

**PART ONE**

Coeliac disease (CD) is the prototype for wheat intolerance, a standard against which we compare all other forms of wheat intolerance. Wheat intolerance and gluten-related health issues cause widespread medical problems and place a heavy burden on health services. Chronic diseases and health problems of this kind have increased over the past 50 years. CD is said to have reached epidemic proportions in USA. Is this also true in Australia?

**In the interests of sustainable health, we strongly urge the Department of Health to:**

- Establish a ruling that all children are routinely screened for Coeliac Disease.
- Provide a state subsidy to children with coeliac disease to compensate them for the higher cost of their gluten-free foods, and provide extra holiday time. Eg as in Italy and Sweden. [ In Italy children with coeliac disease receive a €140 monthly stipend to cover the additional cost of food, as well as extra holiday time].
- Require a Surgeon General's warning on all wheat-containing products, much as they require for cigarettes.
- Have Western Australian law require that gluten-free food be available in schools, hospitals, and public places.
- Make possible for a graduate to study for a masters degree in coeliac disease, from diagnosis to management thereof.
- Identify those with gluten intolerance or gluten sensitivity.
- Change government and dietitian's recommendations for all who eat cereals.
- Gather statistics on the number of patients across Australia and within Western Australia diagnosed with the coeliac disease. Also the number likely to have coeliac disease but are currently undiagnosed. Compare with data from previous years and determine whether we have a trend of escalating numbers, and if so, the extent of that trend.
- Educate the community to connect health and food.
- Increase government funding devoted to research, education and action taken on preventative health measures.
- The WA Coeliac Society or a similar organization can be guided and supported by DOH in publishing a restaurant guide, and be required to provide annual reports to Parliament. [Eg *Associazione Italiana Celiachia*].

**Reasons supporting these requests:**

**Prevalence:**

Wheat, rye and barley are troublesome for a large percentage of us. You are more likely to have the disease than your grandparents were. [Dr William Davis, 'Wheat Belly', Harper Thorsons publ 2011]

According to Coeliac Australia, coeliac disease affects **approximately 1** in 100 Australians but this may just be the tip of the iceberg. It's believed that 75 percent of cases currently remain undiagnosed. This means that approximately 160,000 Australians have coeliac disease but don't yet know it.

[www.bupa.com.au/health-and-wellness/health-information/az-health.../coeliac-disease](http://www.bupa.com.au/health-and-wellness/health-information/az-health.../coeliac-disease)

'Inflammatory diseases of the intestine, including Crohn's disease, ulcerative colitis, and celiac disease are now very common in Australia and remain major challenges for clinicians'.

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[ NCBI, PubMed, National institute of Health USA, 'Overview of IBD in Australia in the last 50 years'. [J Gastroenterol Hepatol](https://doi.org/10.1111/j.1440-1746.2009.06073.x). 2009 Oct;24 Suppl 3:S63-8. doi: 10.1111/j.1440-1746.2009.06073.x.

'Coeliac disease is a highly prevalent disease, under-diagnosed illness in the Australian population'. [Louise Wienholt . 'A thesis submitted for the degree of Masters of Science in Medicine in the Faculty of Medicine', University of Sydney, March 2006].

There is also evidence that the prevalence of CD has increased over recent years in some countries. In USA, 1 in 133 have Coeliac disease. Most are unaware they have the disease.

Professor of evolutionary medicine, Loren Cordain:

'At first these numbers may seem trivial because they imply most people have no trouble whatsoever with eating gluten containing grains. Not true. Until very recently, the classical medical view of gluten was that it caused only one auto immune disease (celiac disease) and possibly one other (dermatitis herpetiformis – an itchy skin rash). In the last five years, most well-recognized celiac researchers in the world, including Drs. Alessio Fasano and Marios Hadjivassiliou, have completely demolished this traditional perspective on gluten. These scientists have coined the term “gluten sensitivity” and have shown that celiac disease is just one of many illnesses and autoimmune diseases caused by gluten containing grains.

'Intriguing evidence uncovered by these researchers and others show that gluten sensitivity may underlie an extraordinary number of health problems and disorders including those shown below:

**Diseases and disorders Linked to Gluten Sensitivity:**

- Acid reflux
- Addison's disease
- Alopecia
- Anemia
- Aphthous ulceration
- Asthma
- Ataxias
- Attention Deficit Disorder
- Atopic diseases
- Autism
- Autoimmune thyroid diseases
- Dementia
- Dental enamel defects
- Depression and anxiety
- Dermatitis herpetiformis
- Eating disorders
- Epilepsy with cerebral calcifications
- Graves's disease
- Hashimoto's thyroiditis
- Hyperactivity
- Infertility
- IgA nephropathy
- Irritable Bowel Syndrome
- Liver disease
  - Chronic active hepatitis
  - Primary biliary cirrhosis
  - Primary sclerosing cholangitis
- Migraine headaches
- Peripheral neuropathies
- Psoriasis
- Rheumatoid arthritis

Schizophrenia  
Selective IgA deficiency  
Sjogren's Syndrome  
Systemic Lupus erythematosus  
Type 1 diabetes  
Uveitis  
Vitiligo

'If even a small percentage of these disorders and diseases are directly caused by the consumption of gluten containing grains, we really need to rethink governmental recommendations for all of us who eat cereals. In a recent interview, Dr Fasano estimated that twenty million people nationwide (USA) are sensitive to gluten. These numbers are truly staggering and represent an epidemic – so much so that the Centers for Disease Control now consider celiac disease and gluten sensitivity a major public health threat.'

Do we have a similar epidemic emerging in Australia? Is so, what action is being taken?

### **Mortality rate**

Tragically coeliac disease mostly kills the young. In one large analysis over 8.8 years, there was up to 29.1 per cent increased likelihood of death in people with coeliac disease or who were antibody positive with coeliac disease, compared the broad population.

[ Ludvigsson JF, Montgomery SM, Ekbom A *et al*, 'Small intestinal histopathology and mortality risk in celiac disease', J. Am. Med. Assoc. 2009,(11) :1171-8. 302 ].

The greatest mortality ....was observed in the 20 year old and younger age group, followed by the 20 to 39 group. Mortality also increased across all age groups since 2000; mortality in people with positive antibodies to wheat gluten but *without* coeliac has more than doubled compared to mortality prior to 2000.

A UK study of 4,700 people with coeliac disease indicated that participants with coeliac disease showed a 30% greater likelihood of developing some form of cancer, with 1 in 33 developing cancer despite the relatively short period of observation (three and one half years). Most cancers were gastrointestinal malignancies.

*Yet wheat is the grain government encourages us to eat. This is irresponsible and urgently needs to be rectified.*

### **Duty of Care / Disclosure:**

Our government health system fails us by recommending a daily intake of grains for everyone, without proper disclosure of potential serious health implications for some.

[http://healthywa.wa.gov.au/Articles/F\\_I/Healthy-eating](http://healthywa.wa.gov.au/Articles/F_I/Healthy-eating)

The new Public Health Act should rectify this.

### **Duty of Care / Preventative measures urgently required in our health system :**

Drs. G. Williams and R. Neese, (Ref: 'Dawn of Darwinian Medicine'), consider that widespread medical problems signify bodies responses and bodies attempts to remedy a

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problem. This is particularly so with inflammatory diseases of the intestine. I believe for most individuals the health impacts are preventable if diagnosed early, if “triggers” of the disease are well known, and if diet is adjusted and strictly adhered to accordingly.

***With an improved health system in place, preventative measures applied to this one area of health alone can significantly reduce the prevalence of these otherwise widespread chronic health problems in our society.***

Australia lacks the cultural advancement, dedication and commitment of say, Italy, where it is well known that modern wheat varieties have a higher toxic gluten content than ancient 'traditional' varieties. There's also the problem of overexposure. Wheat and modified starch are everywhere, so Italians for example, have a high exposure, as they are big pasta and bread eaters. 'Italians are very conscious of the connection between health and food'. Food is central to Italian life and community.

<http://www.legalnomads.com/gluten-free/italy>

**Australia has a lot of catching up to do. Children in Australia are not likely to be diagnosed until age eight or much older, if they chance to be lucky. What is our WA government doing for its children?**

In Alberta Canada (Stollery Childrens Hospital) the number of children diagnosed with CD increased 11 fold from 1998 to 2007. 53% displayed no symptoms, but reported feeling better with gluten diminished. There seems to be a fundamental change in the disease – suggesting that something in wheat itself indeed changed sometime over the past 50 years.

Agriculture can adapt by excelling in production of healthier food varieties, instead of the other way around ie. Instead of people's bodies being forced to adapt, often unsuccessfully, to unsafe / hazardous foods.

**Electron microscopy / SEM techniques provides the best tool for necessary detection of gluten at a molecular level.** Could this be a multi-use tool, not only for maintaining zero gluten levels in foods, but also used to advance Australia's medical research into wheat-related health issues? CD is the prototype for wheat intolerance, a standard against which all other forms of wheat intolerance can be compared. In turn, could knowledge gathered assist in finding grains that are naturally safe and compatible for 21<sup>st</sup> century citizens?

Meg Wilson



## PART TWO

**Doctors for the Environment Australia (DEA)** is a collection of Medical Doctors in various stages of their career who understand that our environment directly impacts on human health and well being.

Public Health and Environmental Health are inseparable. *Environmental Health needs to be factored into the decision - making of all agencies.*

Timely actions that are required to effectively combat impacts of climate change on both Public Health and Environmental Health, need to be included in the new Public Health Act.

### **Environmental health - a matter of relationship:**

Psychologist Robin Grille makes this comment:

*'At the very core our dilemma is one of relationship - that is we have been driven to fight against nature, to dominate it, exploit it, instead of learning how to live harmoniously as part of it. The excessive and unsustainable plunder of the environment could be treated, to borrow from George Stephenson's vernacular, as a 'psychiatric health' problem.*

'Parenting for a Peaceful World', The Children's Project, Richmond, Australia 2005.

### **WA GOVERNMENT AS WORLD LEADERS:**

**WA can be world leaders in dealing with climate changes that impact on public health and environmental health** – ie leaders in climate change mitigation, in refurbishing and reorienting the international system to deal with threats facing global society, in halting loss of biowealth and toxification threatening all of humanity's feeding base. They can strive to develop a set of Health Sustainability Goals.

**WA can also be world leaders in making emergency preparations** to deal with escalating odds of epidemics eroding human health in coming years. UN's head of disaster-planning warns world governments that failure to prepare for natural disasters will have “unconcievably bad” consequences. [*The Guardian 29 March 2016, page 7*].

Drought can have destabilising effects as we have seen in Syria. During the recent Queensland drought, babies in rural areas there suffering early signs of malnutrition, usually seen only in the third world.

Queensland drought crisis: Families suffer Third World-like malnutrition

December 11, 2015 10:00pm

Michael Madigan

<http://www.couriermail.com.au/news/queensland/queensland-drought-crisis-families-suffer-third-worldlike-malnutrition/news-story/93172d139fe7850c6bb57d27f28a2d17>

<http://www.ecosmagazine.com/?paper=EC150p16>

**Costs escalate without timely action.**

## GOVERNMENT AND DOH CAN ACHIEVE THIS BY:

- accepting the adaptation imperative of our times.
  - employing a whole-of-government approach .
  - ensuring upfront preventative health measures are incorporated in guiding principles and action items of the Sustainable Health Review. .
  - ensuring the DoH Sustainable Health Review is strongly focused on Environmental Health. This is the right time to do so.
  - ensuring the role of Environmental Health is included in all levels of government investment in a healthy, sustainable environment, especially for the purpose of prevention of Emerging Infectious Diseases (EIDs).
  - building defences against epidemics.
  - isolating the ill and stockpiling medical supplies and isolation gear. [*Bradshaw and Ehrlich, 'Killing the Koala and Poisoning the Prairie', P 177* ].
  - **requiring DOH Environmental Health Directorate to monitor the effectiveness of all agency decisions in achieving combined human health and Environmental Health objectives**
  - acting responsibly and appropriately in the knowledge that cumulative impacts of individual management decisions present a significant risk to the ongoing sustainability of WA's and Australia's land, which in turn impacts on public health.
  - producing effective adaptation policies and actions to minimize adverse impact of inevitable climate change, even if global temperature increases are limited to 2 °C by the coming Paris Climate Agreement.
  - using strategies for achieving cool communities eg through street tree planting, improving and expanding green spaces, and retaining urban bushland, given that human health and lives in the built environment are likely to be impacted by heat waves, sharply increasing morbidity and mortality rates. (*Australia State of the Environment Report 2011* ).
  - Requiring effective adaptation policies and actions to be implemented to minimise the adverse impact of inevitable climate change, even if global temperature increases are limited to 2 °C. Effective adaptation policies and actions clearly should be directed towards halting the drivers of climate change, such as land clearing.
- <https://pielkeclimatesci.wordpress.com/2009/05/29/new-scientist-article-land-clearances-turned-up-the-heat-on-australian-climate/>  
<https://www.sciencedaily.com/releases/2007/10/071027180556.htm>  
<http://www.smh.com.au/news/National/Land-clearing-blamed-for-climate-change/2007/10/28/1193555525054.html>
- curbing Land Use Change (LUC) / deforestation / land clearing to minimize potential for Emerging Infectious Diseases (EIDs).

- stepping up recovery efforts to rapidly expand green infrastructure / vegetated zones.
- preventing 'tipping points' in environmental health, caused by inertia and lack of timely action, by: .
  - \*ensuring clearly defined management boundaries for avoiding tipping points
  - \*ensuring effective and efficient procedures for responding to issues of concern
  - \* ensuring adequate monitoring systems are in place that identify when a pressure is approaching, or has reached, a boundary or tipping point.
- ensuring that efforts to improve policy and management will not continue to be hampered by poor understanding of the broader impacts of drivers and pressures on the environment, and the flow-on effects on human communities and economic activity.
- prioritizing Biosecurity especially natural Biosecurity, and upholding WA's natural quarantine advantage by virtue of its relative geographic isolation (ocean on one side and desert on the other)..
- There are well-documented effects of polluted air and water on human health. Government needs to preserve and strenuously protect our green infrastructure so that the Essential Ecosystem Services they provide are maintained. Natural assets management needs to be structured around this understanding. Eg The Perth Airport area has air quality problems that urgently need to be addressed.
- regulating microplastics.
- producing strategies for dealing with microplastics ; controlling their predicted combined impacts on human, animal and environmental health and the food chain, is urgently required.
- regulating nanoparticles.
- producing strategies for dealing with nanoparticles and preventing harmful impacts on human, animal and environmental health and the food chain health.
- ensuring livestock management practices do not pose risks to human health in view of rising antibiotic resistance, 'superbugs', and a potential increase in zoonotic transfer of diseases, and parasites to humans (and vice versa).

*Scientific American magazine, December 2016 edition, pages 64 - 73, has a main article written by Melinda Wenner Moyer which will be of interest : 'The Looming Threat of FACTORY FARM SUPERBUGS' - 'Antibiotic-resistant bacteria from livestock pose a deadly risk to people. But the farm lobby won't let scientists track the danger'.*

<https://www.scientificamerican.com/article/how-drug-resistant-bacteria-travel-from-the-farm-to-your-table/>

## **REASONS SUPPORTING THIS SUBMISSION :**

1) Environmental Health is all- encompassing, covering physical, mental and social health.

- 3) The Public Health Act has a Duty of Care to public health.
- 4) Consultants to government also have a Duty of Care to public health.
- 5) The Public Health Act has a Duty of Care to get Environmental Health properly acknowledged at every level, but so far has failed to do so.
- 6) Public Health cannot focus on just one aspect eg treatment. It needs to look at environmental issues, which are too often the root cause of poor health in people. Not only safety of food and water, air quality and waste water come into question, but also land-use change (LUC).

**7) Land use Change (LUC) is reported to be a major driver of Emerging Infectious Diseases (EIDs), a growing concern for Australia and our Indo-Pacific region as a whole. eg Ross River Virus (WA) and Dengue fever, Ebola(Africa), MERS (Middle East) and Zika virus (South America) have all been linked to land clearing.**

Ross River Virus is on the increase in the hills and metro region. Economic impacts are high as there is no cure and debilitating symptoms of Ross River virus can last as long as 1 – 2 years, lowering productivity in the work place.

References:

Indo-Pacific Health Security Initiative, Media release, 08 Oct 2017 ...

[https://foreignminister.gov.au/releases/Pages/2017/jb\\_mr\\_171008.aspx](https://foreignminister.gov.au/releases/Pages/2017/jb_mr_171008.aspx)

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## **Australian researchers are blaming land clearing and deforestation for the potential increase in mosquito-borne diseases.**

A team from the University of Western Australia (UWA) warn that the rate of mosquito-borne diseases such as Ross River virus will continue to rise unless more careful land clearing practices are adopted.

They have issued a report which highlights the link between deforestation and mosquito-borne disease in patterns.

Researchers Andrew Jardine, Dr. Angus Cook and Professor Philip Weinstein, from UWA's School of Population Health and Dr. Lara O'Sullivan, from UWA's School of Humanities refer to a report by the Food and Agriculture Organization (FAO) of the United Nations in 2005.



## Related Stories

- Researchers identify impact of climatic factors on dengue disease burden in India
- Molecular analysis confirms zoonotic transmission of malaria in Atlantic Forest area in southern Brazil
- Novel compounds found to be highly effective in preventing transmission of malaria

That FAO report found that from 2000 to 2005 approximately 13 million hectares of forest were cleared each year, a net loss - after reforestation and forest expansion - of 7.3 million hectares per annum.

They say the severity of the impact of such large-scale environmental change on human health is only beginning to be quantified, yet the nexus between such change and human health may be traceable back to antiquity.

The team question whether, when it comes to disease and environmental change, humans are slow learners, as reports dating back to Roman Times chart the possible links between deforestation and an increase in malarial disease.

Professor Weinstein says there are many examples from around the world that suggested the experiences of Ancient Rome were being repeated and a growing body of research from Africa, Australia, and the Amazon, points to a connection between mosquito-borne disease rates and ecological changes associated with deforestation.

Professor Weinstein says the evidence is there and it calls for careful management of agricultural clearing and a multidisciplinary approach to policy development on the issue, particularly in regions where there are already indications of escalating disease rates.

In the study an example is given in the form of the impact of land clearing in Western Australia, where deforestation for agriculture has left more than one million hectares of the South West affected by water logging and dryland salinity.

Professor Weinstein says this has had a pronounced impact on the water balance, as the shallow-rooted annual pasture crops use less water than the deep-rooted native perennial vegetation they replace and the resulting increase in recharge and runoff leads to a rise in the water table, bringing saline water to the surface, which vectors such as mosquitoes can exploit.

The research is published in the international science journal BioScience.

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'How Forest Loss Is Leading To a Rise in Human Disease'.

BY JIM ROBBINS • FEBRUARY 23, 2016

**YALE UNIVERSITY:**

[https://e360.yale.edu/features/how\\_forest\\_loss\\_is\\_leading\\_to\\_a\\_rise\\_in\\_human\\_disease\\_malaria\\_zika\\_climate\\_change](https://e360.yale.edu/features/how_forest_loss_is_leading_to_a_rise_in_human_disease_malaria_zika_climate_change)

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**“Land clearing and deforestation mean more mosquito-borne diseases”.**

<https://www.news-medical.net/news/2008/09/08/41265.aspx>

**NEWS MEDICAL LIFE SCIENCES -**

**8 September, 2008**

8) Natural Biosecurity provided by forests and vegetation zones across our region clearly needs to be preserved for the sake of food security, human and environmental health.

9) The health of our physical environment is inextricably bound up with public health. By protecting our natural environment, our natural environment protects us. Our bushland provides essential ecosystem services on which human health and survival depend.

**These essential ecosystem services need to be recognized as the foundation of health services to the community !**

10) Mental Health is improved when green growth comes back after 2015 fires. The green was seen as a new start following a catastrophic event. ( Toni Burbidge, Mundaring Landcare coordinator). The psychological benefits of contact with nature are well recognized. . .

11) Ongoing threats (eg the Draft Perth & Peel Green Growth Plan for 3.5 million) in recent years to significant natural environments in our region, have raised valid concerns about harmful impacts large-scale clearing would obviously have on public health and community well-being. Perth has already exceeded its carrying capacity, pollution is of increasing concern. Truly liveable - ie healthy, sustainable and resilient communities require excellent planning.

12) Cumulative impacts of land clearing in our region are largely ignored. The tree canopy of our hills bushland - "the lungs of Perth" - maintains air quality, moisture content and temperature within the range for human well-being and survival, it provides water catchments and more, yet is constantly under siege from inappropriate clearing and *ad hoc* development. Lack of understanding means impacts of climate change are ignored.

*'Land clearing / deforestation (ongoing since European settlement began) may be making Australia's droughts longer, hotter and drier than they would be otherwise. Land clearing could be of the same level of importance in Australia's greenhouse gas emissions when it comes to climate change.'* ( Dr Clive McAlpine, Uni of Queensland).

13) Surely Prevention is the way forward.. Risks from ongoing land-clearing are now unacceptably high. "Mitigation" after environmental harm is done is difficult and costly, full recovery is often

impossible. The situation is becoming irreversible.

#### **14) Climate change – potential impacts on human and environmental health:**

*[NB: Because the previous government failed to produce a State of the Environment Report 2016 (SoE 2016) for WA, and failed to contribute to the Australia SoE 2016, we are hampered by lack of up-to-date information on which to base decisions. This needs to be rectified].*

**The Australia State of the Environment Report 2016 (SoE 2016) identifies a number of risks to the Australian environment:**

<https://soe.environment.gov.au/theme/overview/framework/risks>

1) Australia SoE 2016 : 'Key risks to the Australian environment include pressures created by climate change, land-use change, habitat fragmentation and invasive species.'

'As described earlier in this report, strong evidence exists that the climate is changing at a rate unprecedented in the geological record. **Climate change poses serious risks to Australia's population, economy and environment.** Without strong action to reduce greenhouse gas emissions, the world is likely to warm by 4 °C by 2100 ([Sherwood et al. 2014](#)). For Australia, this would mean temperature rises of 3–5 °C in coastal areas and 4–6 °C inland ([CCA 2015](#)).'

The likelihood and impact of risks posed by climate change .....depend on the extent to which implementation of the Paris Climate Agreement is successful in limiting global warming to less than 2 °C. ...

#### **Land clearing as a major contributor to climate change:**

<https://www.newscientist.com/article/mg20227084-700-land-clearances-turned-up-the-heat-on-australian-climate/>

<http://www.ecosmagazine.com/print/EC150p16.htm>

2) **In the built environment**, risks, besides increased economic impact, are loss of human life as a result of prolonged extreme heat events. (Australia SoE 2011 and SoE 2016: Overview-risks).

**Heatwaves – impacts on public health are likely to increase in number and severity. Eg Impact in Victoria in late 2009 “was clearly identifiable and substantial.” Increased mortality and morbidity were recorded by Vic DOH.**

**\*Malnutrition in babies in rural areas** resulted from the long Queensland drought six years ago.

'Queensland weather disaster highlights difficulties with feeding babies'. (2011)

<https://www.uq.edu.au/news/article/2011/05/qld-weather-disasters-highlight-difficulties-feeding-babies>

3) In coastal regions, such as ours, risks are increasing population density, pollution, habitat loss and invasions associated with urbanisation, trade and industrialisation.

**15) Natural biosecurity** provided by our bushland needs be factored into both state and local public health plans. Bushland naturally controls many pests and diseases affecting humans and agriculture / food production. Without bushland in urban areas especially, costly chemical methods of pest and disease control are used. These chemicals pose health hazards to both public health and environmental health, and can have lasting impacts. (Australia SoE 2011).

Healthy waterways with native plants and animals minimise risks from mosquito breeding, and risks from toxic algae. Insectivorous birds and frogs are particularly adept at mosquito / insect control, but are in decline due to

loss of bushland habitat and excessive pesticide use. Efforts to protect habitats for insectivorous bird and frog populations need to be put in place, to increase bird and frog populations. Education is important.

**15) Microplastics present a major health issue in coming years.** 'Coastal waterways are threatened by new classes of pollutants. These include microplastics and nanoparticles, which are largely unregulated and whose effects are poorly understood.'

*Australia SoE 2016 Overview – Risks'*

*15) All these factors below impact on public health and are within our power (govt. and community) to change for the better:*

***'The cumulative impacts of individual management decisions present a significant risk to the ongoing sustainability of Australia's land. This is exacerbated by government policies (such as vegetation clearing controls) that support further habitat loss and fragmentation. It is almost certain that the extent and connectivity of native vegetation will continue to decline. In addition, some land management practices, such as inappropriate application of fertilisers and pesticides, and poor irrigation, represent an ongoing risk.'***

*'It is clear that invasive species are a major ongoing risk to Australian biodiversity, inland waters and coasts, and this risk is likely to remain in the near future. Climate change may create conditions that exacerbate the range and impacts of invasive species.'*

*'Coastal environments are potentially the most at risk of all Australian environments because they simultaneously bear the brunt of population density and urbanisation, habitat loss, invasive species, the downstream impacts of agriculture, and the widespread effects of climate change, including sea level rise, erosion, storms and heat stress.'*

***'The risk from these and other pressures can be increased by inertia or lack of timely action before tipping points are reached. For example, lack of timely action can occur when an issue is raised but, because of complex procedures and/or the involvement of multiple jurisdictions and organisations, a decision is not made before an irreversible change occurs (e.g. extinction of a species).'***

*This risk can be reduced when there are: **This risk can be reduced when there are:***

*\*clearly defined management boundaries for avoiding tipping points*

*\* effective and efficient procedures for responding to issues of concern*

*\* adequate monitoring systems in place that identify when a pressure is approaching, or has reached a boundary or tipping point.*

***'There is also a risk that efforts to improve policy and management will continue to be hampered by poor understanding of the broader impacts of drivers and pressures on the environment, and the flow-on effects on economic activity and human communities.'***

**This failure in knowledge and education within govt. needs to be rectified**

*'Even after management actions and resilience are taken into consideration, some pressures can continue to pose a risk to the environment. Identifying and assessing the risk to the environment examines both the likelihood that the impact will take place and the severity of anticipated consequences if it does occur. **Risk assessment provides valuable information for determining the need to adjust policies or adapt management approaches to mitigate risks.'***

16) Appropriate restrictions on land - clearing are called for.

Meg Wilson

