



**Ecologically Sustainable Development -  
Strategy or Snake-oil?**



**MURDOCH**  
**UNIVERSITY**  
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*Delivered by*  
**Professor Ian Lowe**

**22nd Walter Murdoch Memorial Lecture**  
**September 17 1996**



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## **Introduction to Professor Ian Lowe given by Professor Jeff Gawthorne, the Deputy Vice Chancellor of Murdoch University**

My name is Jeff Gawthorne, I am the Deputy Vice Chancellor of Murdoch University and it is my pleasure this evening to welcome you to this, the 22nd Memorial Murdoch Lecture. Today, this very day was the birthday of Sir Walter Murdoch whose name our University bears and if Sir Walter was alive today, he would be 122 years old. I am sure that he would be delighted with both the topic and the speaker for tonight's lecture.

Professor Ian Lowe is a Professor of Science Technology and Society and he is former Head of the School of Science at Griffith University. He chairs the Australian Governments Advisory Council on the state of the environment as well as the Queensland Health Promotion Council and is Deputy Chair of the Council of the Australian Consumers Association. He has served as the Director of the Commission of the Future and on various advisory bodies for Sustainable Energy Policy and the Greenhouse Effect. And he has of course published extensively in his academic discipline. I understand that he is currently helping to develop a report on the global environmental artbook under the illstresses of the United Nations.

I am very pleased to announce that Ian does not drive an old V8 at high speed neither does he drop an old cigarette butt on the pavement or swear lively in public. In fact he cycles 15 kilometres to and from his place of work, he sings tenor in the Brisbane choir and he bowls useful outswingers for the Griffith First Eleven. I am sure he practices what he preaches. Ladies and gentlemen please welcome Professor Ian Lowe to talk on Ecologically Sustainable Development. Strategy or Snake-Oil?



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## Professor Ian Lowe

Thank you very much for the introduction and for the invitation. I am honoured to have been asked to deliver the Murdoch Lecture. This is a university that I have admired for a long time and had quite a bit to do with over the years and I am delighted to be here on this occasion and honoured to have been asked to deliver this lecture.

The topic I have chosen addresses the issue of whether ecologically sustainable development, which is the stated policy of the Commonwealth and all state and territory governments is a strategy which is being pursued or snake oil which is being used to disguise what is really going on.

The title is deliberately provocative in the spirit of Walter Murdoch and I assure that the lecture will also be provocative.

Let me start with a focusing quote attributed to Cre-Indians, "Only when the last tree has died and the last river has been poisoned and the last fish has been caught, will we realise that we cannot eat money." It is a restate common place among hunter gatherers societies that we cannot afford to damage the ecological basis of our survival. Essentially everything that we eat and drink, except water and salt, was once living. So something as basic as being able to provide for our own nutrition is dependent upon the health of natural ecological systems. Advanced industrial societies, of course, place considerable physical distance and considerable technological horsepower between food production and its consumption. And in those terms we easily overlook the ecological reality in our pursuit of material gains. I want tonight to talk about Ecologically Sustainable Development, what it is, what are the criteria to meet the goal of ecologically sustainable development, what are the obstacles between where we are now and where we should be in principle be heading ,how we are doing in achieving this stated goal of ecologically sustainable development and where will we go from here?

I would remind you at the outset that there's a growing mood to change our behaviour and be more aware of environmental issues. The New York Times and CBS News have, since 1980, been asking Americans if they agree with the statement, "Protecting the environment is so important that requirement and standards cannot be to high and continuing improvements must be achieved regardless of cost."

I think that's a very strong statement. Many people regard me as a bit of a greenie but I don't think I don't hesitatingly put my hand up for the proposition that requirements cannot be too high and continuing improvements must be achieved regardless of cost as I am aware of the facts that marginal gains come at increasing costs and in some cases the gain would not be worth the price.

When Americans were first asked about that proposition in 1980 about 43% were in favour of it and about 42% were against. The proportion in favour steadily increased throughout the 1980s until by the second half of 1989, more than 80% of Americans said that they agreed with the statement that requirements and standards cannot be too high and continuing improvements must be achieved regardless of cost.

Here in Australia, the AVS last year asked Australians whether they thought the economy was more important than the environment or the environment more important than the economy? Approximately 20% of Australians said they thought the environment was more important than the economy. About 70% said they were equally important and just over 10% said they thought the economy was more important than the environment.

You would not, I suspect reading the political news from Canberra or perhaps even from the parliament in your own state see that set of priorities reflected in official decision making. I think there's a growing public expectation that our Leaders will do far more to preserve the ecological basis of our life.

We are, it must be said, getting a greener shade of rhetoric. I give you, as exhibit A, this quotation "Meeting the challenges will require unprecedented cooperation and vision. There is no quick technological fix. The critical issue is and will always remain, the need to plan for a more secure and sustainable world. It will require a long term commitment from all of us as individuals and the fundamental change in our attitude to the use of resources."

What Leader of a conservation movement? What long haired academic could possibly have said that? Well actually it was that arch pragmatist political fixer and man of unusual personal habits, former Senator Graham Richardson, in his previous life as Minister for the Environment, which shows that we are at least getting a greener shade of rhetoric. I said at the outset that there is formally a national strategy for ecologically sustainable

development which was agreed by the Council of Australian Governments, plus the Commonwealth and all State and Territory Governments in December 1992. Stating that ecologically sustainable development is the goal of those governments and setting out a range of policies which might in principle take us in that direction.

There are a variety of definitions of ecologically sustainable development. So many that practically everyone can feel comfortable with one or another. As a simple soul it seems to me that any definition of sustainable development worth it's salt has to encompass the idea that the pattern of development is able to be sustained, if not indefinitely at least beyond the next budget forecast and some definitions it seems to me don't meet that minimal criteriam of sound english. I think the best short definition of sustainable development is that given by the Bruntland Commissions, the World Commission on Environment and Development when they said that, "sustainable development means meeting the needs of this generation in ways that do not reduce the options for future generations."

It seems to me that encompasses at least three criteria. It means that we mustn't deplete natural resources to a level that would give future generations fewer options than we have. It means we mustn't damage the natural environment in a way that leaves them with fewer options and it means that we mustn't respond to problems of resource depletion or environmental damage in ways that might threaten social stability. As a specific example of that most people would, I think, if they reflected on it conclude that our current pattern of urban transport in Australia violates the first two principles because it's based on a non-renewable resource which will be significantly depleted in the lifetime of some people who are in this room and a significant source of air pollution and other environmental problems.

The solution, sometimes advocated by those who have a simplistic faith in the market, is to say that if oil is being consumed too rapidly the solution is to increase its price which will cause people to use it in a more responsible manner and indeed it might, however, in the short term, problems would be caused by the fact that people who live on the outer fringes of our large cities, on average, have lower disposable income than those in the city as a whole, have furthest to travel from where they live to where they work or where they don't work, have older and less efficient vehicles, are least likely to have public transport options and are least likely to have the available capital to replace their old inefficient vehicles with

newer and more efficient ones. So that solution however economically rational it might be, would almost certainly not be socially sustainable. Particularly given the number of marginal electorates in outer urban areas.

I would also draw your attention to the fact that there are value judgements implicit in all those criteria. There is no absolute standard by which we could measure what's a level of resource depletion that is acceptable or a level of environmental damage. I will enlarge on those in a moment. I would finally draw your attention to the fact that a pattern of sustainable development should not bring us into conflict with other societies. In the unconsciously wise words of a former Australian Federal Politician, "We cannot behave as if Australia was an island." In planning for the future of Australia it would be imprudent at least to use strategies which might well bring us into conflict with our neighbours.

Let me say something about the issue of the resources. First, what is a resource is affected by economics. In the 1970s the world price of oil increased from \$2.00 a barrel to \$30.00 a barrel and as a consequence many deposits of oil that had previously not been economic became economically viable. Increases in price, whether caused by shortages or whether caused by cornering of the market, affects what is a viable resource. Secondly, what is a resource is affected by technological change. We have developed in the last thirty years the capability of extracting oil from under the sea bed, which has significantly increased what constitute resources of oil. It is influenced by politics. The decision that the minerals under Coronation Hill or for that matter the minerals in Antarctica or the mineral sands of Fraser Island should not be regarded as resources or political decisions. Rather than economic decisions or technological decisions.

So the issue of what constitutes a resource is always relative. However, two general comments can be made. The first is that we are quite naturally steadily depleting the richest and most easily accessible deposits. It would be rational to behave in any other way and by so doing we are insuring that future generations will pay a higher economic and or environmental cost for access to minerals and other resources. The second general point is that it's hard to make a case that there will be any absolute shortage in the foreseeable future of any significant resource with the possible exception of oil. I think as I left Brisbane an Associate of this University was giving a seminar in the city in which I live based on his book about the expected shortages of oil early in the next century. In terms of what are usually called environmental issues but what I prefer to call ecological issues, because the

word environment cannots our surroundings and suggest surroundings of which we are not a part, but humans are of course part of the ecological system and we cannot be divorced of that system.

We are increasingly aware, I would suggest that we are part of the natural world and that awareness has widened the scope of what are seen as significant ecological issues. People have always been concerned about environmental issues that impinge on their own welfare and the catch phrase of the 1980s was *NIMBY - Not In My Backyard*. The readiness of some people to have pollution as long as it was in somebody else's yard and not theirs. But concern about such issues as the disappearance of the great whales, or the endangered status of the Chinese Great Panda or the flattening of the Brazilian Rainforest constitutes I believe a much wider awareness of the extent to which we are part of the ecological system. Very few of us are likely in our lifetime to be affected directly and personally by the disappearance of whales or the Great Panda or the Brazilian Rainforest and the concern about these issues is in a sense a modern ecological equivalent of John Dunn's warning that, "we are all part of humanity and we are thus impoverished in any human disappears we are all part of the eco-system and are thus impoverished if any part of it disappears, therefore sen not to know for whom the ecological bell tolls."

The more we learn about the complex web of life, the more we become aware of inter-relations which were previously unsuspected. I have noted there one specific example of which I only became aware in the last 6 months. A doctoral candidate at a university in the remote Eastern States was studying truffles, the fruiting bodies of fungi, in the eucalypt forests of Southern New South Wales and he found that one particular truffle was the fruiting body of the fungus which has an active and positive symbiotic relationship with the eucalypt trees.

The fungus grows preferentially on the root system of those trees, it helps the trees to extract water and minerals from the soil and in return siphon some off for themselves, a mutually beneficial relationship. The truffle that turned out was also the favourite food of a small endangered mammal called *The Long-Footed Potoroo*, which was until recently almost the archetypal example of the sort of irrelevant creature that only 'rat-bag greenies' were worried about. The student found that the long-footed Potoroo lurching on the truffles then wandered through the forest and as nature took its course redistributed the spores of the fungus and so made the spores available to other trees on which the fungus grew. So that even if

you are only concerned about something as basic as sustainable log production from the eucalypt forest, you would be concerned about the Long-Footed Potoroo because we now know that it is vital to the health of the growth of the eucalyptus tree that constitute that forest.

I give that example to illustrate the point that, as we become more aware of the natural world around us we become more aware of the complexity, become more aware of the inter-relatedness and more aware of the importance of small links in the chain.

There have always been local impacts of human activity. The old Northern English saying “where there’s mook there’s bruss” reflected the fact that making bruss often involved making mook and historically we tolerated that either because the mook was seen as an acceptable price for the bruss or in some cases because those getting the bruss were not those who were copping the mook.

The rising concern about environmental issues in recent times reflects the fact that the growing human population and the increase in power of our technology has meant that environmental impacts have steadily spread out over a wider compass. First, to regional affects such as acid rain, pollution of water, contamination of whole air sheds until finally the ultimate environmental problems, deterioration of the global ozone layer and changing of the global climate. I believe these have been an important catalyst for changing public opinion as I think people have essentially said that a bit of local environmental pollution may have been an acceptable price to pay for material progress but changing the pattern of the entire globe is perhaps going a little bit too far.

I wanted to remind you briefly of the scale of the problem that the greenhouse affect represents. The carbon dioxide concentration in the air as a result of burning of coal, oil and gas is now 35% above the pre-industrial level. The amount of methane in the air is double the pre-industrial level and we have also added other trace gases that contribute to the warming potential of the atmosphere most conspicuously chlorofluorocarbons, which being a human creation were, of course, not there in the air at all 50 years ago. Significant changes have now been observed in the climate, the Earth is about 0.7 of a degree warmer than it was at the start of this century, and the scientific body advising the United Nations on climate issues, the inter-governmental panel on climate change said in its second assessment report last year “that there is a discernible human influence in the observed climate change.” The Chair of the IPCC, Dr Bert Bolin, went personally to

the UN framework conference on climate change in Geneva in July to appeal to the representatives of the Nations to take action urgently to address the problem.

The scale of the changes needed are however intimidating, because the IPCC pointed out that we would need to reduce emissions of carbon dioxide to less than half the current level to stabilise the global climate and even when we did that there would still be climate change for an extended period because of the time lag in the system.

A technological fix is in principle possible. There are a range of technical options for clean energy, some of them being explored even on this campus. They are mainly held back by problems of short term economics, and our inability to cost the so-called externalities, the environmental costs of conventional fuel technologies. I recently reviewed, for example, attempts to cost the environmental liabilities of burning coal to generate electricity. Most of us pay about 10 cents a kilowatt hour for electricity, there are varying estimates ranging from about 1 cent to about 30 cents a kilowatt hour for the environmental and social costs of coal fired electricity not taking account of climate change and if you look at attempts to cost climate change they range from about 1 cent a kilowatt hour to about 1 dollar a kilowatt hour. The point I am making is that we are not even close to having the defensible technique for costing the environmental liabilities of conventional fuel technologies but they are certainly positive and the fact that they are not counted into the prices we see, means that in the terms of the economical rationalists we do not make the most prudent decisions because we do not perceive the real price at the point of making our decisions.

The practice of discounting future costs and liabilities, which is entirely defensible in terms of economics, inevitably stacks the deck against those technologies which are less damaging in the long term because if you use 5 or 10% per annum discounting any costs incurred more than 20 years in the future are essentially negligible. The chances of adopting the new technologies are inevitably reduced by the dominant ideology of market economics. It would take an incurable romantic to expect that a sustainable energy supply technology mix would be brought about purely by the magic of the market. However if you read the recent biography of Mr Keating's period as Treasurer you will be relieved to know that incurable romantics are in no short supply in the higher ranks of government, so we can no doubt see this expectation continue.

I believe we need a broader view of energy and I think the Bruntland Commission's view of energy is an admirable succinct statement. They saw it not so much as a single product, as a mix of products and services upon which the welfare of individuals, the sustainable development of nations and the life supporting capabilities of the global eco-system depend. In those terms, we as individuals don't want energy, I have never yet heard somebody say I must go and get some mega-joules. What we want are the services that energy affords us. We want, as Amy Lovins put it, "Hot showers and cold beer! The ability to move around or cook our food or wash our clothes". The Bruntland Commission was quite optimistic about the chances of meeting those needs in ways that are environmentally acceptable. They said a safe environmentally sound and economically viable energy pathway that will sustain human progress into the distant future is clearly imperative. It is also possible that it will require new dimensions of political will and institutional co-operation to achieve it.

One problem in achieving those dimensions of political will is the simple view that growth is inevitably good. One of the most bizarre statements of this is attributed to the English astrophysicist and science fiction novelist Fred Hoyle, in his little book 'Energy or Extinction', which argued that nuclear power was the only sensible energy source for the future. After which, some critics said that he should have stuck to science fiction and some more unkind ones said that he had. In that book Professor Hoyle said that the energy used per head in Britain was half that in the United States and went on to observe this is of course the over riding reason why the standard of living in Britain is lower than that in the United States. "If we could double our energy use to the American level," he said, "our standard of living would rise inexorably to that in the United States." This is an extreme statement of the assumption often implicit that happiness is simply equated to the level of consumption of material resources. There is, of course, some association between living standards and the level of energy services that are provided, but there is no association at all between energy services and the resources that are used to produce them or the pollution that follows.

It is obvious from that it seems to me that the priority for the future has to be to provide the energy services that people want at less cost. Less cost in terms of resources. Less cost in terms of assaults on the natural environment and in particular the legitimate development aspirations of nations in the Third World need to be met in ways that have less impact on the natural environment than our energy systems have. There needs ,it

seems to me, in the future to be a much more equitable distribution of resources than that which now applies.

The 20% of the human population in which we are included in the industrialised world consume 80% of the resources of the world at the moment and it could be argued that all of the reasonable material needs of the world could be met by a more sensible allocation of current resources. In 1989 Lester Brown did a calculation. He proposed a hypothetical global program to arride the entire human population during the 1990s including the 90 million or so extra that are added each year with the basis for a civilised life, adequate nutrition, clean drinking water, basic shelter and reasonable health care. He costed the program at US\$215 billion a year. A huge sum of money and said rhetorically “where could such an unimaginably huge sum of money come from?” Well actually he said it is about 15% of the global military budget.

So that in principle, all of the needs of a decent lifestyle for the entire human population could be provided simply by reducing the obscene level of resources currently devoted to finding clever ways of killing other humans. In terms of human population, it seems to me you could argue that the globe is however already overpopulated if the aspiration is to the sort of lifestyle that we take for granted and the rate of population increase is still considerable one of the submissions to the Jones inquiry into a population policy for Australia suggested that we might reasonably aspire to a population increase of a mere 2% per annum.

The adjective mere is interesting. I can understand it because as an academic last year I received a pay increase which was a mere 2% and had I blinked I might not have noticed it. The problem is, of course is that of compounding because a mere 2% per annum amounts to a mere doubling, every mere 36 years, so it would amount to an eight fold increase over 108 years, so that if for example, the human population of Australia were to increase by a mere 2% per annum, it would increase by a factor of 8, between now and the end of next century and the same of course would apply at the global level. I don't know anyone who believes that sort of population increase can be sustained for anything like that time.

There are only three models in natural eco-systems of the rate of change of population over time in a closed system. It either increases and levels out at a sustainable value, it exceeds that, collapses, increases again, collapses again and oscillates around the sustainable level or it so grossly exceeds the carrying capacity that the population collapses and the species goes locally

extinct. It ought to be obvious which of those three is the most desirable, I would have thought and that seems to suggest a clear need for a population policy both locally and globally.

Internationally the factors that correlate with population being approximately under control are a high level of education of women and women having significant control over their fertility and in general in the population relief from poverty and insecurity which leads people to believe that a large number of children is the best insurance for their old age.

Finally, I believe in choosing technologies, we need to have a broader estimate of their costs and benefits than has been traditional in the past. We need to recognise that no technology is ever purely beneficial. There are always costs as well as benefits and we need to beware of the social impacts of technological change. In his book 'The Social Control of Technology', David Collingridge contributed the widespread hostility to technology to the massive gap between our continually growing technical confidence and our static capacity to assess the impact of flexing those technological muscles on human society. In those terms I believe we need new tools for making decisions.

We need to move away from such clumsy measures of well-being as the gross domestic product. A measure by which the well-being of Perth would be increased is if before leaving this evening I took a hammer and smashed the left headlight of every car in the parking area and a need to evaluate what has been called natural capital, our stock of renewable and non-renewable resources. In those terms we have been running Australia incorporated on a profit and loss account with no balance sheet and as a result, we have in those terms, not noticed that our quite reasonable performance on our profit and loss account has been achieved by systematically liquidating the natural assets which we inherited. It is equivalent to flying a jumbo jet with a speed gauge but with no fuel gauge or altimeter and if you were flying a jumbo jet you might want to know how long you can keep flying at the current speed and how rapidly you have problems when that ceases to occur.

The Australian Bureau of Statistics is now developing so called satellite accounts of our natural assets so that we can hopefully in the future make more rational decisions. But those more rational decisions will require a long term perspective and a recognition that we are part of the natural environment. Which leads me to the issue of the state of the environment report, as the Deputy Vice Chancellor mentioned introducing me, I had the

privilege of Chairing the Advisory Council which has recently produced Australia's first ever independent national report on the state of the environment.

In one sense it was a response to the issues raised by the Brundtland Commission about the interaction between economic development and environmental well-being. In a second sense it was a reaction to the National Strategy for Ecologically Sustainable Development which said that an essential tool to the achievement of sustainable development was to have regular reports on the state of the natural environment . Thirdly, we had an obligation after the 1992 Rio Conference to report regularly to the international community on the state of the environment. It was also, I think I might venture to suggest, a politically crafty response to a public mood that saw the environment as increasingly important.

Despite all of that, the Government of the day made what Sir Humphry Appleby would no doubt have called a courageous decision, by deciding not to ask the Department to produce a public relations hand out saying what a good job the Government was doing but asking an independent advisory council to draw up the best possible Report on the state of the environment and when John Faulkner launched the framework for our Report he said that he wanted us to tell the whole story, the good, the bad and the ugly in a way that nobody could run away from or hide from. The Report covers the land, the air, our inland waters, estuaries and the sea, our social environment and our cultural environment.

The objectives were several. To provide accessible accurate information on the current state of the environment and so increase public understanding of environmental issues. To develop a set of indicators that will allow us to monitor environmental progress as routinely as we measure economic progress by such arcane indicators as the trade weighted index, which I suspect not one person in a million understands. We are also asked to warn of potential problems, to assess our progress towards meeting the goal of ecologically sustainable development. Most politically contentious, to report on the effectiveness of responses to environmental problems and to identify gaps in our current knowledge.

We were urged to use a general model developed by the OECD, the so-called precious state response model, which is in operational terms a linear model with feedback which sees the state of the environment affected by pressures on it which sees responses flowing from the state of the environment and those responses aimed at doing something about the pressures which are causing the problem.

We argued that the world is rather more complicated than that, that responses are sometimes directed at the state rather than the pressure, that the nature of the pressure will determine the response and the nature of the state will sometimes influence the pressure. For example, the pressure of an invasive weed population on a creek can in turn reduce the prospects of that weed population growing and prospering, so we used the precious state response model but one which included all of the interactions between those variables. We set up seven expert groups to look at the areas of human settlements, biodiversity, atmosphere, land resources, inland waters, estuaries and the sea and our natural and cultural heritage.

There was some controversy not least with our colleagues and the Government Department about the first and last of those because not everybody could see that human settlements and our natural cultural heritage were an integral part of the environment. Our view was that two thirds of Australians live in the major urban areas 85% of Australians live in urban areas of one kind or another and it's simply not reasonable to report on the environment neglecting where 85% of Australians live. Secondly, we argued that what constitutes the environment and what constitutes desirable standards of environmental protection are at least partly culturally determined and our culture is an influence as what we regard as environmentally important.

The products of the process were a large report. 600 handsomely bound pages, which just landed with a heavy thud on the Minister's desk. To save the number of trees being felled, that would otherwise be necessary, it is also available as one dinky little CD Rom and a stand alone executive summary was also launched a couple of months ago. The process is also developing a set of environmental indicators and other publications that were commissioned as part of the process of gathering data.

There were problems. At least some of which I am prepared to confess publicly. The first is that in some cases the data that is needed to report on the state of the environment is simply not collected. For example, while it is generally believed that air quality outside the major urban areas is quite reasonable. We simply cannot say if air quality in such urban areas as Darwin, Hobart or Newcastle is acceptable because there is absolutely no data collection whatsoever. In other areas data is collected but remains locked in filing cabinets in state government instrumentalities and all our piety and wit could not cause any of it to be discaused so no judgements could be made about those environmental issues.

There are some areas where the problem is clear but the cause is not. For example, there is general agreement that the level of phosphorous in our inland streams is high and a cause of environmental problems. But there is a brisk debate in the scientific community about whether that level of phosphorous is a consequence of the current level of application of phosphate fertilisers or the leeching out by erosion of phosphate fertilisers that were applied 50 to 100 years ago and there is no way in the short term of resolving that debate.

A third problem is that responses to environmental issues are usually aimed at changing the situation and so any snapshot is inevitably only as good as the time and data that was used to take that picture in some cases the most recent data is three or four years old and the problem is constantly under attack. The problem may be now quite different from that represented by the data we used. There are a range of complex issues which absolutely defies certainty in reporting. In some cases because of long time lags, for instance the fact that a third of all the irrigated land in Victoria is now subject to salinity is a reflection of practices 50 to 100 years ago and we are only now becoming aware of the agricultural practises which have in time caused to unacceptable problems of salinity of agricultural land.

A political problem is that there is a natural tendency either for those writing the Report or perhaps more importantly those reporting to the public on what the Report said to focus on the bad news and that is a political problem because we were conscious of the fact that there may never be another state of the environment report if politicians formed a view that it was simply another club with which to beat them for their inept performance in the past.

There are two more fundamental problems. An honest and frank report must inevitably draw attention to the fact that some of our current practises are not sustainable and by so doing it, it will inevitably threaten some powerful vested interests. I have a small folder of letters which I received as Chair of the Advisory Council from some Government departments and some instrumentalities which essentially could be unkindly paraphrased as saying we know what you are reporting is true, but we really don't think you should say it. A political problem it seems to me with any honest report is that it will inevitably threaten some traditional practises.

Finally a problem in drafting a Report that it has to be clear and accessible but it also has to honestly reflect complexities and uncertainties. You will probably know that it has been said that any consultant would be unable to make a statement if you cut off their hands because they couldn't say on the one hand this but in the other hand that and it is clearly true that many of the environmental problems are so complex that it is not possible to make clear and unequivocal statements of the sort 'all loggings should be stopped or no logging is a threat to sustainability of forests' but the community I suspect increasingly wants those sorts of clear and definite statements. Well I will give you some clear and definite statements before the DVC reaches for his stage hook to drag me off.

The overall message of the Report and since we thought that the attention span of some decision makers is such that they probably wouldn't read even the executive summary so we have a summary of the summary which is one page of bullet points and for those whose attention span isn't up to that these are condensed versions of those bullet points we have a beautiful, diverse and in any way unique environment and I draw your attention to the fact that I am using unique not as it's used on the television news to mean something slightly unusual of which we have good action footage but in its literal sense of something which has no parallel anywhere else in the world. A very high fraction of the species in Australia are not found anywhere else in the world for that matter a very high fraction of the wildflower species found in this state are not found anywhere else in Australia let alone anywhere else in the world and we obviously have a particular responsibility to preserve those parts of our biological heritage that are found nowhere else.

Some aspects of our environment are by any international standards in relatively good condition. Our estuaries and oceans away from major urban centres are relatively clean, urban air quality while it is nothing to write home about and while we might be concerned about the future impact of projected changes in transport has in most urban areas improved significantly in the last ten years. Our food contains relatively low levels of residues by international standards. Our drinking water is of relatively good quality, and so on.

Some of our approaches to managing environmental problems, such as the Great Barrier Marine Park Authority or the Murray Darling Basin Commission are now seen internationally as models of good practice. That is the good news. There are some areas as I said where the data simply

doesn't exist to allow any sort of reasonable judgement to be made and that suggests an urgent need for data collection and research. To identify the most basic problem we probably have only identified about half of the plant, animal and invertebrate species of this continent.

New discoveries are being made literally every week and less than two years ago a tree that grows to a height of 35 metres was found within one hundred kilometres of Sydney. At the current rate at which the boring but important science of taxonomy is being conducted the best estimators will take about 1000 years to identify the biota of this continent. We are simplifying the task a little by wiping out a few of the species but the problem with that of course is that we simply don't know the importance of what we are losing and it seems to me that any rational being would conclude that as a matter of urgency we need to get a better grip on the biota of this continent so we know what's important and what isn't.

The bad news is that we have some very serious environmental problems and there is a need for urgent action to respond to these. These problems are the combined consequences of population growth and distribution of our lifestyles, the technologies we use and the demands on natural resources that have built up over the last two centuries or more. I want to emphasise that no single government or sector is to blame for these problems in a sense we are all responsible and the problems suggest changes are needed in government policies at all levels, in the behaviour of corporations and in our expectations as individuals.

The positive news is that Australians are at least as environmentally aware as people in any other country that I can identify and generally as a community we recognise that we need to do more to preserve our natural heritage. It is also good news that most of the problems identified in the state of the environment report do have solutions and the Report identifies many successful initiatives at dealing with environmental problems. In those terms I believe we have a better opportunity than most countries to achieve the goal of ecologically sustainable development if we are serious about doing it. In general our actions to address environmental problems have been most affective where the approach was comprehensive and systematic, integrating the various different aspects of the problem. Our failures have tended to be peace meal efforts that treat symptoms rather than underline causes or simply one aspect of the problem rather than the problem as a whole.

In general I have tried to argue that we have a responsibility to protect our rich biological diversity and our outstanding natural environment. I believe we have that responsibility to all future generations of Australians and in those areas which have been identified by the international community as a global significance such as the Great Barrier Reef or south-west Tasmania or Kakadu we also have an international responsibility.

Progress towards ecologically sustainable development fundamentally, requires integration of ecological thinking into all our social and economic planning. I believe far too often we act implicitly as if we believe that, if we have a healthy enough economy we will always be able to solve any environmental problems that crop up. The state of the environment report shows that there are some problems which may be, either too expensive to solve or insoluble, if we simply pursue economic goals rather than integrating environmental awareness into all our social and economic planning.

Let me summarise what I have said. We are part of a complex ecosystem, a complex eco-system which we still have a relatively primitive understanding of and which has complexities that we are only slowly gaining an awareness of. Our actions are now clearly shaping the future of humans and other species. In those terms I think it is important to remember that the future is not an unknown land into which we totter unsteadily on one day at a time but something we are all in the act of creating. Not somewhere we are going to, but something that we are building. Just as the Australia in which we live today has been shaped by the decisions and actions of us and previous generations. So we by our decisions and actions are determining what the Australia of the 21st century will be like. In those terms whether or not we achieve the goal of ecologically sustainable development is largely in our hands. It is a matter of what decisions we take and what actions we take.

In those terms I want to remind you that this earth is the only home we have and the only home we are ever likely to have. There is no realistic prospect of mass rescue by friendly aliens or mass migration to another part of the cosmos, we will determine what environmental state Australia is in in the future, what environmental state the world is in in the future. In those terms I believe it is a great challenge and an awesome responsibility but I believe that the state of the environment report gives enough grounds for hope for us to believe that if we do have the political will and the

institutional cooperation we can achieve the goal of economically sustainable development. Above all else I believe that we should adopt a so called precautionary principle and be aware that where the consequences of our action may be serious or irreversible damage we would be wise to be cautious.

I started with a provocative quotation and I want to end with another provocative quotation which is based on a metaphor developed by Anthony Tucker nearly 30 years ago at the time when the Apollo 13 space mission ran into problems and the world agonised for about a week as some ingenious malpractice was used to husband the resources and harness the waste disposal systems of a small space craft to get three humans back to earth on a journey that lasted less than a week. Anthony Tucker writing in the Manchester Guardian as it then was said that “we ought to be much more worried about the journey of a larger spaceship in which we are engaged which now has nearly 6 billion passengers which also has limited resources and limited waste disposal systems but has no flight plan, no overall strategy for husbanding the resources, no strategy for ensuring that the waste management systems are not overtaxed” and I came across a quote on the Internet which bills on this metaphor and says we are not passengers on spaceship earth we are the crew and it is about time we took our responsibilities seriously.

Thank you very much