

A Submission in Response to the Consultation Paper *Land and Biodiversity at a Time of Climate Change* VicHealth 2 July 2007

VicHealth

The Victorian Health Promotion Foundation (VicHealth) was established by the Victorian Parliament in accordance with the Tobacco Act 1987 with a mandate to promote good health for all Victorians.

Our vision is a community where:

- health is a fundamental human right;
- everyone shares in the responsibility for promoting health; and
- everyone benefits from improved health outcomes.

VicHealth works with other sectors to influence individuals' health-related lifestyles and to improve social, cultural and environmental conditions to sustain health. Our activities reflect national and state public health priorities.

Health and Biodiversity

We commend the Government on its initiative in developing policy directions to protect Victoria's land health and biodiversity. We believe such protection is essential for protecting and promoting the health of all Victorians.

The points VicHealth would like to make in relation to the consultation paper *Land and Biodiversity at a Time of Climate Change*¹ are:

1. Land health and biodiversity are integral to human health.

- The health of humans and other species is inextricably linked and dependent on the capacity of ecosystems to provide fundamental goods and services.²
- There has been steady progress in our health and life expectancy over the last century in Australia and in Victoria, largely due to better living and working conditions and prevention of infectious and non-communicable diseases. Material improvements in our living conditions and lifestyles, which until now have supported gains in health and life expectancy, are becoming the source of new challenges to health, many of them related to environmental degradation and stress.
- Our health depends on the quality of our natural, built, social and cultural environments, but most fundamentally on the health of our natural environment and on biodiversity.³
- Protection of land health, ecosystems and biodiversity is "a fundamental public health strategy for promoting wellbeing and preventing illness".²

- The health of the population is best improved and protected by the creation of a sound, equitable and sustainable living environment.²

Arguments supporting the importance of biodiversity for human health include:

- ***Biodiversity provides or supports ecosystem services essential for health***
 - Living plants, animals and microbes interact with each other and with non-living components of the environment, to produce “ecosystem services”.
 - Ecosystem services fundamental to human health include: regulation of the concentration of atmospheric oxygen, carbon dioxide and water vapour; filtration of pollutants from drinking water; regulation of global temperature and precipitation; soil formation and fertility; plant pollination; and food and fuel provision.⁴
 - Destruction of these services would result in serious population health impacts including:
 - direct health impacts of ecosystem service loss including climate change, water scarcity, fire risk, increased UV radiation and severe weather events including flood and heat waves.^{3,5}
 - indirect health impacts of ecosystem service loss including displacement, conflict and other points listed below.^{2,3,6}
- ***Biodiversity is vital for the prevention of infectious disease.***
 - There are complex relationships between ecosystem disruption, biodiversity, and the emergence, spread and increased virulence of human infectious diseases.^{3,7}
 - These include relationships between: pathogens; arthropod or other animal vectors; reservoir species; and other organisms within ecosystems and landscapes that support the interactions between them.^{3,6}
 - Biodiverse ecosystems help control the emergence and spread of human infectious diseases by maintaining equilibria in these relationships.⁴
 - Established infectious disease which can outbreak or change distribution in response to ecosystem disturbance include malaria, leishmaniasis, yellow fever, Lyme disease, cholera, dengue, salmonella, cryptosporidiosis, rabies and Japanese and West Nile encephalitis.^{3,4,7}
 - Significant infectious diseases which have more recently emerged in response to ecosystem disturbance include SARS, Ebola, HIV and H5N1 avian influenza.⁷
 - The protective function of biodiversity in relation to infectious disease has only recently begun to be appreciated, with calls for the integration of biodiversity indicators into international endeavours to prevent emerging infectious disease.⁷
 - Recommendations for mitigating the infectious disease risk of disturbances to ecosystems include:
 - Sustainable agricultural development and land use: such as avoiding the overuse of antibiotics in livestock and poultry; preventing ‘close spatial associations’ between domesticated and wild animals; and reducing destruction of natural habitat.⁶

- Risk assessment of the epidemiological impacts of human activities that reduce vertebrate species, as high biodiversity within vertebrate communities assists in reducing human disease risk.⁶
- Risk assessment of resource extraction projects (e.g. forestry and mining) and the development of human habitations in previously undisturbed habitats including consideration their potential for increasing infectious disease risk.⁶
- ***Biodiversity is the basis of world food production and human nutrition***
 - Adequate nutrition is a requirement of the normal development and health of children and the health of adults, particularly in relation to the prevention of chronic disease.
 - Reduced dietary diversity can play a significant role in a range of chronic disease, including malnutrition, obesity, cardio-vascular disorders, diabetes and cancers.⁷
 - Biodiversity on land, in freshwater and in the oceans is essential in providing the dietary variety recommended for good health, for example in the *Dietary Guidelines for Australian Adults*.⁸
 - Globally human diets are changing, from traditional diets with high diversity of fruit and vegetables, to urbanized westernized diets low in diversity and high in energy, a trend which has been linked to growing rates of obesity and chronic disease.³
 - The protection of agricultural biodiversity is vital to the dietary health of Victorians. Government should ensure that the genetic and species diversity of agricultural produce is preserved and improved, and that its health significance is explained and promoted to consumers.
 - Biodiversity which supports agricultural practices should be protected, including: pollinating and seed dispersing insects, birds and animals; predators of common agricultural pests; and native species that protect against invasive species.⁶
 - Current methods of food production, transport, storage, preparation and waste are in the main unsustainable⁹ and may pose a major threat to biodiversity.
 - The development and support of sustainable food production systems, which protect agricultural and native ecosystem biodiversity, should be a public health nutrition priority of government.
- ***Biodiversity is an essential resource for the treatment of illness.***
 - Many medicines and natural pesticides are largely derived from plants, animals, and microbes.
 - A survey of the 150 most frequently prescribed drugs in the United States demonstrated that 57% of them, with an economic value of \$80 billion, contained compounds, or were patterned after compounds, derived from non-human species.^{4,10} Estimates of the percentage of sales of major pharmaceutical companies which are derived from natural products are between 15-30%.⁶
 - Over 119 important drugs currently in use include compounds derived from plant species.⁶

- New medicines are constantly being developed. Ziconotide (SNX-111), derived from the venom of cone-snails, has been found to have analgesic properties estimated to be 1000 times that of morphine.⁶ “Cone snails may contain the largest and most clinically important pharmacopoeia of any genus in nature”.⁶
 - Medicines are most frequently derived from plants and animals in species-rich areas such as tropical rain forests and coral reefs, but species from temperate zones (such as Victoria) have yielded some of the most useful drugs.^{4,11}
 - For example Taxol, the active ingredient of Tamoxifen, the world’s largest selling treatment for breast cancer, derived from the Yew tree of North America, has also been isolated from fungi associated with the relatively recently discovered Wollemi Pine of NSW.¹²
 - Eighty percent of people in developing countries rely on medicines based largely on plants and animals.¹⁰
 - About 1.5 million species have been identified globally, but this is thought to be a fraction of the spectrum of biodiversity - there may be 10 or even 100 times as many species on earth.⁴ Despite large scale global screening efforts less than 1% of the world’s 250,000 tropical plants have been screened for potential pharmaceutical applications.¹⁰
 - Analysis of new pharmaceuticals approved world-wide from 1983 to 2000, demonstrated that an average of seven to eight new drugs per year came from natural products.⁶
 - At the present rate of extinction, it is estimated we are losing one major drug every two years.¹⁰
 - Soil and microbial diversity is particularly important in the face of the global problems of increasing antibiotic resistance and emerging infectious disease.¹¹
- ***Medical research is dependent on biodiversity and other species.***
 - The value of plants, animals and microbes to medical research is considerable.⁶
 - Species loss leads to the loss of valuable research models that help us understand human anatomy, physiology and disease.
 - Many species, including endangered species, provide biological models that “could be lost to medical science with the loss of the species”.⁴ For example:
 - understanding bears’ physiological mechanisms for preventing bone resorption and uremia during hibernation could lead to new ways of preventing and treating human osteoporosis and renal failure.⁴
 - Toxins from the skins of frogs have provided understanding of the structure and function of nerves and muscles in humans.⁶
 - Infection-fighting and cancer-fighting molecules in the tissues of sharks are promising in understanding human immune systems and methods to prevent or treat cancer and infection.⁴
 - Policy recommendations to conserve and sustainably manage species which are important for health research⁶ and are worthy of consideration by the current review, include:

- The development of codes of conduct for the sustainable and responsible collections of organisms by biomedical companies, other research institutions and researchers.⁶
 - The development of a “Green List” of species fundamentally important to human health, whether or not they are threatened or endangered, as a basis for targeting protection mechanisms.⁶
 - The diversification of organisms used as biomedical research tools, to increase awareness of the value of diverse organisms to research and to diminish the pressure on a small number of species that may already be threatened, including primates.⁶
 - The development of more comprehensive linkages between genomic, population, geographic, and taxonomic databases, to reinforce efforts aimed at promoting human health and protecting other species.⁶
- ***Biodiversity is important for mental health***
 - Mental disorders are the leading cause of disability in Victoria accounting for 26% of the non-fatal disease burden in 2001. In terms of specific causes, depression is the leading cause of disability in Victoria accounting for 8% of the non-fatal disease burden in men and 10 percent in females in 2001.¹³
 - The National Strategy for the Conservation of Australia's Biological Diversity identifies that the conservation of biological diversity provides significant cultural, economic, educational, environmental, scientific and social benefits for all Australians.¹⁴
 - Biodiversity has considerable cultural, social and spiritual significance, which is less tangible but is nonetheless highly valued by people in all societies. This significance is often not recognised by governments or the general public.^{3,15}
 - Biodiversity is arguably essential to cultural identity, social cohesion, sense of place and quality of life and therefore to mental health.^{3,15}
 - Biodiversity loss or a dissociation from the natural environment can result in cultural erosion, negative impacts on social structure and behaviour, loss of sense of place and mental health issues. ‘Solastalgia’ is a term that has been coined for the mental distress of the loss of sense of place.¹⁶
 - Victoria has the most diverse range of ecosystems in Australia and has flora and fauna found nowhere else in the world.¹ These resources are arguably central to the cultural identity and mental health of Victorians.
 - Loss of biodiversity and ecosystem disturbance may also have indirect mental health effects through the impacts of extreme weather conditions, population displacement and conflict.³

2. Human diversity is an essential part of biodiversity and is fundamental to realizing some of the health benefits of biodiversity

VicHealth would like to commend DSE's acknowledgement of the importance of incorporating Indigenous Australians' knowledge and the aspirations of Indigenous peoples in land management decisions, by the inclusion of this as a policy question in the consultation paper.

The UNEP report *Cultural and Spiritual Values of Biodiversity* (1999)¹⁵ states:

“Respect for biological diversity implies respect for human diversity. ... creating forms of development that are sustainable and in harmony with the needs and aspirations of each culture implies breaking out of patterns that render invisible the lives and perspectives of those cultures.”

VicHealth would like to take this opportunity to outline the potential health gains and opportunities of protecting land health and biodiversity and including Indigenous people in land and biodiversity stewardship roles.

Indigenous Victorians' traditional models of health are truly 'ecological' models of health, where human health is seen as interdependent with that of other species. The cosmologies of Indigenous traditional health models “ascribe life, spiritual value and interconnectedness among all life forms to the aspects of the natural world used in the process of promoting human health and wellbeing”.¹⁵

Indigenous Victorians continue to advocate the link between their health and the health of their lands, and relate their poor health predominantly to dispossession of land and interruption of their communion with other species, as well as a range of other social and cultural factors relating to their continuing experience of colonisation. Indigenous Victoria's have the poorest health of any group of Victorians with a life expectancy, for males and females respectively, that is 20.5 years and 16.8 years lower than non-indigenous Victorians.¹⁷ Addressing the poor health of Indigenous Victorians requires acknowledgement of the significance and currency of their health models, and the importance of Victorian land health and biodiversity to their health.

As argued above, 'bioprospecting' or the exploration and exploitation of therapeutic compounds from natural sources is valuable for both conservation and health. Indigenous knowledge of health, biodiversity and the therapeutic properties of flora and fauna is central to realising the human health and economic potential of this resource. Of the 119 important drugs currently in use which are derived from plant species, 74 per cent were discovered during exploration of traditional medicines.⁶

There is an urgent need to protect Indigenous cultural and linguistic diversity which allows this important knowledge to be perpetuated through generations. For a range of health, social and economic reasons, the education of Indigenous children in their own culture, including Indigenous health and medicine, should be viewed as a social resource and a policy priority. There is also a need to supply Indigenous peoples with the support and resources they require to research and document the knowledge of Indigenous elders related to the medicinal value of plants.

This Indigenous knowledge of the medicinal value of native flora and fauna also needs protection. Indigenous communities world-wide are concerned that traditional knowledge systems have been exploited without “due consideration for the principles of equitable access and benefit sharing”.⁷ Indigenous people’s concerns about “biopiracy” suggest there is a:

“need to ensure that bioprospecting preserves and respects traditional knowledge systems, and involves local communities in a manner that values and protects habitats and species, creates local business opportunities and supports the continuance of local cultural traditions. This requires direct engagement and collaboration with the biotech and pharmaceutical industries, national institutes of health and medicine, and research funding agencies worldwide” (ibid.).⁷

A case in point was the Western Australian government’s licensing of the Melbourne-based pharmaceutical company Amrad to develop an anti-AIDS drug from the Smokebush plant, a traditionally medicine of Aboriginal peoples. Amrad obtained a global license to develop the patent from the United States National Cancer Institute.¹⁸ The drug was predicted to provide the WA government with royalties in excess of \$100 million by the year 2002, but no provisions were made for any remuneration of the Aboriginal people who first discovered the medicinal properties of the drug.¹⁹ Development of the drug was subsequently suspended in 2001,²⁰ although the company (a wholly owned subsidiary of CSL since November 2006) presumably still owns the rights to development.

The Australian *Patents Act 1990* does not provide Indigenous peoples with broad protection for their traditional knowledge as “it is unable to protect knowledge until it is turned into an economically viable ‘invention’ through a process of ‘manufacture’ which is novel and involves an ‘inventive step’”.²¹

There is a need to balance Indigenous peoples’ rights for adequate compensation and a role in developing new medicines, with pharmaceutical companies’ rights to promote their products and maintain patents that will generate enough revenue to continue the development process.⁶ Pharmaceutical companies face high financial risks, with the costs of developing an initial discovery into a commercial drug in excess of U.S. \$400 million.⁶ Joint venture and profit sharing arrangements can work to achieve this balance.⁶

The National Strategy for the Conservation of Australia's Biological Diversity¹⁴ states “The close, traditional association of Australia's indigenous peoples with components of biological diversity should be recognised, as should the desirability of sharing equitably benefits arising from the innovative use of traditional knowledge of biological diversity.”

VicHealth recommends that the policy process includes consultation with Indigenous communities on these issues and considers measures such as:

- Support for Indigenous community controlled research which maps Indigenous knowledge of the health promoting properties of native Victorian flora and fauna.
- A review of Indigenous intellectual property rights in relation to Indigenous knowledge of the health promoting properties of native Victorian flora and fauna.
- A review of policy on bio-prospecting which facilitates proper acknowledgement of Indigenous people’s rights in relation to economic gains stemming from

- Indigenous knowledge of the health promoting properties of native Victorian flora and fauna.
- A rationale and plan for increased employment opportunities of Indigenous people in land and biodiversity stewardship and research, based on the potential health gains for both Indigenous and other Victorians.

3. Governments and others have a significant stewardship role in conserving biodiversity to protect health

Present high levels of community concern over climate change and biodiversity loss represent an opportunity to revisit the efficacy of institutional arrangements in responding to this complex social problem. Arguably the fundamental determinant of biodiversity loss and land degradation is the impact of the patterns of our daily lives and business on the natural resources of Victoria. It follows that the only way to effectively address biodiversity loss and protect land health is to make them “everyone’s business”. Institutional arrangements must inculcate environmental sustainability as the bottom line of organisational and individual decision making. For example, an environmental sustainability linkage unit, or at least policy remit, in every department of government, including DHS, is arguably a starting point in supporting the complex social change needed to address the relationships between resource use, biodiversity loss and land degradation.

VicHealth trusts that the government’s desire to ‘cut unnecessary regulation and simplify administration’¹, will result in the regulatory environment and institutional arrangements protecting biodiversity being strengthened as well as streamlined.

Although the Victorian community are concerned about the state of the environment, VicHealth would query the statement in the consultation paper that “Victorians have shown that they understand the importance of our soil, plants and animals air and water, coastal estuarine and marine ecosystems to our livelihoods and future prosperity”.¹ For example, we would question whether Victorians really understand the importance of biodiversity and the significance of a loss of biodiversity to their health and wellbeing, or indeed how they may act to mitigate biodiversity loss. As two thirds of Victorian land is in private ownership, and still contains important biodiversity¹, the community’s understanding of the significance of biodiversity and commitment to its protection is paramount.

The stewardship of the urban community is particularly important, with over 70% of Victorians in urban areas, where many of the pressures on biodiversity originate. Urban awareness and lifestyle change to reduce the ecological footprint of Victoria’s cities and towns is important for both biodiversity and health.

It is worth reiterating that drought is severely impacting on the livelihoods of rural farmers and communities and rates of depression and suicide are high among some groups of rural people, notably young men.^{22,23} It is important for the mental health of rural communities that they are viewed and included as land stewards and partners in environmental solutions, and that economic opportunities surrounding sustainable land use and biodiversity conservation are created for this group.

It is arguably timely to revisit and expand the types of measures outlined in section 5 of the National Strategy for the Conservation of Australia’s Biological Diversity¹⁴ “Involving

the Community” and determine new and effective ways to increase public awareness of the importance of biological diversity conservation, including its health benefits. These could include consideration of:

- The role of legislation to manage sustainable landscapes and protect biodiversity, for example options such as mandatory product labeling and its impacts on marketing and consumer choice.
- The optimal mix of community representative groups to support biodiversity conservation. For example, a coalition of medical professional associations and medical conservation groups would be good advocates for health arguments.
- How community juries may be used in determining policy solutions for complex problems, for example the use of conservation zones for recreation. VicHealth would argue that recreational pursuits in national parks and protected areas is important to the health of Victorians in terms of their physical activity and mental health benefits, but should be managed to prevent loss of biodiversity, as this is arguably more important to human health.
- How scientists and policy makers can work more closely within and across disciplines, and with the community, to ensure that the “the values of biodiversity are better explained to those outside of the ecological sciences, and particularly to the general public”.⁷

4. Public health has a role to play in protecting biodiversity

The field of public health is yet to broadly acknowledge both its potential impacts on biodiversity, and the significance of interventions to protect land and biodiversity for population health. For example, issues at the nexus of public health and biodiversity conservation include:

- The development and wide spread use of antibiotics which has resulted in the emergence of multi-resistant microorganisms and new threats to health.
- Contraception and controls of human population growth, which is a key factor in ensuring population growth is sustainable and protecting biodiversity (although conversely estrogenic compounds from contraceptive pills in effluent may have deleterious effects on fish and other flora.²⁴
- Public health related increases in human life expectancy, which put further pressure on other species and biodiversity.
- The goals of public health nutrition and the sustainability of the food supply in the face of continuing desertification of arable land and loss of agricultural productivity.

There are considerable policy synergies between health and environmental and land use policy. For example, although agricultural productivity has increased dramatically, so has energy use related to food storage and transport, the over consumption of food and food related waste. Suburban sprawl has had deleterious impacts on health related to increased car dependence and reduced walking and cycling, as well as impacting on fragile ecosystems around major towns and cities. Good urban planning and more efficient use of land resources related to food and housing may be beneficial both in helping conserve biodiversity and addressing public health issues such as obesity.

This current policy initiative gives the Victorian public health community the opportunity to revisit relevant policy positions with a longer term lens of environmental sustainability

and health. For example it may be timely for public health to re-evaluate the currency of some of its 'environmental health' assumptions, for example if the removal of native vegetation does make human water supplies "safer".¹ It is also an opportunity to look at more meaningfully integrating environment and public health policy. The protection of biodiversity is essential to ensure significant health improvements for Victorians, now and for future generations and we need to refocus the rationale for environmental conservation in Australia to include health issues.²

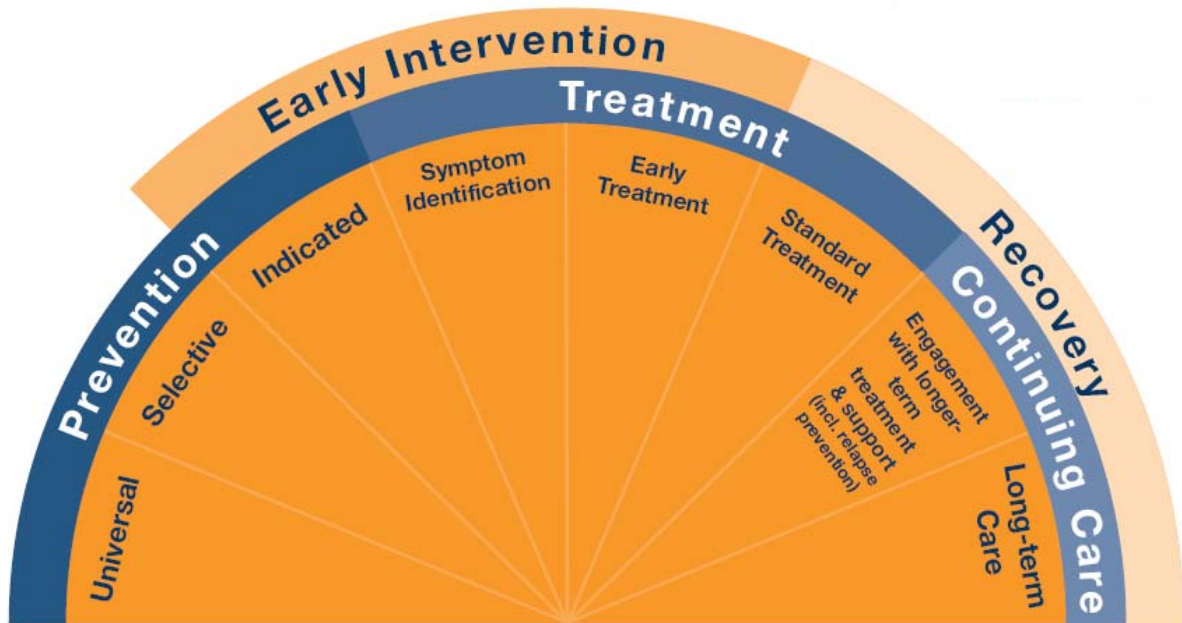
The *Convention on Biological Diversity* (1992), of which Australia is a signatory, requires that biodiversity is appropriately accounted for in environmental impact assessments, and in all areas of policy including health. A report auspiced by the World Health Organisation, the United Nations Development Programme, and the United Nations Environment Programme urges governments to "incorporate human health issues into National Biodiversity Strategies and Action Plans".⁶

5. Health arguments, concepts and frameworks may be usefully employed in conserving biodiversity:

A final point is that public health models may be usefully adapted to support the effort to conserve biodiversity.

To be effective, any response to the complex problem of loss of biodiversity and depletion of our land resources has to be a whole of government and community approach, encompassing a range of short and long term interventions. Models mentioned in the consultation paper such as integrated catchment management and landcare models could be usefully located within a spectrum of approaches and nested within a broader holistic framework. Public health has long used a population health framework to organize its efforts in responding to the range of human health needs from health promotion across the population, to palliative care of the terminally ill (see Figure 1).

Figure 1: Spectrum of interventions for public health



(*Source: Australian Health Ministers 2003²⁵ (Figure adapted from Commonwealth Department of Health and Aged Care 2000 and Mrazek and Haggerty 1994))

Such a framework could be usefully adapted to encompass the range of responses needed to protect biodiversity and land health, from promoting Victorian's awareness of the importance of biodiversity, and the need for lifestyle change to reduce Victorians' ecological footprint (universal prevention) to managing rare and threatened species and responding to threatening processes (long term continuing care). This type of framework would ensure that the response is comprehensive, encompassing the entire spectrum of complementary interventions from prevention to recovery and relapse prevention.

6. What is not covered in the White Paper

The consultation paper suggests genetic modification of organisms is not being included in policy development. In VicHealth's view, genetic modification of organisms, which potentially has major ramifications for both biodiversity and health, should be listed as an issue not included in the White Paper.

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