They erupted at the end of a record heatwave and there seems little doubt that this was a fire exacerbated by climate change. But it is the recurrent realities that are more striking. For those of us who know the history, the most haunting aspect of this tragedy is its familiarity. The 2009 bushfires were 1939 all over again, laced with 1983. The same images, the same stories, the same words and phrases, and the same frightening and

awesome natural force that we find so hard to remember and perhaps unconsciously strive to forget. It is a recurrent nightmare. We know this phenomenon, we know the specific contours of the event, and we even know how people live and how people die. The climate change scenario is frightening. But even worse is the knowledge that we still have not come to terms with what we have already experienced.

The Bureau of Meteorology predicted the conditions superbly. The Victorian Premier, John Brumby, issued a warning. Fire experts knew that people would die that day. History repeated itself with uncanny precision. Yet the shock was, and still is, immense. It is the death-toll, and not the weather, which makes the event truly unprecedented.

The recommended survival strategy of 'leave early or stay and defend your home' was a death sentence in these Victorian mountain communities on a forty-something degree day of high winds after a prolonged heatwave and a long drought. There is no identifiable 'early' in this fire region on the fatal days. We understand why this policy has evolved and it has much to recommend it. It is libertarian; it recognises the reality that people prefer to stay in their own homes and defend them if they can; it seeks to minimise late evacuation which is so often fatal; it encourages sensible planning and



preparation; and it has demonstrably saved lives and homes. It will continue to guide people well in most areas of Australia. But I fear that it has misled people in this distinctively deadly fire region to believe that they could defend an ordinary home in the face of an unimaginable force.

We need to abandon the idea of a *national* fire plan and develop ecologically sensitive, bioregional fire survival strategies. We need to move beyond an undifferentiated, colonial sense of 'the bush' as an amorphous sameness with which we do battle, and instead empower local residents and their knowledge of local ecologies. The quest for national guidelines was fatal for the residents of these Victorian mountain communities on such a day; it worked insidiously to blunt their sense of local history and ecological distinctiveness. Clearing the backyard, cleaning the gutters and installing a better water pump cannot save an ordinary home in the path of a surging torrent of explosive gas in the fire flume.

A 'stay and defend' option is only realistic in such places and conditions if every property has a secure fire refuge or bunker. A bunker at the shire hall or at the end of the street is not good enough – people will die getting to it. I welcome the Prime

Minister's promise to rebuild these communities 'brick by brick' – and I would like him to add: 'and bunker by bunker'. Many people built bunkers in their backyards in the second world war and most, thankfully, were not used. But we know for certain that any secure bunkers built in these Victorian forest towns *will* be used in the next generation, and they will save lives. This is an appropriate challenge to the design and construction industries of the fire continent.

Fires inflame blame. Arsonists will be rightly condemned, but they will also distract us from addressing the reality of fires mostly caused by lightning. There were arsonists in 1939 and 2009 and there will be again in 2069; they are a sickening factor mostly beyond our predictive control. Water-bombing helicopters will again be promoted and in some areas they will be effective. The environmental and protective impacts of systematic control burning of our forests will be debated even more vociferously. Climate change will be correctly identified as a new factor in fire behaviour. But none of these policies or issues will ultimately save lives in these Victorian

mountain communities on a holocaust day. Deep in the forests on Black Friday, 1939, with flames leaping kilometres ahead of the fire front, there was only one way to go – down. Well-built dugouts saved lives.

There was another meaning to Judge Stretton's declaration that *they had not lived long enough*. He was saying that lived experience alone, however vivid and traumatic, was never going to be enough to guide people in such circumstances. They also needed history. They needed – and we need it too – the distilled wisdom of past, inherited, learned experience. And not just of the recent human past, but of the ancient human past, and also of the deep biological past of the communities of trees. For in those histories lie the intractable patterns of our future. There is a dangerous mismatch between the cyclic nature of fire and the short-term memory of communities. These bushfire towns – where the material legacy of the past can never survive for long – need to work harder than most to renew their local historical consciousness. The greatest challenge in fire research is cultural.

*Modern humanism is the faith that through science humankind can know the truth – and so be free. But if Darwin's theory of natural selection is true this is impossible. The human mind serves evolutionary success, not truth. To think otherwise is to resurrect the pre-Darwinian error that humans are different from all other animals.*

*John Gray in Straw Dogs, 2002*

There is a perennial question in human affairs that is given real edge and urgency by fire: *do we learn from history?* Testimony from the 1939 and 2009 fires suggests that there is one thing that we never seem to learn from history. That is, that nature can overwhelm culture. That some of the fires that roar out of the Australian bush are unstoppable. As one fire manager puts it, 'there are times when you have to step out of the way and acknowledge that nature has got the steering wheel at the moment.' It seems to go against the grain of our humanity to admit that fact, no matter how severe are the lessons of history.

**Tom Griffiths**

Tom Griffiths is Professor of History in the Research School of Social Sciences at the Australian National University and the author of *Forests of Ash: An Environmental History* (Cambridge University Press, 2001).

First published in *Inside Story*:

<http://inside.org.au/we-have-still-not-lived-long-enough/> and *The Age*, 'Insight' section, Saturday, 21 February 2009.

## Talking about fires 2

# The biological management of forest fuels and fire risks

Southern Australia has been undergoing a systemic aridification with climate change.

This aridification dictates that most Australian forests are at intensifying risk of uncontrollable fires and destruction as periods of extreme fire weather increase.

Unless managed, this emerging environment makes it inevitable that:

1. Most of Australia's natural forests are at increased risk of intense fires.
2. The communities, water resources and bio-systems within these fire zones are at risk of more frequent intense destruction and degradation.
3. No level of human intervention will be able to prevent or limit such destruction on extreme fire days.

Our only chance to prevent widespread conflagration is to urgently and radically change our current approach to the reduction of forest fuel levels, the only fire variable able to be readily influenced by our actions.

We have two options for reducing such forest fuel levels and fire risks. The first, *fuel reduction burning*, is likely to become of more limited use and effectiveness due to:

1. The increasingly restricted periods when it is possible and safe to use it.
2. Its negative impact in further aridifying forests and increasing fire risks.
3. Its ineffectiveness in the prime wet sclerophyll forests with rainforest understoreys that are now most at risk of fire and degradation.

Although previously ignored, the preferable option is to reduce fuel levels microbially by restoring and enhancing the *natural litter bio-degradation* processes in these forests.

Effectively all the biomass that has been fixed by these forests over the past 40 million years has

either been converted by fire back to CO<sub>2</sub> or been bio-converted by fungi into stable soil humates. Victoria's immense brown coal deposits are testament to the primary role that bio-degradation processes and humate formation has played over this period.

We now face a similar choice of fire or fungi in managing our future extreme fire risks.

Whereas fire based strategies lead inevitably to dryer and more fire prone forests, enhancing fungal bio-degradation activities leads to the formation of the soil conditions that helped generate the moister, cooler, more productive and less fire prone premier wet sclerophyll and rainforests that dominated much of Australia under lower fire impacts.

Our challenge is to urgently recognise and adopt practical management approaches for reducing fuel levels in limited strategic areas by such enhanced bio-degradation so as to create moister forest conditions less prone to fire even on the more extreme days. Although not replacing the need for hazard reduction burning, particularly in the interim, these enhanced bio-degradation approaches may be valuable in breaks to protect key communities, water and wet forest assets and as

options for safe control burns decrease.

While there is more to know, we can create the environmental and natural microbial conditions to safely accelerate the bio-degradation of fuels and fire risks in such sites.

We know these same processes have been highly effective in nature in creating and protecting the soils and less fire prone conditions in our prime wet sclerophyll forests.

The challenge is in refining and extending the use of such strategies as appropriate as part of our critical fire management responsibility despite intensifying climate changes.

We have perhaps a decade left to either adopt effective forest fuel and fire management or witness the widespread destruction of forest bio-systems, communities and our current climate as more extreme fire weather intensifies fire frequencies and impacts.

*Confucius advised that if we hope to repair what is wrong in the world, we had best start with the 'rectification of the names'. The corruption of society begins with the failure to call things by their proper names, he maintained, and its renovation begins with the reattachment of words to real things and precise concepts. So what about this much abused pair of names, sustainable and unsustainable?*

*Michael Pollan, 16 December 2007  
in article Our Decrepit Food Factories*

Although the aridification of southern Australia and the intensification of extreme fire weather are likely to be dangerous positive feedback processes directly linked to climate change, these conditions are not unique and have been survived by our forests previously.

It follows that provided we understand and manage the processes that enabled these forests to protect themselves and survive extreme fire events previously, we may be able to use this knowledge to similarly protect other bio-systems and assets despite our dryer, warmer and more fire-prone climate.

However, to do so we may need to be prepared to see and respond beyond the status quo. To understand that we have two options for reducing fuel loads and fire risks in forests – fire and fungi – and to use both of these appropriately and synergistically as in nature to protect and enhance the survival and bio-productivity of our forests despite increasing fire risks from climate change. Our biggest challenge may be in recognising this imperative and our options for managing it in time.

*We tolerate shapes in human beings that would horrify us if we saw them on a horse.*

*Dean W.R. Inge.*

**Walter Jehne**

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## Permanence

I often think about why and how this culture values permanence. So often we hear this culture described as a throw-away culture and that's certainly true. But there's a larger sense in which permanence is valued above all else. People want to make a mark. They want to build some monument that will last. They want to stop decay. They want to cheat death. It's all based on that disrespect for nature you've written about and worse, a fear and hatred of nature and of death. ... Even in conversations about 'green' products, permanence is valued. ... I should prefer structures that will be eaten by termites and fungi (and lived in by birds and mice along the way), and valuing that permanence interferes with my attempts to live sustainably. I think part of the problem is that civilization constantly tries to turn circles into straight lines. Ultimately, the circles *will* close, but it can take a long time.

Terry Shistar, quoted in *What We Leave Behind* (2009) p 58

## Talking about fires 3

### Bushfires in South-East Australia

*Colin Samundsett has provided his thoughts about our fires under a variety of headings.*

The NSW Department of Environment and Health's website has a list of some 113 relevant publications dated from 1860 to 2004. Paul Collin's *Burn* did not come to print until 2006. Gurdap Singh's notes from Lake George data, going back some 130,000 years and recording a marked increase in frequency about ten millennia ago, was not listed. And there is much else of relevance elsewhere. A lot of data, from obvious importance to the obscure yet equally important, are available for sifting through.

#### Frequency and landscape change

Fire regimes in south east Australia surely were altered by Aboriginal occupation. What proportion to divide between

deliberate action and accident is debatable. Mucking around with fire within stands of Mountain Ash would lose favour early. Fires lit in other environments according to tested cultural regimes were not done by gods – we are all human, and mistakes fostered by uncooperative weather were certain. The sum of it all would have resulted in change to already fire-prone environments.

Since the establishment of European settlement, apart from new land practices, the frequency of fires couldn't do other than increase due to a vastly increased presence of fallible human beings. Undoubtedly the landscape is continuing to be changed by fires, and the frequency of these is increased in step with increasing population – no matter how careful the majority of its individuals may be.

#### Combustibles

It's a fair guess that grass, detritus, Acacia, Eucalypt savanna, Eucalypt forests (excluding Mountain Ash), Pine, Mountain Ash, all have different characteristics of combustion: speed of ground travel, ease of ignition, volatility of oils, density of massed combustibles, generation of mini-tornados of combusting gas within and above the general wind speed – at height, or at ground level. All are represented in south east Australia, and ignition in one may cause ignition in another.

## Ignition

Until 60,000(?) years ago and human intervention, lightning would have been about the only source. Subsequently, Aboriginals were well acquainted with fire, but did not have the simple facility of a match or cigarette-lighter, nor the wide ranging social spectra of current societies. Since European settlement there has been vast escalation of ignition potential by humans. Whether this has been via technological failure, accident, misadventure, or arson, the potential for ignition arising out of each or all is increased by numbers of participants in a bushfire prone society.

## Fuel minimisation agents

Prior to human presence, browsing fauna/megafauna had some impact on vegetation – to an unknown extent – on most landscapes. Australian dung beetles probably played a part in disposing of their excreta, incorporating it into the soil thereby enhancing porosity, fertility, and fungal presence; whatever the extent.

The contribution of megafauna to forest/plains maintenance disappeared, and probably species of dung beetle with them. Smaller mammals continued to contribute, particularly with enhancement of fungal dispersal, until after 1800. The gravity of this latter loss was noted during the International Mycological Congress at Cairns in 2006. In this context Paul Stamets, in attendance there though not presenting, has written cogently of the importance of fungi and their ecological associates in minimising fire prevalence in north western USA forests. Although the moisture regime there is vastly different, fungi are also prominent in decomposition of litter here. Whatever continued presence useful fungi might have in spite of altered ecology, the particular animals required for their adequate dispersal have been grossly depleted.

Human efforts at fuel minimisation are a mixed bag of general landscape husbandry, human habitation issues, and the need for immediacy in relation to fire control. These do not necessarily complement each other.

The issue of landscape husbandry is itself a complex issue, as evidenced by the Guidelines for

fire regimes on behalf of the Golden Shouldered Parrot north of Cooktown. In south east Australia the interface between so many regimes for stakeholders with differing requirements – both human and natural – has even greater complexity; very likely insoluble to the satisfaction of many.

## Atmospheric conditions

The most reliable feature of weather in south east Australia is its unreliability. Timely prediction of it is limited in regard to the detail required – whether it be year to year; or hour to hour (or less) when it comes to wind change in rugged topography. Fluctuating pressure gradients across the continent in warmer months commonly precipitate a sudden onset of high temperatures, low humidity, and high wind speeds.

That is simply a fact of life for the region, to be factored into the overall perspective of bushfire, especially by those at the sharp end of combating emergent fires. The obvious communication difficulties facing these people are compounded by ionization of atmospheric components, thereby inhibiting electronic transmission, caused by the heat of flame – including flame from grass.

## Climate now and future

The weather regimes over the past few thousand years to the present here are not designed with benevolence for the currently preferred style of human occupation. The more people there are that are

attempting to force their will over what is a recalcitrant climate, the more difficulties are engendered.

Some compromise by our resident *Homo sapiens* in the south east has to be made. In the face of expected climate deterioration there will be further compromise. Exactly what that will be is indeed worthy of debate, conducted with honesty – rather than obfuscation and hope – within a broad rather than a narrow spectrum.

**Colin Samundsett**

*Before Darwin...we were believed not to share with other creatures a total dependence on the workings of the natural world despite repeated, contrary evidence from droughts, famines and pestilence. Despite the insistent claims of this evidence, despite the vast amount of detailed scientific knowledge that links and integrates its parts, despite all these things we cling to a pre-Darwinian view that we can escape our biological origins. In this way we have become Homo arroganis and Homo hubrisii. Economists have melded these antiquated notions with their own limited understanding of humanity's circumstances.*

*John Coulter  
SPA Newsletter, February 2009*

## Talking about fires

Philip Gibbons, a Senior Fellow in the Fenner School of Environment and Society at the ANU wrote an article *We Need to Talk about the Forests* published in *The Canberra Times*, 23 February 2009. This was one of several articles and statements put out from the Fenner School in the wake of the Victorian fires.

Naturally, after the fires, there were a great many statements about the lack of prescribed burning in the lead up to the fires, and pushing the need to burn more, more frequently, clear land around townships and so on. The Fenner School researchers tried to counter this push, by showing among other things, that some of those forests are naturally too wet to burn in ordinary conditions. They can only burn in extremely hot and dry conditions, when prescribed burning would be far too dangerous to carry out.

Philip Gibbons, a former Victorian firefighter, describes the situation as follows. It was not a lack of prescribed burning. Maps available on line show 'the Victorian fires moved across a mosaic of forest that had been prescribed burnt and logged, converted to plantations and cleared. Marysville had a large area around it that was prescribe-burnt last year. Calignee is surrounded by a mosaic of cleared land and forest...

*Old age brings along with its ugliness the comfort that you will soon be out of it, – which ought to be a substantial relief to such discontented pendulums as we are. To be out of the war, out of debt, out of the drouth, out of the blues, out of the dentist's hands, out of the second thoughts, mortifications, and remorsees that inflict such twinges and shooting pains, – out of the next winter, and the high prices, and company below your ambition, - surely these are soothing hints.*

Ralph Waldo Emerson, 1803-82  
written in 1864

Ecologists, foresters and firefighters who have been associated with wet forests that occur in areas burnt by the Murrindindi complex of forests understand that these forests carry fire only in hot dry seasons.

In other words, they cannot be safely prescribe-burnt. The native vegetation in these wet forests has burnt and regenerated under a regime of infrequent intense fires for millennia.'

As a former firefighter Gibbons probably has a better chance of being believed by some people who would otherwise not want to believe an academic researcher, so we can hope that his word carries authority with them. As an ordinary Canberra resident who had thought that the fires that had burnt right up to the edge of Canberra just a year before our disastrous fire storm in 2003 would protect parts of the city, I was shocked to find that the pre-burnt area was no protection at all. There were certainly

reliable witnesses who saw fire sweep straight across bare paddocks.

In very hot, dry conditions the nature of fire can change from travelling through available fuel, to propelling clouds of volatile oils and terpenes well ahead of the fire where they can explode and ignite when they hit something ready to burn. No amount of prescribed burning, or any apparently reasonable fire break will stop them.

Most NSF members realise how valuable our remaining forests are as homes for biodiversity, as carbon sinks, as the most effective way to ensure clean water for reservoirs, and for their aesthetic beauty. It will be tragic if public opinion in the wake of the Victorian fires insists on more clear-felling. Fortunately the people who love the forests and want to live amongst them, tend to be taking the same

attitude as some of the recent shark attack victims: don't destroy the shark, I was in its domain.

We hope the preceding articles encourage a public conversation about the forests.

Jenny Wanless

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## Postmortem ecology – a case for natural burials

From time immemorial, dying, death and the disposal of human remains have been of central concern to human cultures. For many thousands of years early humans buried their dead in simple shallow graves, their bodies thereafter becoming part of the natural ecosystem.

Since neolithic times and the development of civilization, humans have become the only species in which the dead do not return naturally to the ecosystem. Illusions of immortality led ancient Egyptians to develop embalming techniques for the preservation of bodies of pharaohs and other influential persons, a practice which is still favoured by some wealthy people today. Ancient Romans consigned their dead to subterranean catacombs, and when disintegration of soft body parts was complete and demand for space more pressing, skeletal remains could be transferred to ossuaries.

As Christianity spread throughout Europe, burial grounds became associated with churches, graves

being dug deeply below fertile soil, into which bodies enclosed in wooden coffins were lowered. In contrast to the pomp and circumstance of some funerals, Thomas Gray (1716-1771) wrote of the leveling effect of mortality, in his *Elegy written in a Country Churchyard*:

“The boast of heraldry, the pomp of pow’r,  
And all that beauty, all that wealth e’re gave,  
Awaits alike th’inevitable hour:  
The paths of glory lead but to the grave”.

More humorously, the Yorkshire folk song *On Ilkley Moor bar t’at* depicts awareness of the re-cycling powers of nature: “....Then worms’ll cum an’ eat thee up.....”.

As population increased and churchyards became crowded, extensive civic cemeteries were established. Long-life coffins, deep burial and embalming result in the dead remaining intact for a very long time, occupying and scarring valuable real estate in cities. Partly as a result of crowding, cremation was introduced as a method of body disposal in Britain in the late 19<sup>th</sup> century, and South Australia was the first State in Australia to introduce cremation facilities in 1909.

Contrary to popular opinion, cremation is not a “clean” way of body disposal. Studies of emissions reveal that incineration turns people into at least 46 different pollutants. Some of these, like nitrous oxides and heavy metals, remain in the atmosphere for more than a century, causing ozone depletion and acid rain. There are other ecological disadvantages, including particulate and greenhouse gas emissions from gas- or electric- fired incinerators, and the waste of valuable timber from rainforests evanescently used for body storage in coffins.

In recent years, an alternative to deep burial and cremation has emerged through the concept of natural cemeteries. The burial method is in a 1m deep plot, with rapid bio-degradable non-pollutant caskets or shrouds, compost soil and over-planting with native trees. This enables natural processes of

decay to occur, returning the body’s nutrients to the ecosystem rapidly and without pollution, while the over-growing tree or shrub extracts CO<sub>2</sub> from the atmosphere.

The first natural cemetery was established in the UK in 1993. By 2003 there were over 100 and by 2008 over 200, their growth in popularity being three times faster than for cremation. There is a well established natural cemetery in Wellington, New Zealand and one is planned for South Australia. It is intended that the cemetery will become a permanent bush park – a living memorial to those buried there, a home for native flora and fauna, and a beautiful place for family and friends to visit. The natural burial is effectively an environmental donation – both physically and monetarily to the biosphere and to future generations.

*The myth that we can become “energy independent” and yet remain car-dependent is absurd. In terms of liquid fuels, we’re simply trapped. We import two-thirds of the oil we use and there is absolutely no chance that drill-drill-drilling (or any other scheme) will change that. The public and our leaders can not face the reality of this. The great wish for “alternative” liquid fuels (bio fuels, algae excreta) will never be anything more than a wish at the scales required, and the parallel wish to keep all our cars running by other means — hydrogen fuel cells, electric motors — is equally idle and foolish. We cannot face the mandate of reality, which is to do everything possible to make our living places walkable, and connect them with public transit. The stimulus bills clearly illustrate our failure to understand the situation.*

*James Kunstler 9 February 2009*

The ACT Government is proposing a second gas-fired crematorium for Canberra, which is actively opposed by local residents. Alternatively, for a government which prides itself on aiming for sustainability and reducing our greenhouse gas footprint, a golden opportunity should not be missed to establish a natural cemetery, which would enhance rather than detract from environmental values. The rising generation of ecologically aware citizens might be enthusiastic if tripartisan support could be gained to implement such a vision.

**Bryan Furnass**

Further information from:  
[www.naturalburials.com.au](http://www.naturalburials.com.au)

(Bryan Furnass is a retired physician with an interest in environmental health. This article first appeared in The Canberra Times and is reprinted here with their kind permission.)

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### **Our doublestandards**

We have, in fact, two kinds of morality side by side: one which we preach but do not practice, and another which we practice but seldom preach.

**Bertrand Russell, *Sceptical Essays* (1928)**

# Farrago

## Menace of mercury

Mercury is a dangerous metal that damages the human nervous system and causes memory loss and disturbed vision. It also impairs the functioning of the liver and thyroid.

About 6000 tonnes of mercury are released each year by human activity, going into the air, soil, rivers, lakes and seas. One third of this amount is emitted from coal burnt in power stations, or elsewhere. Mercury in the air is washed down by rain, and bacteria and other natural processes convert it to organic methylmercury. In this form it is absorbed by sea creatures and works its way up the food chain.

The second most prolific source of mercury is its use by small scale gold miners in Asia, Africa and Latin America. The miners like working with liquid mercury because it is relatively cheap, works quickly and leaves the gold cleaner than traditional panning. The United Nations Environment Program estimates that ten million miners and family members may be suffering from mercury poisoning.

Both sources of mercury are increasing and our energy-saving lightbulbs also contain mercury. The industrial boom in Asia has been powered by a boom in coal fired power stations. Now the financial down turn has turned many investors' eyes to gold as a safe investment to replace banks and shares.

The UN has spent \$US7 million in six developing countries to educate miners and local suppliers about mercury. Now a global meeting has agreed to negotiate a binding treaty to tighten controls on its use.

Michael Richardson  
*The Canberra Times*, 3 March 2009

*The attempt to restart "consumerism" will be equally disappointing. It was a manifestation of the short peak energy decades of history, and now that we're past peak energy, it's over. That seventy percent of the economy is over, especially the part that allowed people to buy stuff with no money. From now on people will have to buy stuff with money they earn and save, and they will be buying a lot less stuff. For a while, a lot of stuff will circulate through the yard sales and Craigslist, and some resourceful people will get busy fixing broken stuff that still has value. But the other infrastructure of shopping is toast, especially the malls, the strip malls, the real estate investment trusts that own it all, many of the banks that lent money to the REITs, the chain-stores and chain eateries, of course, and, alas, the non-chain mom-and-pop boutiques in these highway-oriented venues.*

James Kunstler, 9 February 2009

## Green scams

James Lovelock thinks that we do not have time to save ourselves by limiting carbon emissions. "Most of the 'green stuff' is verging on a gigantic scam. Carbon trading, with its huge government subsidies is just what finance and industry wanted. It's not going to do a thing about climate change, but it'll make a lot of money for a lot of people."

Lovelock is not in favour of massive wind farms, or geosequestration, but thinks that massive burials of charcoal could work. Farmers would burn crop waste at very low oxygen levels and plough the resulting charcoal into their fields. This would not need to be subsidised but farmers would benefit.

However Lovelock is not hopeful that the idea will be adopted. He likens humans to the first photosynthesisers, which released that nasty poisonous gas, oxygen, killing off most of contemporary life. Humans themselves could suffer a ninety per cent die-off this century as a result of human lack of action on climate change and related environmental damage.

*New Scientist*, 24 January 2009

## Top predators

Hammerhead sharks used to be the top predators in Chesapeake Bay, on the US east coast, where cownose rays formed a major part of their diet. The shark population has been hunted extensively in recent years, with flow on effects across the ecosystem. The ray population has exploded, practically eating out the scallops and crustaceans.

Removing top predators always unbalances an ecosystem,

something Australians must remember when hearing the calls to increase shark catches as a response to the recent attacks on swimmers.

*The Canberra Times*, 7 March 2009

**Nuclear budget** - The US Government spent \$52.4 billion on nuclear weapons in 2008, according to the Carnegie Foundation. Maintaining the US arsenal cost \$47 billion, and about \$5 billion was used on preventing nuclear threats. This is twice the total spent on science, space and technology, and fourteen times the budget for energy research. *New Scientist*, 17 January 2009



Contributions for the next edition of *Nature and Society* are invited now from all members. They should be sent to the editor, Jenny Wanless, 22B Jensen St, Hughes ACT 2605, ph 02 6281 3892, or to our office by 25 May 2009.

Contributions may be sent on paper or electronically. This journal was prepared using Microsoft Word and Adobe PageMaker 7.0.2.

Items in *Nature and Society* do not necessarily reflect the opinions of the majority of the Forum members, but are published in the hope of stimulating thought and discussion.

Jenny Wanless and Keith Thomas prepared this edition together with the named contributors; Jenny and Keith also contributed the unattributed items and provided the quotations.

### Nature and Society Forum's major projects

**ANSI:** The Australian National Sustainability Initiative is endeavouring to establish a working display site in Canberra that addresses all aspects of sustainable building and lifestyle. Contact Wendy Rainbird

**Biosphere Reserve Nomination:** supporting the nomination of the ACT as a UNESCO Biosphere Reserve, part of UNESCO's Man and the Biosphere program. Contact Ian Anderson

**Biosensitive Futures:** interactive website launched this year provides authoritative information on social and environmental issues for public discussion. Also kits on the same lines for use in discussion groups. Contact Stephen Boyden. Visit [www.biosensitivefutures.org](http://www.biosensitivefutures.org)

**SEE-Change:** community-based discussion and action groups to encourage local involvement in sustainability activities. Contact Bob Douglas

**Social learning workshops for sustainability:** a number of groups focusing on different aspects of local sustainability, including art and transport, youth film makers, local communities. Contact Valerie Brown

**Solar Planning and Housing:** extending knowledge of how to build or retrofit houses to use less water and fossil fuel energy while enhancing liveability. Contact Derek Wrigley

All contacts can be reached through the NSF office.

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