

Nature & Society

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Editorial

What a weird mob we humans are: such a mixture of intelligence and stupidity, goodwill and hostility, kindness and cruelty. Much of the time we do not even notice the contradictions in the way we behave. At this Christmas season we express the wish for Peace on Earth and Goodwill to Men (let's up date that to goodwill to all humans) and then act in ways that ensure these noble sentiments cannot come to fruition. Good resolutions are made and quickly broken. Welcome to the season of conspicuous over consumption and excess.

This season is therefore a good time to talk about morals. Just as Daniel Quinn argued that we will have to have a new way of thinking if our species is to survive for more than a few generations (see the editorial in the October journal) so we will need to adapt our moral code to avoid overwhelming all the natural systems on which our survival depends.

For years NSF member Neil Burry has been trying to alert us, and the rest of society, to the perils of over consumption of food by individuals, and of all resources by our society. He says 'An understanding of personal obesity gives an understanding of economic obesity. It is all a matter of energy imbalance which stands high in the list of concerns of the Nature and Society Forum. Indeed Stephen Boyden has made it the supreme concern. Tim Flannery makes it the supreme concern in his book *We are the Weathermakers*. Indeed we are the weathermakers who are over our healthy economic and body weights as the result of over consumption.'

As we approach this new year an interesting phenomenon is occurring. Quite suddenly, it seems, there is much public discussion on many issues NSF and other organisations have been working for years to get into the

public arena: climate change, peak oil, energy consumption and supply, the rapid decline of fisheries, the plight of the oceans, shortages of water, human health and nutrition, and many more, all are getting a really public airing for the first time.

It is fascinating to watch the growing public and political perception of the problems about which we have been talking and writing for decades. It almost seems miraculous, but of course it is not. The systems have reached a tipping point at which acceleration of the problem has occurred and it can no longer be ignored. And it is no coincidence that this is all happening at the same time; we have argued for ages that all these things are connected. They are the consequence of too many people consuming too much and stressing all the

life support systems of the planet.

Neil coined the term Darwinian original sin to alert us to the moral dimensions of the problem. All species, humans included, tend to eat well in good times to tide themselves though bad times. This served us well when there were lean times. Anyone who saw the

Sir Brian Heap accepts that South Asia and Africa are about to suffer the terrible consequences of First World excesses. What of our responsibility to them? "The poor aren't our problem," Heap says. "We're their problem."

*Washington Post, 2 Sept 2006
(Heap is a biologist and Royal Society member)*

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Australian film *Ten Canoes* this year would have been impressed by the lean active aboriginal tribal people who formed the cast. It gave us a great contrast to the body shapes of our current lifestyles, with plentiful cheap fattening foods available every day of the year, without any great expenditure of human muscle power in acquiring them.

It is in our genes to overeat and to take things easy when there is no need for energetic activity, that is why Neil called it Darwinian original sin. We know what we should do about it, but it is so easy just to do what nature programmed us to do – eat what we want when it is available (and to stockpile possessions, too). Scarcity would solve the problem, as it does in Africa, but scarcity is unknown to us at present. So for now will power is the answer, and that is why many people are now thinking of the problem as a moral one.

While much is being said on the problem of over consumption of food, the issue of over consumption of all other resources has not made it into public or political consciousness. Indeed politicians, economists and business people are still busy urging us to over consume. They still insist that supplies of energy should continue to grow, without any understanding that all the problems that are now surfacing have been caused by that growing consumption, and that the only way to address the problems is to start reducing consumption right now.

Christmas is a good time to talk about morals. It is at least a time when we tend to remember the golden rule that is basic to most religions, *do unto others as you would they should do unto you*, (even if we only think of the others as being those in our in group). So, in the lead up to Christmas, we can remember that it should not just be a time for consumption. Judging from the replies to our requests for suggestions for Christmas presents, most NSF members already realise this.

Daniel Quinn's idea of a new Renaissance, a change in thinking that makes every one understand that humans are part of nature, not separate or more important, will also inevitably mean a change in our system of moral thought. It will make care of the biosphere our

most important duty realising that the well-being of people is totally dependent on the health of the biosphere. Human morality will have to recognise and respect the limits imposed by the finite nature of the Earth itself.

Merry Christmas and a Happy New Year, remembering that over consumption leads to neither health nor happiness.

Jenny Wanless

Youth and Sustainability Workshops

Some time ago Val Brown and Wendy Rainbird instigated community brainstorming sessions with a grant from Healthpact ACT, to help local groups to apply for, and receive, grants for local action. One of the resultant projects which is presently in progress is Youth Leadership for Sustainable Consumption in the ACT. With Project Officer Julie Collin at the helm, a series of three workshops have been held.

The workshops aimed to introduce young Canberrans to sustainability issues; educate them about sustainable consumption practices; inform them about sustainability related organisations; give them the skills they need to set up their own projects; and support them in implementing those projects.

Through the workshops young people have been learning how they can work together to create a healthier planet by saving the environment and developing better communities. They have met like-minded people who are interested in the environment, social justice and positive change. They are learning the skills they need to take leadership roles, and are enthusiastically getting involved, to work for the future of the planet and society.

In September this year, the *Medical Journal of Australia* reported the case of a 22 year old kitchen hand with full-blown scurvy. The young man's diet consisted of bread, Vegemite, cheese, dry biscuits, chocolate and a cola drink. He had never liked fruit and vegetables and had not eaten any for ten years. Oral vitamin C supplements returned him to health. He did not want to change his diet.

The modern commercial drive to market unhealthy food everywhere and seduce us into more sedentary leisure means we are facing a seemingly unstoppable juggernaut of obesity and diabetes.

Paul Zimmet

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Where we are:

Our rooms are in the South West Wing of Weston Creek Primary School, Minns Place, Weston, ACT.

By car: from Civic, follow the signs to Weston from the Tuggeranong Parkway and continue to Weston by veering left from the traffic lights at the Cotter Road turnoff. This takes you along Streeton Drive for one kilometre, then turn left into Hilder Street (there is a small signpost pointing along Hilder Street). Drive around behind the school into Minns Place and then into the car park. Our rooms are down the slope to the left of the school building – about 40m from where you'll park your car. Follow the sign to 'Sustainability Groups'.

There is space for three or four cars for disabled access close to the entry. There are ramps over the kerb from this small parking space and entry to our building is without steps.

By bus: The 126 bus route from Central Canberra and walk 200m.

By bicycle: The office is adjacent to the western trunk cycle path between Civic and Tuggeranong.

Forthcoming NSF meetings

For the latest information visit our website www.natsoc.org.au and click on "What's On".

12 December 2006 - End of year gathering

NSF members and friends will gather at the NSF rooms in Weston for a couple of hours from 5:30pm on 12 December to celebrate the 92nd birthday of our patron Frank Fenner and to hear – briefly – what our organisation has achieved during 2006 and our plans for 2007.

The February meeting will be held at the Fellows Lane Cottage, Building 3T, ANU campus, beginning 7:30pm. A gold coin donation would be appreciated.

21 February 2007 - Origins of the Nuclear/greenhouse impasse: a view from the earth and anthropological sciences.

Dr Andrew Glikson will explore aspects of the ongoing mass extinction of species in terms of prehistoric evolution, the emergence of civilisation and the advent of modern science. The imbalance created between the innovative powers of an overgrown neocortex on the one hand, and the mammalian brain on the other hand, leads to an impasse which threatens advanced life forms. Random creativity results in often destructive technological determinism. The consequence of these developments – the combined climate crisis and nuclear paradigm, threaten an anthropogenic mass extinction. However, the strongest force on Earth remains the life force, which has survived for four billion years despite catastrophes such as volcanic activity, tsunamis, asteroid/comet impacts, ice ages and greenhouse effects.

Dr Glikson is an Earth Scientist from the Department of Earth and Marine Sciences, Australian National University, Canberra. His work focuses on studies of the early history of the Earth, including mass extinctions and the philosophy of science. His current research priorities include the effect of early asteroids and comets on the evolution of Earth and the role of *Homo sapiens* in recent terrestrial evolution.

In science it often happens that scientists say, 'You know that's a really good argument; my position is mistaken,' and then they would actually change their minds and you never hear that old view from them again. They really do it. It doesn't happen as often as it should, because scientists are human and change is sometimes painful. But it happens every day. I cannot recall the last time something like that happened in politics or religion. Carl Sagan

What's been happening

The Social Change Project

Background

This is an important NSF project. We are hoping it will attract active involvement across the country, stirring up thinking, discussion and debate about the way forward.

The project is based on NSF's appreciation that the future well-being of humankind will require major changes in our social system and lifestyles. And it embraces the notion of a future *biosensitive society* – that is, a society that is sensitive to, and that satisfies, the health needs of the ecosystems of the natural environment and of all sections of the human population.

The project reflects our view that there will be no significant move towards a biosensitive society until there comes about a new 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.

The Project is made up of two parts: Part 1 – People and Nature (PAN) Papers, and Part 2 – A Social Change Roundtable.

Part 1. People and Nature (PAN) Papers

This part of the program consists of the presentation of a network of statements on the processes of life, the human place in nature and key ecological and health issues facing human society today (see table opposite). These are succinct authoritative summaries of the state of knowledge about important ecological and health themes. They are written in a style readily understandable by non-scientists.

Some of the papers (Series 1A) provide an overview of the human situation in the biosphere, important ecological and health issues facing our society today and the essential characteristics of a biosensitive society of the future. Others (Series 1B) discuss specific issues and topics.

The Pan Papers will be available on NSF's website, and it is hoped also to make them available in hard copy for distribution to members of NSF and other interested individuals and groups.

Contributors to Part 1 of the project include Gordon Ada, Bob Birrell, Keith Boardman, Stephen Boyden, Duncan Brown, Tony Capon, Richard Eckersley, Frank Fenner, Nicky Grigg, Colin Groves, Walter Jehne, Brendan Mackey, Tony McMichael, John Sandeman, Alice Thompson and David Tranter.

Part 2. Social Change Roundtable

This part of the project is for individuals and community groups who are in basic agreement with the conclusions set out in Part 1. It encourages them to communicate their ideas on the social changes that will be necessary to achieve a biosensitive society.

We anticipate that some contributions will focus on the changes necessary in societal arrangements (e.g. the economic system) and on the roles of different sections of society in

bringing about a smooth transition to a biosensitive society (Series 2A).

Others will concentrate on practical measures that can be taken by concerned individuals or groups (Series 2B).

Some suggested topics for inclusion in this part of the project are shown in the table

opposite.

Already contributions have been received from (or promised by) Janis Birkeland, Doug Cocks, Geoff Davies, Barney Foran, Philip Laird, Murray May, Cameron Neil, Mike Smith, Ted Trainer and Derek Wrigley.

The outcome of this exchange will be available on the NSF website and will be publicised as widely as possible in the media.

Organisation

The project is managed by a Steering Committee appointed by the Board of NSF, consisting of Stephen Boyden (Convener), Catherine Gross, Keith Thomas, Jenny Wanless and Malcolm Whyte.

There is a Scientific Advisory Panel consisting of Nicky Grigg, Brendan Mackey, Tony McMichael, Cedric Mims and Will Steffen.

We plan to seek funding to appoint a project officer to run the project on a day to day basis and to act as webmaster (at present Keith Thomas plays this role). One job for the project officer will be to keep the papers up to date as

The health of living systems would move to top place in the hierarchy of priorities of the dominant culture and this crucial change would have significant impacts on the outcome of decision-making at all levels of society.

Stephen Boyden

new information comes in and new opinions are voiced and to commission new papers to fill emerging gaps. Another will be to provide images (photographs, graphs) to complement the papers. And yet another will be to respond to requests from schools and community groups for advice on how particular information might best be used.

Present situation

Most of the papers (Part 1 of the project) are complete and are presently being finalised and readied for loading to the NSF website.

A specimen paper has been loaded for NSF members to view at:

http://www.natsoc.org.au/html/sc_A1

and others will be added as resources allow.

With around fifty papers forming the initial base of our Social Change project we need help to format these papers and load them to the internet (Dreamweaver) and prepare them through desktop publishing (Adobe InDesign). NSF members who could help with this or who know of someone who could should contact the NSF office or Stephen Boyden.

Stephen Boyden

The structure of the material for the Social Change project

Part 1: People and Nature papers ('What and why')

1A Overviews

1 Our place in Nature, 2 Ecological issues in Australia, 3 Health and civilisation, 4 A biosensitive Australia, 5 Healthy people, healthy planet

1B.1 Specific issues - Ecological issues

1.1 The greenhouse effect, 1.2 Thinning of the ozone layer, 1.3 Persistent organic pollutants, 1.4 Soil salinity, 1.5 Sodic and acidic soils, 1.6 Soil erosion, 1.7 Disruption of nutrient cycles, 1.8 Biodiversity, 1.9 Energy issues, 1.10 Water issues, 1.11 Forest issues, 1.12 The oceans,

1B.2 Specific issues - Human health issues

2.1 Climate change and human health, 2.2 Diseases of modern civilisation, 2.3 Quality of life, 2.4 Infectious disease, past, present and future, 2.5 Immunisation

1B.3 Specific issues - General biological principles

3.1 Photosynthesis, 3.2 Nutrient cycles in nature, 3.3 Soil health, 3.4 Diversity and uniformity in nature, 3.5 Human evolution, 3.6 The human population.

Part 2: Suggested topics for the Social Change Roundtable ('How')

2A Societal issues

Alternatives to consumerism, Action by individuals and families, Action by local communities, The role of government, The role of educational authorities, Young people and the transition, The business world and the transition, The economic/ financial system in a biosensitive society, The structure of the work force in a biosensitive society.

2B Practicalities

Retrofitting houses to reduce greenhouse emissions, Designing new houses, Growing food locally, Biosensitive transport systems, Biosensitive cities, Reducing waste, Biosensitive lifestyles, Alternatives to fossil fuels, Improving the health of soils in agricultural systems, The use of grey water in the garden.

Climate Change

In this issue we publish two articles and a book review on climate change. Beginning on page 8 Walter Jehne gives us – by popular demand – a written account of his presentation to our October meeting. As there was a high degree of interest in the views he presented, we have given more space than usual to a single topic. On pages 15-17 Bryan Furnass and Derek Wrigley write on what is currently the generally accepted version of this phenomenon. We hope these three articles will stimulate discussion amongst members. **Jenny Wanless**

SEE-Change

NSF's SEE-Change steering committee and members of SEE-Change groups came together on 25 November to review of progress since the June community roundtable. The review comprised presentations on two reports: one by Bob Douglas, convenor of the steering committee, and the second by the three ACU students who provided much of SEE-Change's public presence and logistical support over the period. The reports are available to members from the NSF office. The presentations were followed by an open discussion on how we would continue developing SEE-Change in 2007.

SEE-Change is about empowering individuals and communities to influence their future through enhanced understanding of what is happening to humans on the planet and through discussion and action on the opportunities and threats that lie ahead.

Bob's report concluded that the SEE-Change concept has already generated considerable excitement and activity in several parts of the ACT over the trial months. The ACT Chief Minister's Department supported our investigation of the viability of the SEE-Change concept with a grant.

There are now two active SEE-Change groups meeting regularly in Jamison and Lyneham; plans are well-developed for a shop-front centre developed in association with the Bluegum School at Hackett, and preliminary meetings have been held in Kippax and Weston, with a meeting planned for early 2007 in Gungahlin.

SEE-Change played a large part in bringing out thousands of Canberrans to the Walk Against Warming on 4 November. Four SEE-Change banners were prominently displayed during the walk and at the rally, and 1500 leaflets explaining SEE-Change were distributed to walkers.

The book "SEE-Change Centres, Grey Power and Hope" was reprinted in November. It provides background to the need for SEE-Change and describes how a SEE-Change centre might be established.

A half-day seminar discussion on the marketing of the SEE-Change concept helped us evaluate the effectiveness of different marketing strategies and has given us focus in prioritising our activities.

The SEE-Change website will go live this month.

ACT Biosphere Reserve project

In November Ian Anderson and Keith Thomas represented NSF before a hearing of a committee of the ACT House of Assembly which is considering whether the ACT should be nominated as a UNESCO Biosphere Reserve. They were preceded by the CSIRO who seemed to be arguing for a wholly urban biosphere reserve - that is, excluding Namadgi, the Brindabellas etc.

They also thought a 7-year lead time was realistic.

We put the NSF position of nominating the whole of the ACT as a Biosphere Reserve and told the Committee that achieving Biosphere Reserve status in 2008 would be feasible. The Committee were concerned, however, to bring the community along in active support and felt this could take more time.

Trish Harrup from the Conservation Council described the Biosphere Reserve consultation project they had been funded for and NSF believes there is scope for this project itself to 'bring the community along' to a sufficient degree.

Ian Anderson also told the committee that the increasing public interest in climate change should give added impetus to the nomination. His point was that existing Biosphere Reserves had been nominated and managed on the assumption of climate stability. The ACT, however, could build climate change into their nomination and an ACT reserve could be an important international laboratory for how a city in a landscape copes with climate change.

The Biosphere Reserve nomination was initiated by NSF and we will continue to pursue it.

Australian developers have been among the gloomiest doomsayers since Biblical times. They invariably predict ruin and a return to the Dark Ages if they do not get their way.
William Lines
Patriots, 2006, p 189

Debating a Wind Farm Development:

The application of a justice and community fairness framework to increase social acceptance.

The talk given to NSF by Catherine Gross in November did not have the mass appeal of our meetings on sustainable housing or Walter's new ideas on climate change, but it was just as

important. Without social acceptance, there is no way to achieve the changes that are needed to enable humanity to work its way out of the mess into which we have got ourselves.

Catherine conducted her pilot study in the town of Taralga, in the southern tablelands of New South Wales, where a wind farm proposal had created significant discussion and community conflict which had not been resolved at the time of the study.

A summary of the submissions received by the NSW state planning authority showed that about a quarter of the submissions were concerned with the community division engendered by the proposed wind farm. The research aimed to identify themes and factors that individuals themselves thought were influential in forming their beliefs, attitudes and actions. To this end, Catherine concentrated on the consultation process of the environmental impact assessment period and not on the pros and cons of the wind farm itself.

The focus of the research was on the perceptions of the consultation process as experienced by selected members of the community, not on the adequacy of the process itself. Interviewees with different perspectives were selected; these included some who were opposed to the proposal, others who were in favour, and some who were neutral or undecided at the time of their selection.

The ways in which people heard about the wind farm varied. Some in the community first heard of it from a generalised information flyer inviting the public to a meeting, others by word of mouth, or through the local newspaper. Many interviewees thought this was unfair from the start.

Interviewees were dissatisfied with the two public meetings held. The first was considered to be too late in the process; the second meeting seemed to be taken over by a 'rowdy' opposition, which meant pro wind farm people felt silenced. There was also strong dissatisfaction over the lack of response to formal submissions. Indeed there seemed to be almost nothing right about the process.

All in all, the wind farm development proposal generated considerable tension within the community, such that the project was delayed and is now in court. For proposals to succeed they need to be as fair as possible, and to be perceived as fair they need to be as transparent as possible.

Catherine distinguished different categories of justice and fairness. Procedural justice focuses on the processes by which decisions are made. Distributive justice is about outcomes which can be public goods and public burdens.

The relationship between these factors makes a difference to trust between members of the community, the authorities and the developer/ proponent and to whether the decision will be accepted. Outcome fairness and favourability are crucial, but so is procedural fairness; all influence public perception.

Obviously the Taralga case generated a great deal of disquiet. Another wind farm is also causing community divisions. One resident from near this second site felt strongly enough to come to our meeting. She quoted the much cited argument about

bird kill, based on the Altamira site in California. Apparently no one ever gets around to pointing out that any human structures can kill birds, with skyscrapers, power station cooling towers and radio masts having a major impact. Birds are also destroyed

by other human activities such as transport and land clearing.

In any dispute the proponents are likely to put the best possible spin on things, while opponents are concerned about negative aspects. Good access to impartial and scientific advice and to an independent environmental impact assessment is essential.

A wise proponent will need to be mindful of the various justice issues at stake. They will be honest about pros and cons, and as clear and transparent as possible. They need to acknowledge concerns, address them where possible, or at least explain why they cannot, so they engender trust. If they act otherwise, then communities are rent and many worthwhile projects will not go ahead.

Jenny Wanless

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.

Aldo Leopold, A Sand County Almanac

The Biology of Global Warming and its Profitable Mitigation

Understanding global warming in its historical and policy context

It is now over 100 years since Svante Arrhenius first warned about the risks of global warming and over 50 years since the evidence from Hawaii confirmed it to be occurring. After decades of denial, misinformation and inertia, all must now accept that global warming is real, urgent and may have very dangerous imminent consequences if not addressed.

This recognition and urgency has no doubt been prompted by the reality of extreme weather events, recent publications such as the Stern report and Al Gore's film, *An Inconvenient Truth*.

While we may be forced to accept this reality, there is still much valid concern about the very simplistic assumptions and models being promoted about what has caused global warming and what we need to do to address it. Assumptions and policy responses which dictate that:

1. Global warming is caused by an increase in the earth's greenhouse effect ...
2. due to increases in CO₂ levels in the atmosphere ...
3. as a result of increased burning of fossil fuels by humans and, as such,
4. needs to be mitigated by 2100 by reducing CO₂ levels and fossil fuel use ...
5. over the next decades to avoid adverse impacts projected by 2100.

While the above may have been a simple expedient message to manage public concern about global warming and provide the context for governments to talk about agreements and responses such as Kyoto, it may unfortunately be grossly misleading. It may not accurately reflect the complexity of the factors contributing to global warming, its cause, urgency and potential impact. In doing so it may impede scientific understanding of its real cause and more effective mitigation options. Indeed the status quo assumptions, models and expedient political responses to global warming that have been locked in for the past decades may now become the major

risk factor in understanding the nature of the challenge and taking effective action, hopefully in time.

Systems analyses in reassessing scientific evidence and the current assumptions

To try to avoid these risks and provide an objective re-assessment of global warming a group of concerned independent scientists has sought to re-analyse all the known verified scientific evidence underpinning our current assumptions, models and understanding of global warming from a fresh systems perspective unimpeded by past positions. Rather than accepting the conventional physical climate models and assumptions, the analyses examined all relevant physical, chemical and biological evidence as well as skepticisms in a multi-factor pattern analysis. This sought to test many of

the assumptions but also to identify novel inter-relationships and resolve inconsistencies that might contribute to a more ecologically coherent understanding of the causes of global warming and its mitigation options.

Although these systems analyses were based on verified scientific data, often

identical with that underpinning the conventional climate models and assumptions, what was novel was the inconsistencies found between the models and some of this data and the profoundly different understanding of global warming that arose from this wider ecological systems analysis.

For example, the Vostok ice core data confirms there is a close association between CO₂ levels and temperatures over a series of glacial and interglacial cycles over the past 420,000 years. However, it may not be valid to assume that such an association confirms the assumed causal relationship in which increases in CO₂ levels cause increased temperatures. In fact temperature increases may precede CO₂ increases by hundreds or thousands of years, indicating that some other factor may be triggering global warming and the CO₂ increases. .

Even more interesting is the consistent upper and lower CO₂ and temperature levels in the Vostok data. This suggests that feedback mechanisms may be operating to control both CO₂ and temperatures in successive glacial and interglacial cycles. It follows that this feedback mechanism may have

The struggle for conservation is not a struggle against 'forces', 'structures' social constructions' or 'cultural artifacts', but a struggle against human nature. Most people identify more with a society that takes on and challenges nature than with one that exists in a sustainable relationship with the natural world.

*William Lines
Patriots, 2006*

governed the earth's temperature and CO2 levels, rather than the CO2 levels being the determinant factor as assumed in conventional climate models.

Most significantly this feedback mechanism appears to have failed in the current interglacial cycle resulting in CO2 concentrations increasing in the past 250 years well above previous maxima of 280 ppm to reach 380 ppm by 2005. Whatever caused the failure of this feedback mechanism that previously limited CO2 levels to below 280 ppm may be critical to understanding what caused global warming. Indeed the consequent CO2 increase may be a symptom of the failure of this feedback mechanism, not itself the cause of global warming.

Although there is no question that increased CO2 can contribute to global warming via its (minor) contribution to greenhouse heat absorption, it is critical in understanding the cause

of global warming that we separate cause and effect. If, as the Vostok data indicates, the CO2 increases are a symptom of the breakdown of the former feedback processes, reducing the rate of CO2 emissions while slowing down symptom expression by itself, is unlikely to be effective in mitigating global warming. If we wish to mitigate global warming we need to restore the feedback process that formerly naturally controlled CO2 levels and temperatures in previous interglacials. To do that we first need to understand what these processes were and how to restore them.

Consequently the Vostok data fundamentally questions the validity of our simplistic assumptions about the causal relationship between increasing CO2 levels and global warming. Similarly it fundamentally questions the veracity of mitigating global warming by solely trying to slow down CO2 emissions. The Vostok data also indicates there may be a more effective way to mitigate global warming: by understanding and restoring the natural feedback processes whose failure in this current interglacial seems to have caused global warming. However to do this we may need to examine options beyond the conventional current climate models.

As another example, inconsistencies exist between current projections and research by NASA that confirms that the world's oceans initially absorb

most of the CO2 emitted but that this is then equilibrated with the atmosphere over a 25-50 years lag period by which time 60% of the final CO2 level is expressed in the atmosphere. Much of the exponential increase in global CO2 emissions released since the 1970s is consequently still held in ocean biota and has not yet been fully equilibrated and expressed in the atmosphere. It follows that we are locked into an *accelerating increase* in atmospheric CO2 levels above the current level of 380 ppm over the coming decades irrespective of additional CO2 emissions or reductions from here on.

Consistent with the above, the rate with which CO2 levels are increasing has accelerated in the past decade to now average 2.5 ppm/an*. Consequently it is totally naïve to assume and irresponsible to promote that we can mitigate global warming by

slowing down future rates of CO2 emissions by any level. We had that opportunity and warning in the 1970s but are now 25 years too late. We cannot avoid the lag effects and impacts from our past emissions by now slowing down future emissions.

So what levels of global warming and impacts have we already locked in? The Stern report tells us that while CO2 concentrations are currently at 380 ppm, when we add the greenhouse effect from

methane, nitrous oxide and other greenhouse gases, they are already in effect at 430 ppm CO2 equivalence. The scientific consensus is clear that if CO2 equivalent levels increase above 550 ppm, the world risks dangerous climate change from average temperature increases ranging from 3-6 degrees celsius and even higher local temperature increases. Such temperature increases would risk triggering some of ten major positive feedback processes, such as the melting of polar ice caps and the thawing of permafrost, each of which could greatly intensify further dangerous uncontrollable climate impacts that risk the viability of current economic, social and ecological systems.

Unfortunately if, as we must, combine the data from the Stern report on the current CO2 equivalent levels and the NASA data on lag effects from CO2

There appears to be a hierarchy of drives in humans. The biggest concern is always survival and reproduction, and protection of clan and family. For most of human history, humans have had to struggle against nature to survive... It took a few thousand years of adoring gardens, loving exploring, expanding into unspoilt environments and so on to bring us up short with the recognition that we've gone too far. We broke nature and now we are smashing it and getting rid of humanity's biggest heritage.

E.O. Wilson

* Parts per million per annum

emissions since 1970 it is inescapable that CO₂ levels of around 550 ppm are already locked in and will occur as early as 2030. Irrespective of current talk and attempts to reduce future emissions we cannot escape temperature increases and rainfall disturbance accelerating further with these inevitably triggering uncontrolled dangerous climate change from as early as 2030, not a distant 2100 as hypothesised by some.

Looked at objectively the best available peer review scientific evidence, and these analyses confirm that, using our current approaches:

1. We can no longer avoid the consequences of dangerous global warming.
2. We cannot mitigate these locked in impacts by future CO₂ emission reductions.
3. These dangerous consequences will occur as early as 2030 not 2100 as suggested.

Clearly this totally unpalatable situation is unavoidable if we stay with our current understanding and approaches. Our only hope is that our status quo understanding is wrong. Fortunately for us it is—fundamentally.

The basis of a biological understanding of global warming from the systems analyses

As indicated in the above analysis of the Vostok ice core data:

1. The CO₂ increases may primarily be a symptom of, not the cause of, global warming.
2. This provides us with the option of addressing the real cause of global warming, not ineffectively and belatedly trying to slow down its symptom expression - providing we are prepared to think and look beyond the status quo dogma to understand the real causes and mitigation options.

The independent systems analysis of the available scientific evidence was undertaken specifically to provide this understanding and such mitigation options, hopefully in time. While there is always

more detail to understand, the analyses already provide a consistent compelling case of what has actually caused global warming and what needs to be done to mitigate it. In view of the pending imminence of dangerous global warming consequences, it is important that this understanding and these mitigation options are now objectively analysed on their merits.

A detailed outline of the evidence and conclusions arising from this analysis was presented publicly at a Nature and Society Forum seminar in Canberra on 18 October 2006. Further detailed documentation is being prepared. This brief article cannot provide all the evidence and its substantiation. However it seeks to provide an overview of why the current assumptions and models of global warming are not sustainable and the basis for understanding the biology of global warming and its profitable mitigation.

If we look beyond the limitations of our current assumptions we in fact have a great depth of scientific knowledge about the earth and its climate. This knowledge logically needs to provide the context for re-examining our understanding of the earth's natural heat dynamics and balance and how these may have been disrupted by recent human activities to cause global warming.

Water and heat dynamics of global warming

Clearly the 'blue planet' for the past 4 billion of its 4.6 billion years has been unique

amongst our sun's planets in that it has retained vast quantities of water, which because of water's unique chemical and heat absorptive and buffering capacities has enabled the formation of a relatively stable climatic environment, compatible with life. In contrast to other nearby planets it is this water, with its unique heat buffering capabilities, that created the environment for the evolution of the initial marine life. This life in turn enabled the evolution of our current unique atmosphere and the maintenance of a stable buffered environment conducive to the evolution of other higher life forms.

Water and key biological processes have been fundamental in maintaining this buffered conducive

Conservation, however, changed the character of political debate. While much of conservation seemed entirely compatible with a modern politics devoted to bureaucracy, plans, proposals and blueprints, the task of saving the country's natural heritage raised questions that could not be resolved through business as usual. Conservation demanded a kind of clarity and veracity entirely alien to a politics based on fantasy and simplification. For, although people can be fooled, tricked and beguiled, nature cannot. Material reality resists importuning, finessing, or renegotiation. Nature's machinery is invariant, not subject to legislation or cultural conditioning. It cannot be compromised.

*William Lines
Patriots, 2006, p 283*

environment through a range of balanced processes and effects including:

1. The formation of clouds of various densities with different albedo and effectiveness in reflecting from 0 to 90% (mean 30%) of the incident solar radiation back out to space.
2. The transfer of latent heat from the earth's surface for re-release in the troposphere through the evaporation and condensation of water fluxes.
3. The absorption of heat re-radiated from the earth's surface by water vapour and droplets in the lower atmosphere which constitutes from 60-80% of the greenhouse effect.

Collectively these three processes govern over 90% of the earth's heat dynamics and balance. These processes, particularly as manifest in the natural greenhouse effect, have enabled the earth to sustain relatively stable surface temperatures of around 18°C for billions of years, some 30 degrees higher than they would be without the effect of the water and its dominant greenhouse role.

Biological processes in the earth's water, clouds and heat dynamics

Biological processes have been central over the past 3.8 billion years in creating and regulating these climatic conditions conducive for further biological evolution. These biological processes have operated substantially through the production of aerosols, microscopic biological nuclei that are fundamentally important in the condensation of water vapour into different cloud and rain droplets and, through their heat effects, the earth's climate.

Although many processes and agents regulate the global climate, the production of di-methyl sulphide by marine algae for the past 3.8 billion years has been fundamental in nucleating water vapour into micro-droplets which remain suspended and play a dominant role in the earth's natural greenhouse effect and climate stability.

Separate from such biochemical nuclei, terrestrial forests over the past 300 million years - but particularly over the past 100m years - have also been recorded to produce vast quantities of much

larger bacterial cloud nuclei particularly in the former taxonomic group *Aerobacter aerogenes*. These bacteria are produced in the stomatal cavity of leaves and rise as part of the massive transfer of water and heat from the earth's surface as part of the transpiration flux. In contrast to the smaller micro-droplets formed by the biochemical nuclei, these bacterial nuclei are highly effective hygroscopic cloud and rain condensation nuclei, contributing significantly to the dense diurnal cloud dynamics and enhanced rainfalls particularly in tropical regions.

Whereas the biochemical nuclei often form light persistent clouds and hazes, the bacterial nuclei form dense cumulus and nimbus clouds with very high albedo effectiveness, reflecting up to 90% of incoming solar radiation back out to space (the global average is 31%). Because of these nuclei

such clouds can significantly lower mean incident solar heating of the earth's surface by up to 25% below what it would have been under cloudless conditions. Combinations of such cloud albedo and latent heat flux effects have been measured to reduce surface temperatures in equatorial regions up to 15°C relative to clear non-forested sites. Indeed a 1% increase in mean

It would be a mistake to think this culture clearcuts only forests. It clearcuts our psyches as well. It would be a mistake to think it dams only rivers. We ourselves are dammed (and damned) by it as well. It would be a mistake to think it creates dead zones only in the ocean. It creates dead zones in our hearts and minds. It would be a mistake to think it fragments only habitat. We, too, are fragmented, split off, shredded, rent, torn.

*Derrick Jensen
Endgame, 2006, p552*

solar reflectance through increased cloud albedos may have an equivalent effect in cooling the earth's surface climate as would reducing current CO₂ levels back to pre-industrial levels, effectively negating the total global warming effect and risk.

It follows that the destruction of the large portion of the earth's forests that has occurred could have significantly reduced the transpiration of water and nuclei responsible for the maintenance of the earth's former dense cloud levels, albedos and thus heat dynamics resulting in global warming.

While the intensity of incoming solar radiation has increased over the past four billion years with the expansion of the sun, it is significant that the earth's temperature and climate has stayed relatively constant and conducive to life. To maintain such a stable climate in a changing physical environment, biological processes may have contributed to initially capturing and retaining heat, as with the greenhouse effect initially enhanced by biological di-methyl sulphide production and subsequently through

enhanced transpiration and nucleation of high albedo clouds via terrestrial forests which reflect and dissipate heat. It follows that the destruction of up to 80% of the earth's primary forests* by humans during industrialization could have resulted in a marked loss of natural cooling capacity and therefore increased global warming, particularly as biological systems increasingly need to shade and cool the planet from incident solar radiation. Conversely the restoration of such natural forest systems and their cloud and albedo effects are likely to be highly effective in again providing the essential protective global cooling.

The potential significance and effectiveness of these heat dynamic processes can now be seen to dwarf the current attempts to reduce the greenhouse effect of CO₂, even if this were possible in time and scale. Whereas water vapour constitutes some 60-80% of the natural greenhouse effect, by contrast CO₂ levels represent some 20% of the greenhouse effect. However as the net greenhouse effect only represents some 18% of the earth's net energy balance, it follows that the CO₂ component of it may constitute less than 4% of the earth's heat balance. The 35% increase in CO₂ levels since 1750

AD (from 280 to 380 ppm) may influence perhaps 1% of this overall heat balance. Seen in this context it is apparent that talk of slowing down CO₂ emissions – for example through the Kyoto protocol – are at best insignificant and at worst a major deception and illusion in responsibly addressing imminent dangerous global warming.

Consequently water, for the past 4 billion years, has been and remains by far the dominant determinant of the earth's heat balance and climate and the critical means of mitigating global warming. Natural safe options exist for doing this that can also be highly profitable. As indicated a 1% increase in the average albedo reflectance of clouds would have a heat effect equivalent to reducing current CO₂ levels back to pre-industrial, pre-global warming levels.

Why then have our climate models and assumptions about the causes of global warming ignored water and its heat dynamics as a possible causal and potential mitigating factor?

They have done this on the simplistic assumption that humans could not possibly have altered the

earth's water cycles and, consequently, its heat dynamics to influence global warming. Based on this dogma they have simply assumed that the association between increased CO₂ and temperatures in the ice core record is causally linked and that the CO₂ emissions, resulting from our recent use of fossil fuels must be causing global warming. This is despite full recognition that the increases in CO₂ levels represented less than 0.002% of the earth's atmosphere by 1950 and can only have influenced less than 1% of the earth's heat balance.

Clearly the question then becomes how could humans have affected the earth's water dynamics to result in changes to the above heat balances so as to result in global warming? Could such changes explain the onset of global warming but also provide options for its mitigation? As detailed above the

available scientific evidence clearly confirms that human activities can do so and, in fact, have done so.

Forests in the formation and albedo effect of clouds

Substantial de-forestation and farming of the Middle East, Europe, North Africa and North America prior to 1750 resulted

not only in the release of vast quantities of CO₂ into the atmosphere through the burning of timber and associated loss of soil organic matter but also the destruction of the carbon bio-sequestration of these forests. It is this degradation of global bio-sequestration capacities which appears to have removed the CO₂ feedback control processes that the Vostok cores indicate had limited CO₂ increases in previous interglacials and enabled the increase in atmospheric CO₂ levels above 280 ppm from 1750. Although subsequent forest clearing, soil cultivation and fossil fuel use has added to and accentuated this CO₂ increase, it is clear that the exponential increase in fossil fuel emissions since 1900 could not have caused the onset of the CO₂ increases over 150 years previously.

Consequently deforestation can readily account for the increase in CO₂ emissions, the degradation of bio-sequestration capacities and the observed increases in CO₂ levels from 1750. However what evidence is there that deforestation has also affected regional and global water and heat dynamics leading to the subsequent observed warming of affected regions and climates?

What is done to our landbases is done to ourselves. It really is that simple. We cannot live without the earth: the earth can live without us. It is an open question at this point whether it can live with us. It certainly cannot live with us as we are now.

*Derrick Jensen
Endgame, 2006, p 551*

* Also known as old-growth forests

Forests are responsible for the transpiration of vast quantities of water, both in quantity (representing some 48% of all terrestrial evapo-transpiration) but also from soil depths and over periods well beyond those from mere surface evaporation. This transfer of water from the earth's soils to the upper atmosphere by trees is both significantly greater than that observed from similar non-forested lands and contributes to far more frequent and denser cloud formation than from the similar non-forested lands. Consistent decreases in water loss, cloud formation and rainfalls have been recorded over regions following de-forestation. Higher level of cloudiness and rainfalls have similarly been confirmed over forested or re-forested regions than over equivalent cleared regions or oceans.

As outlined above, as part of their transpiring of vast quantities of water to form clouds, many forests also release vast quantities of bacteria. These are convected into the clouds from the stomatal cavities of foliage and act as cloud condensation and rainfall nuclei. Over 1 billion tonnes of such organic nuclei are produced and released into the upper atmosphere annually. Laboratory and cloud seeding studies confirm the effectiveness of these

hygroscopic nuclei in forming condensation droplets, retaining and coalescing water droplets resulting in increased rainfalls. As a result many forested regions may be able to maintain higher levels of transpiration, cloud cover, cloud albedos, rainfalls and bio-productivities than cleared regions.

The increased water transpiration, density and frequency of cloud cover and albedo over such forested regions would naturally result in significantly greater reflectance of incident solar energy and cooling than over equivalent cleared regions without such cloud covers. Such forest and albedo effects can result in surface temperature in equatorial regions being as much as 15 degrees centigrade lower relative to nearby cleared and non-clouded regions with similar incident solar radiation. As the CO₂ concentrations are likely to be similar for both locations, such local and regional surface cooling effects must be entirely and directly associated with the changed water and cloud dynamics, not differences in CO₂ levels.

For a time the grandeur of this monumental place flooded my mind. I lost awareness of all else – my raft, my friend, my obligations; myself. The process of thirty years which had made me a mystified and detached observer of the universe was reversed and I fused into the inexplicable mystery of nature.

*Bob Brown rafting down the Franklin River
Quoted in William Lines
Patriots, 2006, p 159*

Biological mitigation options

While representing only part of the substantial scientific evidence collected, the above analysis demonstrates that the widespread clearing of forests prior to 1750 could readily have:

- changed terrestrial water and heat dynamics
- lowered cloud and albedo reflectance and increased surface warming
- led to the observed increase in atmospheric CO₂ levels
- prevented atmospheric CO₂ being bio-sequestered as had occurred in previous interglacials due to human clearing of the forests and their ongoing human landuse.

Consequently and contrary to the assumptions in current climate models that humans could not have influenced the earth's water and hence heat dynamics, other than via CO₂ emissions, there is in fact compelling evidence that this could have happened and is totally consistent with historical fact and the scientific evidence of the causation of global warming.

Mitigation

In addition to providing a very simple, natural and logical understanding of global warming, the analyses also raise options for mitigating regional heat dynamics and the impact of global warming. Theoretically, if it is possible to enhance the natural cloud and albedo effects by 1%, it should be possible to offset temperature increases from the increased greenhouse effect resulting from the increase in CO₂ levels since 1750. This could be done practically and profitably at collective, regional and catchment levels by restoring suitable natural bio-systems and water dynamics to generate the 1% increase in cloud albedos.

Most significantly the enhancement of such cloud albedos via the restoration of forest bio-systems and processes is totally risk free as it is entirely natural, simply involving the restoration of bio-systems and water and heat dynamics existing before 'civilisation'. However it is also uniquely powerful in enabling individuals, communities and regions to take affordable direct effective action to address regional climate mitigation and resilience buffering

imperatives instead of being captive to policy inaction.

Just as the deforestation and soil degradation that caused global warming resulted in CO₂ increases and the loss of bio-sequestration capacities, the restoration of such forests to mitigate global warming will of course involve – and benefit from – the bio-sequestration of atmospheric carbon into timber and soil organic matter. Apart from reducing the CO₂ greenhouse component, the storage of carbon in soils will be highly synergistic in improving the structure, water infiltration and water holding capacity of the forest soils and the capacity of the forest to enhance and sustain transpiration levels. Similarly as more carbon is fixed in standing trees their capacity to transpire more water, produce more nuclei and provide a more shaded, resilient and cooler surface environment should all increase synergistically, directly helping to achieve the prime objective of mitigating global warming. Even though these mitigation strategies directly involve the bio-sequestration of carbon so as to improve water and heat dynamics and address the causes of global warming, the bio-sequestration of carbon needs to be seen as a means to this end, not the factor that in itself restores the heat balance.

Conclusions

The above outline has sought to provide a brief overview of the findings from the multifactor systems analyses undertaken to better understand the causes of and mitigation options for global warming. Although highly novel and challenging to the status quo understanding and approaches the analyses show clearly that global warming:

1. is an extremely serious, imminent threat to global economies, societies and bio-systems unless addressed urgently,
2. cannot be explained through the current assumptions and climate models nor mitigated via current attempts at CO₂ emission reductions,
3. can be mitigated only by addressing its real cause, not its symptoms.

Clearly further documentation needs to be provided to substantiate and confirm the scientific evidence

underpinning these findings. This is being prepared. Analyses have similarly been conducted from a range of perspectives to test and confirm the veracity of the analysis and consistency of their conclusions. These have all reinforced the feasibility and validity of the above conclusions.

The above analyses provide a fundamentally new ecological but also a logical understanding of the causes of global warming and its mitigation options which is fully consistent with all the available scientific evidence. It effectively supersedes current assumptions and models of the causes and mitigation of global warming based on CO₂. However, this does not mean that the current exponential release of CO₂ from fossil fuels is not now a major contributing factor to global warming and its imminent dangerous consequences and need not be curtailed. It means simply that it is already

too late to mitigate global warming through reducing its CO₂ symptoms.

We now have no choice but to address global warming through its primary and initial cause. We need to rapidly re-establish natural cloud albedos and their cooling effects. To do this we need to re-establish the bio-systems that provided the transpiration and cloud nucleation processes on

which such cloud albedos and cooling effects naturally depend. To help restore and support these bio-systems we need to bio-sequester carbon in forests but particularly soils so that they may enhance the natural infiltration and retention of availability soil water on which forest transpiration and cloud albedos depend. Consequently implementing a valid market price for carbon is likely to be the single most important factor in either impeding or enabling the restoration of these potentially critical but also highly profitable new forests.

With such policy incentives there may still be a sufficient, if brief, opportunity to mitigate the dangerous impacts of global warming through enhancing cloud albedos through the restoration of natural forest eco-systems and their water and heat dynamics.

Walter Jehne

So here's a question I've been asking lately: How do I want the land where I live to be in a thousand years? The answers to that question depend of course on answers to: How does the land want to be in a thousand years? And those answers depend on answers to: How was the land prior to the arrival of civilisation? We can safely say the land itself knows better than we what it wants and what is best for it. The questions then become: how can we perceive what it wants, and how can we help it get there?

*Derrick Jensen
Endgame, 2006, p577*

We now need a global Clean Air Act

Etched on my memory as a young doctor was the great London smog of 1952, in which over 3000 people died in a single weekend.

The physiological cause of death was failure of the lungs to eliminate carbon dioxide (CO₂), which consequently built up in the tissues of the body to toxic levels. They died of CO₂ poisoning.

The local environmental cause was atmospheric pollution by noxious chemicals from the burning of coal in open fires, combined with the becalming effect of temperature inversion. The British Government's response was the Clean Air Act of 1956, which banned coal burning in open fires and re-located energy generation to coal-fired power stations outside cities. The result was a cleaner atmosphere for British cities but acid rain for Northern Europe. Not recognised at the time was the effect of the massive burning of fossil fuels on the global atmosphere, namely the accumulation of greenhouse gases, especially CO₂.

Comparison of local and global atmospheric pollution reveals similarities between the metabolism of humans and the metabolism of the Earth. These need to be seen in long bio-historical perspective.

The Earth's early atmosphere was almost entirely composed of greenhouse gases – water vapour and CO₂. Life first appeared about 3.7 billion years ago. After a billion years or so, micro-organisms evolved a method of capturing the sun's energy to convert CO₂ and water into organic materials. This novel process – photosynthesis – released oxygen as a by-product.

Over hundreds of millions of years, plant life dominated until atmospheric oxygen levels increased enough to enable the evolution of multicellular animals. These animals obtained energy from plant materials, relying on the reverse metabolic process called respiration, that is, taking in oxygen and releasing CO₂.

Most plants were not eaten however. During the Carboniferous period around 300 million years

ago, dead plant and bacterial biomass became fossilised into peat, coal, natural gas and oil.

Aeons later, early humans discovered fire, which enabled them to release energy from plant materials by the process of combustion. A little over two centuries ago the invention of the steam engine harnessed the "fossil" photosynthetic energy stored in coal to do useful work such as manufacturing and transport, thereby launching the industrial revolution. A century later, the invention of the internal combustion engine used fossil energy from oil, thereby launching the era of mass transportation.

The levels of CO₂ in the atmosphere have risen steeply from 280 parts per million in the pre-industrial era to over 380 ppm today. The rise, still continuing unabated, has resulted from an

Twaddle, rubbish, and gossip is what people want, not action ... The secret of life is to chatter freely about all one wishes to do and how one is being prevented – and then do nothing

Soren Kierkegaard 1813-1855

excess of combustion over photosynthesis (which sequesters carbon in plant materials), particularly during the past half century. Both our profligate carbon combustion and reduction of nature's photosynthetic

sinks by land clearing have caused these increases. There is a close relationship between these human-generated rising levels of atmospheric CO₂ and global average temperature. Most scientists conclude that this is a causal relationship - vividly explained in Al Gore's recent film *An Inconvenient Truth*.

To use a metabolic analogy to that earlier London Smog experience, our planet is suffering from the effects of CO₂ poisoning.

The recent Stern Review from Britain focuses on the potential economic recession which would result from failing to reduce greenhouse gas emissions. Much more dangerous is that global warming and associated climate instability will have much more extensive impacts on human and planetary health than does local urban air pollution. Climate change represents an unprecedented disruption of the Earth's life support systems, posing threats to food and water security, habitat destruction, extension of infectious diseases and effects of extreme weather events.

Just as tackling urban air pollution and the early recognition and treatment of some lung diseases can prevent respiratory failure, stemming the causes of global warming can

prevent, we must hope, potential planetary failure. Success will depend on a profound shared cultural change towards reducing human inequalities and adoption of low-carbon economies by both the industrialised and developing world.

This transformation may require geo-sequestration of CO₂ emissions from power stations, less consumerism and wastage and improved efficiencies in design and operation of buildings, agriculture, water use and transport. We must also stop land clearing and promote photosynthesis and bio-sequestration of CO₂ through re-vegetation and preservation of biodiversity.

With our natural resources and expertise, Australia is in a prime position to play an exemplary role in attaining sustainability, not yet accepted by our Federal

Government. Our society can make a progressive shift from fossil fuels to a suite of clean renewable energy sources such as solar hot water systems, photovoltaic electricity generation, geothermal energy, wind and tidal power, and solar generation of hydrogen for fuel cells, with great potential for employment and the economy. Natural gas, yielding less CO₂ than coal and oil, will provide a useful bridging source of energy.

Humans successfully adapted to the Agricultural Transition 400 generations ago and to the Industrial Transition 10 generations ago. Two generations after the British Clean Air Act we need a Global Clean Air Act and carbon trading. Transformation to a low carbon economy presents a great challenge to governments and citizens, but failure to take action now will have potentially disastrous effects on the economy and on human survival, health and wellbeing.

In the final analysis, sustaining a healthy planet will require widespread awareness of our close dependency on the natural world, a relationship which was necessarily recognised by our hunter-gatherer ancestors over many millennia.

Bryan Furnass

Book review

Heat by George Monbiot

Penguin Allen Lane 2006

Despite the rash of analyses of the effects of global warming and climate changes on our existence at the very top of the pyramid, this latest book by Monbiot just has to be a 'must read'. It is credible, readable and inversely enjoyable to those of us who don't really want to believe his conclusions.

Ruthlessly stripping away veneers of assumptions, accepted convenience, comforts and commercial practices he exposes the inconvenient and uncomfortable truths of what our lives have come to rely on and how it cannot continue without major changes to our lifestyles.

Prefacing his chapters with intriguingly apt quotations from Dr Faustus, he covers our denials of what really is happening to our world and the culpable twistings and distortions by industry and marketers to reinforce our disbeliefs. He says 'I think it is fair to say that the professional denial industry has delayed effective global action on climate change by several years'. The blame game is on and the US and Australia cop their full share.

The conflict between scientific truth and political acceptability is clearly stated. If the analysed truth is to be put forward the scientist's credibility is at stake; nobody wants to believe him and governments will not bite the bullet because of voter backlash in the upcoming elections. '*Commissioning endless enquiries is really creating the impression that something is being done, while simultaneously preventing anything from happening until the report is presented.*'

By rigorous analyses, supported by many statistics, Monbiot concludes that our deleterious emissions of greenhouse gases must be reduced by 90% by 2030 and sets about finding his 90% in the areas of housing, electricity, renewables, transport, shopping and cement - with a conclusion that 90% is just achievable if we all knuckle down, roll up our

As places of beauty and fecundity, forests arouse ardour. Forest campaigns attract and animate people like no other aspect of conservation activism. Working at a desk will not enliven; writing reports will not enthuse; making phone calls will not move. But night after night around a campfire, sleeping on the ground, scrambling through the bush, climbing trees, enduring leeches, flies and dirt, and nursing sore muscles and injuries accentuates the physicality necessary for love of nature. As well, the stripped down intimacy of life in the forest with other activists builds the empathy, sympathy, comradeship, and the networks essential to the task of conservation.

*William Lines
Patriots, 2006, p.301*

sleeves and DO something about it. Emphasis on the action!

He makes a good point about the internet - that it is absolutely marvellous at getting eco-blaming messages across to hundreds of people, instantly and free, but think again if you get a warm fuzzy feeling that you have 'done your bit for the environment'. I know how he feels because I have been saying the same thing to buyers of my book - *it's no good just reading it - you have to DO something if we are to improve our situation*.

Monbiot talks in simple, understandable English and really shines in his last chapter in which he speaks from the heart under the heading of 'Apocalypse postponed.' He makes an interesting comparison between religious absolution for crime committed or about to be committed in the fifteenth century and redeeming the environmental cost of your carbon emissions by means of 'carbon offsets' such as tree planting, funding renewable energy projects, etc. *'At best, these schemes merely delay the point at which emissions are saved....encouraging people to believe that they can carry on sinning'*.

He concludes *'The campaign against climate change is an odd one ... it is for austerity, not abundance ... for less freedom, not more ... it is a campaign not just against other people... but against ourselves'*

We are the cause - and the solution. Absolutely everybody should read it this book and act on it.

Derek Wrigley

One essential, and most difficult to implement, element not mentioned in the list of reforms: A ban on advertising for the purpose of increasing unnecessary consumption. And that will really get up the nose of the advertising, retail, housing, and tourist industries etc. It is the elephant sitting across the narrow, difficult, essential, path.

From an NSF member responding to an NSF interest group e-mail about essential measures to mitigate climate change.

Book review

365 Ways to change the world: How to make a difference - one day at a time

by Michael Norton

Penguin 2006

Clive Hamilton and others argue that it is the duty of government to make the big changes necessary to deal with the pressing environmental and social challenges confronting us. Nevertheless, there is still a lot that individuals can do. As this book points out, even the smallest changes can impact on your home, your community and the wider world.

I bought this book out of duty and a degree of weariness, fearing I had read it all before. But I hadn't. Here is a book packed full of extraordinary suggestions about how you can change the world for the better, both socially and environmentally. There's a page and a suggestion for each day, even 29 February. I duly read a page each night - rather like a daily bible reading for Christians, or a diary with a

quote for the day.

Here are some titles: *child prostitution must end* (see www.childwise.net); *go unshopping* (including ten things you should never buy); *green funerals* (try a bamboo eco-coffin); *try vegetarianism* (with a recipe for double green hummus); *AIDS orphans in Africa* (organise a Dinner of Hope and raise money for an AIDS orphan charity); *water fetching* (support the Hippo Water Roller project); *plant a community garden* (for advice, see www.communitygarden.org.au); *consider tithing* (give 10% of your income to charity); *become a zoo checker* (when you see animals kept in appalling conditions, notify your local animal liberation group); *toilets - you've got one* (so buy one for someone else - \$35 will buy an ecological sanitation latrine in Mozambique); *give blood* (if you're able to, give regularly - you may save a life).

That's eleven and there are another 355 to go...

Almost without exception, there is a website to refer to, and in the Australian edition, there is usually a relevant Australian one as well. This is probably the most valuable aspect of the book because it allows easy follow-up.

Given that I'm not an expert on most things, I could not judge whether the advice given through the book was worthwhile or not, although it seemed to be. So I turned to the page on *population pressure*, that being a subject I did know something about. It rightly talked of the limits to the world's supply of land, water and natural resources and wondered whether will be able to support 9.2 billion by mid-century. So far so good. It then described the downside of the coercive Chinese and Indian policies. Fine, except it didn't mention that the Chinese policy had kept the population/ resources balance in check to some degree. So it goes on to argue for eliminating poverty and aiding girls' education as the best means of getting birth rates down. But no real mention of contraceptive supplies to meet the unmet needs of 120 million couples

worldwide. Nor the need for primary health care and reproductive health needs other than contraception. These include access to emergency obstetric care, ante-natal and neonatal care, measures that allow women to have babies safely and give them the confidence to know they and their babies will survive and that they can stop at two children. Perhaps asking too much for a small space, but this particular page was somewhat unsatisfactory.

Nevertheless, this is a great book to give to someone at the end of the year, be it Christmas or Hanukah. They can start at 1 January (*new year's resolution - resolve to change the world*) and read a page a day until December 31 (*new year's eve - light up the future*). They will be reminded there of that great Margaret Mead quote:

'Never doubt that a small group of thoughtful committed citizens can change the world. Indeed it is the only thing that ever has!'

Jenny Goldie

Book review

State in fear

By Peter North

Tomorrow Press 2006

Tuvalu will be the first nation to disappear because of global warming.

This inconvenient fact – and it is almost certainly a fact – is the starting point for Peter North's novel *State in Fear*, which combines an excellent summary of the current scientific state-of-knowledge about climate change, with a fast moving courtroom drama.

Think of the technological details which interrupt Tom Clancy's thrillers, or John Grisham's legal convolutions. But North wants to do much more

than create an airport novel based on current concerns. He is quite overtly polemical, and there's no doubt who are the villains of the piece – the United States and Australian governments.

The island nation of Tuvalu, a few scattered atolls in a million miles of ocean, is one of the smallest and poorest countries in the world, and

much of it is only a few centimetres above sea level. As the novel opens, climate-caused damage is already affecting the islanders.

Meanwhile, on a golf course in California, a conservative judge drops dead of a heart attack. The consequence of this is far-reaching, as the Administration's hand-picked judge in an upcoming case is replaced by an African-American judge well-known for his sympathy for environmental and social causes.

Tuvalu has decided to sue the United States for its failure to sign international climate treaties and failure to moderate its runaway generation of greenhouse gas. For years Tuvalu and other small island nations have been pleading for the developed world to curb emissions, but Australia and the US in particular have ignored scientific evidence and carried on with business as usual.

Now, the charismatic Tuvaluan Environment Minister Lucas Kenabole has gained a new ally – retired computer multi-millionaire Jeremy Houghton, cruising the Pacific in an

electronically fully-equipped luxury yacht, who agrees to fund the Tuvaluans' case in the US District Court in Los Angeles.

North takes his reader through the complexities of the court case – once the incoming judge has decided that the case should be heard – the complex procedure for selecting a jury, and the choice of witnesses; unexpectedly difficult for the plaintiff, as almost every climate scientist in the world is keen to have a chance in the witness-box. (A notable exception is Dr Cartwright of the CSIRO. As the Tuvaluan Minister observes: "Scientists working for the CSIRO are ultra circumspect. Administrators of the organisation check them for political correctness and adherence to approved policy. Going public about the nature of the world has become a hazardous activity for scientists employed by vested interest groups. That includes governments in both the US and Australia." Dr Cartwright is not called as a witness.)

At all points the work of the Tuvaluans and their lawyers is shadowed and monitored by agents of the US government, but North suggests that the *real* US government is run not by Congress and the President, but by a nameless group of industrialists and the Vice President who meet monthly at an exclusive New York club.

Neither the President nor the Vice President are directly named, except when one of the cabal members refers to the VP as "Dick", but the President is treated with contempt. "The President" says North "was chosen as the least competent, most malleable person available to follow the wishes of those whose money had put him into office."

And at the meeting "Dick" is asked: 'You discussed Tuvalu at the Cabinet meeting before you got here today. What does the President think?'

'The President think?' said the Vice President before he could stop himself..."

Peter North has used a strong scientific and environmental framework to create a ripping yarn with a message that Australians should well heed. Unfortunately he is poorly served by his editor, as the book has too many typos and inconsistencies.

The main problem with this sort of scientific and political fiction is that, in the end, it has to match up to reality, and the conclusion of *STATE IN FEAR* doesn't quite meet the expectations which have built up during the chase. But the chase is entertaining, and the message is a serious one.

Jenny Goldie

State in Fear is available from the reviewer; please contact her at 256 Baroona Road, Michelego NSW 2620 enclosing \$30.00.

A little story, based on Garret Hardin's Tragedy of the Commons

Once in mediaeval times, there was a village with a common where people could graze their cows, and for so long as they didn't put more cows out there to graze than the common could support, everyone was happy.

Then one day, an upwardly-mobile villager increased the size of his herd at the expense of his

neighbours to increase his milk production. So disadvantaged villagers followed suit, reasoning that though their yield per cow would be less than before they could still gain some incremental benefit overall by following his example. And so it went, tit for tat, until there was no more grass for their cows to eat, the beasts were pawing at the roots for sustenance, and the soil was being blown away. The result was that every villager lost out, rich and poor alike. So who was more responsible? The villager who sought to improve his lot? Or his neighbours who followed suit? Or the manager of the common? Or was it the system that was at fault?

Today, in this era of the 'Global Village, our village common is the atmosphere, that fragile placenta up there in the sky which nourishes us with the oxygen we need and maintains the temperature of the earth at levels fit for life. Just as the villagers of old put their cows out to graze on the village common, so we are putting our fossil fuel wastes out into the atmosphere for it to process, with the result that its carrying capacity is exhausted and it has caught a fever. Whose task is it then to manage the Global Common? How should it be managed? And how can we villagers play a part?

David Tranter

Other animals do not need a purpose in life. A contradiction to itself, the human animal cannot do without one. Can we not think of the aim of life as being simply to see?

John Gray, Straw Dogs.

Inspired Design

About a decade ago Robert Dane, a doctor from the NSW south coast town of Ulladulla, happened to be in Canberra watching the annual solar boat race on Lake Burley Griffin. He was unfavourably impressed by the boats competing; none of their designers seemed to have much knowledge of how a boat moves through the water. Dane, a keen sailor, was sure he could do a better job, utilising both solar and wind power.

Later, reading a book on evolution, his attention was caught by the description of insect wings developing from flaps of skin insects could raise to absorb warmth from the sun so that they could get moving in the morning. These flaps could catch a breeze and enable the insect to glide away from a predator. Why not use flaps that were covered in solar cells, but could also be raised as sails on a boat?

As a doctor, Dane thought of the human shoulder joint as a model for the attachment of such sails. He enlisted the help of several Ulladulla residents with appropriate skills, patented his invention, sold his medical practice, formed a company and got investors, including locals, interested. He also

approached the naval architect Grahame Parker, who designed the low-wash ferries that ply the Brisbane River and Sydney's Parramatta River. Parker agreed that the technology could be incorporated in his designs.

With every swing of my machete and every closing of my clippers, I can almost hear the blackberries cry out, "Scapegoats. We're scapegoats, and you're a hypocrite. If you really wanted to remove destructive exotics, we should be low on your list. What about bulldozers? Backhoes? Cars? Pavement? Number one would be homo domesticus (called by some homo stupidus) – civilised humans. Take your machete elsewhere and go after real sources of destruction.

*Derrick Jensen
Endgame, 2006, p.581*

The Solar Sailor, the first commercial boat of this kind, has been in service on Sydney Harbour since June, 2000. It has attracted international interest. A trimaran version will start operating on the San Francisco – Alcatraz Island run (the second biggest ferry run in the world) in 2008.

The ferries still have to have a conventional engine to comply with safety requirements, and to keep them on schedule in the evening or on calm or dull days. But when docking the ferries run on their electric batteries, and emit no pollution whatsoever, a great plus as harbour pollution has become a concern in many places. The heavy batteries, which are a major problem for land based vehicles, are no problem on the water, as they provide the ballast needed to maintain the stability of the vessel.

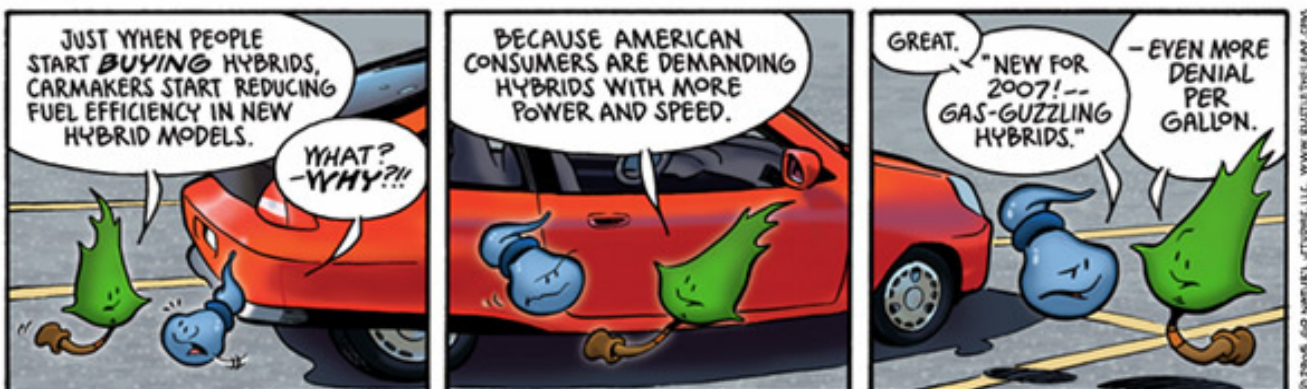
A computer system on board factors in prevailing conditions to control the position of the sails, and the way the solar cells track the sun. It works out the best mix of energy given the weather and the demands of the journey.

Dane's company is now worth about forty million dollars Australian, and Dane has more inspiration on the way. He has drawn up plans for pleasure boats, water tankers and unmanned craft.

New Scientist 14 October 2006

RUSTLE THE LEAF™

BY PONCE & WRIGHT



Christmas Gifts

A gift catalogue compiled by NSF members would leave most commercial retailers gasping for air, and maybe asking the Government to provide drought relief.

A general theme emerged from the replies we received to our request for suggestions for gifts, though it was not expressly stated. In our affluent society most people do not need more things, but they appreciate gifts of time and thoughtfulness. What they want to know is that you have really thought of them.

Suggestions include don't give presents, give time. Find out what the person would really like e.g. an outing to a show, a meal, something they have been wanting to do, maybe just a visit from you, or a spot of home maintenance or gardening.

Actual gifts could include home cooked food, or home grown fruit and vegetables; home made items such as lavender bags or pot pourri, cloth shopping bags; items to make the home more energy or water efficient, such as compact fluorescent light bulbs or low flow shower heads; plants, including native plants to attract birds, and pot plants; theatre tickets, bus tickets, tickets to a dance (good, healthy exercise in a social gathering); a bicycle, or bicycle accessories.

Books, including secondhand ones, feature in several lists. Some families follow a policy of limiting the number or value of gifts, for example one or two books or CDs, to keep everything within bounds.

Members were very strongly in favour of the 'gifts that give twice', such as those from Oxfam shops or charity stalls. Other writers suggested gifts that actually go to a community or an individual in a developing country, with the recipient of the gift here getting a card to tell them of what has been given on their behalf. You can investigate this option at www.oxfamunwrapped.com.au or TEAR Australia, the World's Most Useful Gift Catalogue at <http://www.usefulgifts.org/>.

Close to home you could give donations on the recipient's behalf to the Fred Hollows Foundation,

RSPCA, Bush Heritage or various favourite charities or NGOs (someone suggested NSF).

Some people give subscriptions to various environmental or scientific journals or organisations (usually with educational overtones), that the recipient would probably find interesting.

In all these there has been no focus on children or grandchildren, the category for whom actual presents in the hand are probably most important. Books are good for any age group, and CDs could also be appropriate. Bikes and bike accessories are suitable for many children. Oxfam shops carry many appropriate toys and musical instruments. Consider also the value of a subscription to CSIRO's Double Helix science club. A binocular microscope could open up a whole new world of wonder for a child.

That suggestion leads to thoughts of other

instruments stocked by the same shops, along with books on astronomy, and other mind expanding topics. There are plenty to choose from, so happy hunting. Thank you to all our contributors for their suggestions.

Jenny Wanless

Only three decades have passed since the flimsy plastic bag was introduced to the world, but it will be another millennium before the first of these has degraded in its landfill site. The average UK household spends 470 pounds a year on packaging. In the US alone an estimated 12 million barrels of oil are used to produce the 100 billion plastic bags used annually. A filter-feeding minke whale was washed up in Normandy in 2002 with 800 kilograms of plastic bags and other packaging in its stomach.

*The Ecologist (UK)
December 2006*

Mobile Phone Recycling

The RSPCA has teamed up with ARP (Aussie Recycling Program) to collect mobile phones for recycling. In the ACT a collection box for unwanted mobiles has been placed at the Weston RSPCA shelter. ARP will collect the phones and refurbish suitable ones to be sent to developing countries for reuse. Other phones will have components extracted and used for spare parts.

Money raised by the program will go to the RSPCA to support their work. As over seven million mobiles were bought by Australians last year, there are probably millions of superseded phones lying around. They should not be put into landfill, as they contain many toxic elements such as cadmium, arsenic and lead.

Farrago

Emptying Reservoirs

Storing water in conventional dams exposes it to evaporation. The Grand Bluffs reservoir in Kansas loses 75 per cent of its water to evaporation. Tom Brikowski of the University of Texas has suggested that the best way to store the water is to release it slowly from the dam, allowing it to soak into the river bed downstream so it can percolate down into the depleted aquifers beneath. This could ensure the nearby town of Hays has enough water to survive a drought.

Brikowski suggests that many other places will need to take similar measures as drought spreads because of changing rainfall patterns.

New Scientist 23 Sept 2006

Painkillers turned bird killers

Vultures are not off the hook yet. The painkiller diclofenac was banned in India and Nepal last August because griffon vultures were dying from eating carcasses of cattle that had received the drug. Now Egyptian and red-headed vultures in the region are dying with similar symptoms, and conservationists suspect diclofenac is also to blame.

Until now, little has been known about how painkillers affect scavenging birds. To find out, the UK's Royal Society for the Protection of Birds asked vets and zoos worldwide for their experiences. It found that meloxicam, the drug promoted to replace diclofenac in India, seems safe for most species. However, flunixin and carprofen, used for livestock in Europe, have killed vultures, condors, hawks, owls, rails and a Marabou stork. Ibuprofen and phenylbutazone might also be dangerous. Meanwhile diclofenac remains a risk, especially in South Africa, where ranchers now leave dead cattle out as "vulture restaurants".

New Scientist, 14 November 2006

Rubber Footpaths

A company called Rubbersidewalks has been grinding up some of the 290 million tyres thrown out each year in the USA for reuse in making paving slabs that are easier on human knees, but also kinder to the roots of trees planted in pavements.

The slabs are up to three times as expensive as their concrete equivalents, but are expected to last more than twice as long, cutting down on maintenance costs. The rubber slabs come in two shades of grey, or a terracotta orange. Over sixty cities have installed the rubber squares in problem areas and have reported satisfaction.

The Canberra Times 7 August 2006

With every group my task is the same: to send people home with a new and deeper insight into the central problem that draws us ALL together as humans, regardless of our occupations—and that problem is nothing less than the survival of our species.

*Daniel Quinn
The New Renaissance, 2002*

Polystyrene foam ban

Oakland, California adopted an Ordinance to prohibit the use of polystyrene foam food service ware and require the use of biodegradable food service ware from 27 June 2006.

Aquarium Plunder

Trade in live fish, both for expensive restaurants and to supply aquarium species, is destabilising marine ecosystems, leading to unpredictable collapses. The film *Finding Nemo* promoted the message that fish belong in the sea, but also prompted a huge demand for clownfish in pet shops.

A wave of booms and busts in fisheries has spread out from Hong Kong, a major hub for the live fish trade, as bandits literally spread their nets further afield. The collapse of reef ecosystems potentially affects everyone in the world, but the locals are most severely affected as their food resources are destroyed.

Australasian Science October 2006

A letter writer to *The Canberra Times* asked whether God had designed humans to be global warming planetary plague locusts, or whether evolution was to blame.

Reef Conservation

Traditional customs observed by indigenous communities in Indonesia and Papua New Guinea do a better job of managing reefs than do conservation groups or government laws. Studies showed that poaching in marine national parks and reserves was so bad that most reefs were not significantly better off than non-protected areas.

Communities had long established rules that allowed certain reefs to be fished only for special occasions, whereas other reefs were open to fishing year round. On the protected reefs the fish were much bigger and the fish biomass was forty per cent higher than on the neighbouring reefs. Coral cover and other measures of reef health varied similarly.

Local villagers valued their reefs and would protect them from outsiders, without any government support. Long term conservation requires public support if it is to succeed.

'Conservation strategies are most effective when they can directly benefit the communities involved.' Josh Cinner, ARC Centre for Excellence in Coral Reef Studies.

Australasian Science
September 2006

Organic home gardens are generally well under the horticulture/agriculture limit (it's horticulture if it takes less than a calorie to grow a calorie, and it's agriculture if it takes more).

Lynnet Banion
Internet, 22 Nov 2006

[This contemporary distinction has been devised in the context of peak oil]

Leading by example

The Adelaide-based Savings and Loans Credit Union (S&L) won the 'Best New Entrant' Award at this year's Corporate Responsibility Index awards.

S&L charges lower interest rates on loans for fuel-efficient vehicles, those that achieve seven litres or less per 100km. It also offers cheaper mortgages for houses that qualify as being more environmentally friendly and energy efficient than the average run of houses.

The Credit Union is involved in a housing scheme at Mawson Lakes, where all houses are built to a passive solar design, and residents are encouraged to plant native gardens. Within its own headquarters in Adelaide, S&L has installed carpets made from recycled plastic, paper recycling is well supported and an energy

saving scheme has cut consumption by thirty per cent. The staff have voted to drink Fairtrade coffee.

The corporate fleet is gradually being switched to smaller, more fuel efficient vehicles. All vehicles are registered in Greenfleet's tree planting scheme to

offset their emissions, but S&L has taken the unusual step of opting to plant twice as many trees as the ones theoretically needed to mop up its emissions.

In addition S&L's Visa credit card commission has raised over one and a half million dollars towards the redevelopment of the emergency department of the paediatric wing at Adelaide Women's and Children's Hospital.

The S&L Credit Union has branches in South Australia, the Northern Territory, Victoria and NSW.

Ecos June-July 2006

Carp Killer

The *Koi herpesvirus*, first identified in Israel in 1998, has cut carp numbers around the world. The virus attacks the carp's gills and other vital organs. This is a disaster in places where carp are a major aquaculture species.

In Australia the virus could be beneficial as carp now comprise about eighty five per cent of fish stocks in the Murray-Darling Basin. Overseas studies suggest that the virus infects only carp. The Australian Animal Health Laboratory is conducting tests to see whether the virus would be safe for native fish.

Australasian Science October 2006

Most people know that the wages of dietary sin are a slew of diseases including obesity, cancer, heart disease, diabetes and osteoporosis.

New Scientist 23 September 2006

Runoff and Reef

A major survey along a 150 km transect of the Great Barrier Reef east of Mackay has found that the outer reefs are doing well, but coral closer to the coast is being out-competed by seaweed fertilised by agricultural run-off. Both corals and fish are in low abundance in these areas and there is consistent bleaching across the reefs affected. Further out there are healthy reef structures and much less bleaching.

Australasian Science October 2006



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, by 15 January 2007.

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

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