The Role of Biodiversity and Ecosystems in Climate Change Mitigation

SCIENCE INFORMING POLICY SYMPOSIUM SERIES
The Australian National University June 2-3 2011

Liffey Valley Tasmania | Wayne Lawler | courtesy Bush Heritage Australia

AUSTRALIAN COMMITTEE FOR THE INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE(ACIUCN)

IUCN Australian Committee

SCIENCE INFORMING POLICY SYMPOSIUM SERIES

The Role of Biodiversity and Ecosystems in Climate Change Mitigation

THE AUSTRALIAN NATIONAL UNIVERSITY

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SYMPOSIUM REPORT

Editors

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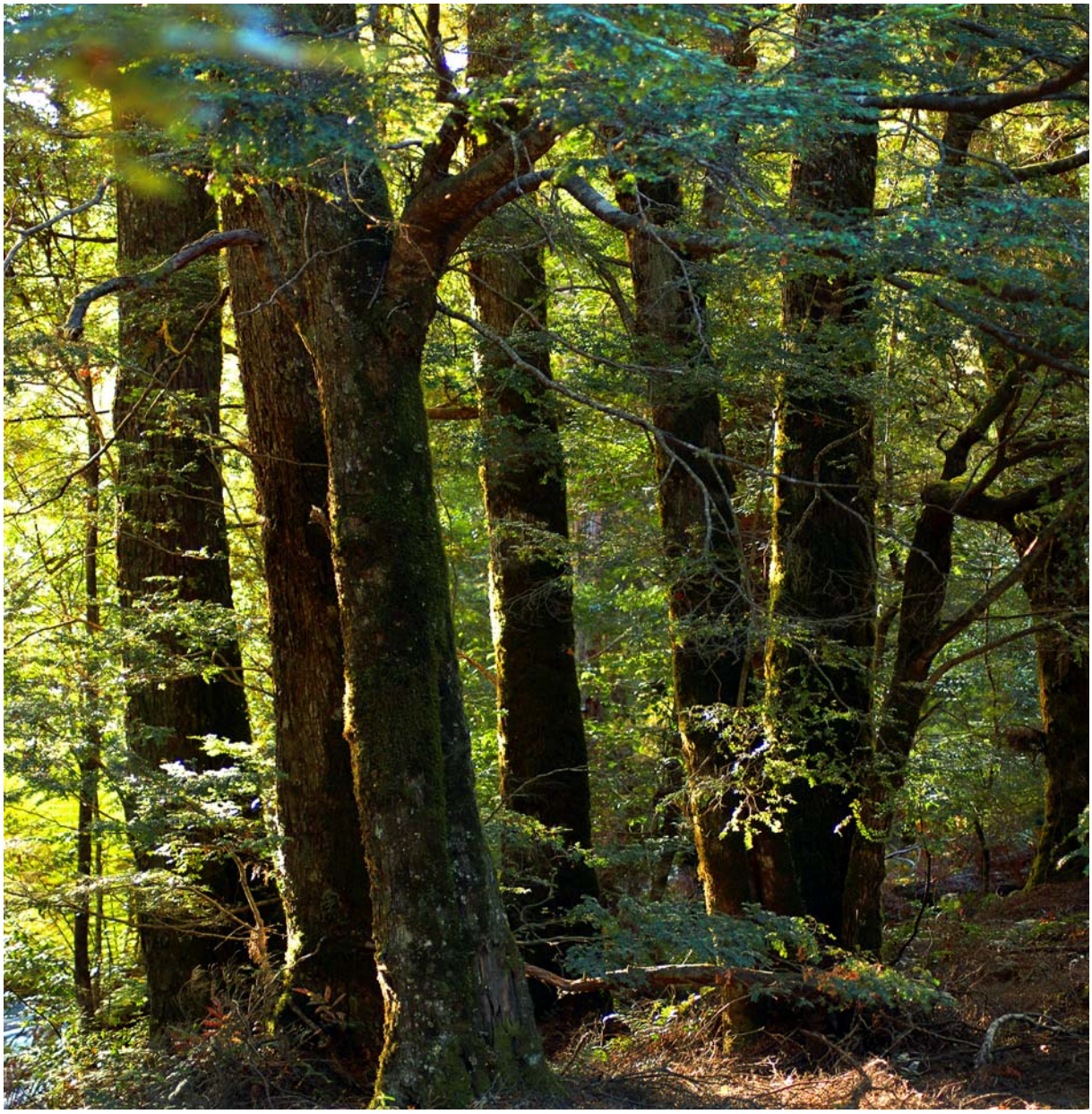

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Disclaimer: The notes for each speaker or panelist were generally provided by the panelist. Neither the ACIUCN nor Fenner School take an responsibility for the accuracy of the materials provided.

THE SYMPOSIUM

The symposium was the first of the 'Science informing Policy' Series which the **Australian Committee for the International Union for Conservation of Nature (ACIUCN)** is organising with other partners, gathering experts and practioners from across government, academic and NGO sectors to discuss strategic conservation issues. The series will bring an apolitical, science-based voice to key environmental policy debates.

The partner for this symposium was the Fenner School of Environment and Society at the Australian National University. Key note speakers included Professor Will Steffen, Climate Commissioner, Professor Brendan Mackey, Scientific Advisory Panel to the Cimate Change Commission and Shayleen Thompson, Head of the Land Division of the Department of Climate Change.

The symposium focussed on the critical role of natural ecosystems in climate change mitigation. The role of biodiversity and ecosystems in climate change mitigation is recognised in international policy under the UN Framework Convention on Climate Change and the Convention on Biological Diversity Strategic Plan 2012-2020. Ecosystem-based strategies are increasingly discussed and embraced internationally for both mitigation and adaptation benefits[1].

The symposium took place at a time when national land carbon policy is being debated in Australia, with profound implications for conservation and more generally land use and land management across all tenures. This aspect of climate change policy has, to date, been inadequately addressed with policy concentrating on measures to reduce fossil fuel emissions and adaptation strategies. While major advances in these directions are crucial, the protection and restoration of natural ecosystems is a necesssary third component of Australia's responses to the multiple and unprecedented threats of climate change.

KEY MESSAGES

1. **Accept the reality of climate change and the responsibility to choose our future**: The meeting accepts the scientific evidence for the reality of human-forced climate change and supports urgent actions both to achieve deep cuts in greenhouse gas emissions and to address the negative impacts to biodiversity, the health of ecosystems, and human economies, societies and cultures. We are at an historical 'fork in the road' and a critical decade for acting to avoid dangerous climate change lies before us.

2. **Mitigate both industrial and land emissions:** Avoiding dangerous climate change demands deep cuts in emissions from all sources. Therefore, a 'dual-track' approach is needed based on policies and measures that simultaneously mitigate fossil fuel emissions and land carbon emissions.

3. **Hold nature's carbon:** Natural ecosystems – forests, woodlands, grasslands, wetlands, salt marshes, sea grasses etc. – store relatively dense and long lived organic carbon stocks in their living and dead biomass and soils. Their native biodiversity gives them resilience in the face of disturbances which makes for more stable carbon stocks. A priority is to avoid emissions by protecting and holding on to existing ecosystem carbon stocks through protected areas and conservation across all land tenures and restoring depleted stocks through better management and ecological restoration.

4. **Integrate approaches for maximum benefit:** A holistic and long term approach to land policy and management is needed which recognises that addressing the role of ecosystems in climate change mitigation will also generate important 'co-benefits' for

[1] Environment Department, The World Bank (2009) *Convenient solutions to an inconvenient truth: ecosystem-based approaches to climate change*. June 2009.

biodiversity, healthy soils, climate change adaptation, regional economies and indigenous livelihoods.

5. **Use economic and complementary measures:** A range of mechanisms and instruments should be implemented and evaluated that provide financial incentives to land stewards for maintaining and restoring ecosystem carbon stocks. There is potential value in both market-based trading schemes, such as the CFI, and other complementary measures. All measures should aim to avoid perverse outcomes and promote co-benefits.

6. **Directly invest in ecosystems carbon:** Many ecosystems and management actions, on both public and private lands, which would sequester carbon with multiple benefits, are unlikely to meet the demanding metrics of market-based measures. Therefore, public investment will be vital to safeguard these ecosystems and promote the restoration of degraded ecosystems.

7. **Create a Ecosystems and Climate Change Fund:** There is strong support for a new and additional fund, outside the trading scheme, but funded by, for example, a carbon tax, for protecting and restoring biodiversity and ecosystems, along with improved natural resource management, stewardship payments, research and monitoring, capacity building and auditing**.**

8. **Strengthen NRM bodies:** Regional NRM bodies are a vital component of the institutional arrangements needed to ensure the necessary good governance of land carbon mitigation policies and programmes, but further investments are needed to raise capacity, in particular, to strengthen regional plans, improve biodiversity conservation outcomes, and raise climate change and carbon management literacy.

9. **Support landscape scale connectivity:** There should be strong support from all levels of government for landscape scale connectivity conservation initiatives such as the Great Eastern Ranges and Gondwanalink. These are driven by the dual goals of biodiversity and climate change outcomes and provide a strategic focus to integrate NRM and protected areas and landscape scale management of threats.

10. **Invest in relationships**: There is strong agreement that we need to build resilience in social capital. Biodiversity is central, but if we are going to better manage our natural systems then people also have to be inspired and motivated. It is imperative to build and sustain community engagement and build the capacity of people to engage over the long periods of time necessary for real change. Administration of NRM has to put maintenance of social capital as a priority at both regional and local level.

11. **Develop national environmental accounting**: There is considerable support for developing an accounting framework for land based emissions which would track losses (emissons) from, and gains (sequestrations) to, ecosystem carbon stocks. Such a framework would recognised the importance of protecting and restoring ecosystem carbon stocks with the ability to 'value' qualitative differences in landscape stocks in terms of their resilience and longevity. These more comprehensive land carbon accounts should be seen as part of the national environmental accounts.

12. **Consider a National Land Use Policy:** Land carbon issues intersect with the other land use challenges including biodiversity conservation, ecosystem health, food soverignty, water security, increasing demand for biofuels and biomaterials, and the sustainability of regional economies. Many existing policies were forged in a different era and cannot meet modern challenges. There is an urgent need for a comprehensive review of land use policy which would identify national priorities, recognise regional differences, enable integration across adminsitrative borders, and reform land policies which impede appropriate responses to the major threats to Australia's biodiversity and ecologically sustainable natural resource management.

Otway Rainforest Victoria, Tom Watt

SUMMARY POINTS KEYNOTES

Professor Will Steffen, Climate Change Commissioner, Executive Director ANU Climate Change Institute, The Australian National University

Climate Change Science Update
Presentation Appendix 1

- This is the critical decade. There has been unequivocal global change in climate well outside the envelope of natural variability in the past 2000 years. The cause is extra greenhouse gases.

- The evidence is overwhelming and clear. It is beyond reasonable doubt that human activities - the burning of fossil fuels and deforestation - are triggering the changes we are witnessing in the global climate.

- We are already seeing social, economic and environmental impacts in Australia – eg we have had nine coral bleaching events on the Great Barrier Reef in the last decade. Disproportionately there is a shift to extreme weather – and a significant increase in high temp extremes in the last decade.

- Carbon in ecosystems must be factored in to climate change policy as there is three times the carbon in ecosystems than in the atmosphere.

- We need to both cut the release of fossil carbon and maintain and increase ecosystem and landscape carbon.

- It is the 'bifurcation point – the 'fork in the road' the 'critical decade' during which Australia and indeed the rest of the world needs to chose the path of a low carbon economy or face very serious consequences.

- Decisions we make from now to 2020 will determine the severity of climate change our children and grandchildren experience.

Professor Brendan Mackey, Scientific Advisory Panel to the Cimate Change Commission, IUCN Oceania Councillor, Fenner School of Environment & Society, The Australian National University

The role of biodiversity and ecosystems in climate change mitigation
Presentation Appendix 2

- Avoiding emissions by forest protection plus restoration should be seen as part of comprehensive approach to mitigation, complementing deep cuts in fossil fuel emissions.
- Protecting and restoring carbon stocks in ecosystems is a vital component of a comprehensive approach to climate change mitigation.
- Terrestrial ecosystems are best conceived as 'buffers' which can be depleted and refilled as they buffer natural degassing of oceans and lithosphere, thereby keeping a significant stock of carbon out of the atmosphere-ocean sub-system.
- We need to protect and restore the ecosystem buffer as much as we can – given the constraints of servicing the food and other livelihood needs of the 10 billion people projected to be living on Earth by 2050.
- The natural biodiversity of forests and woodlands (and other ecosystem types) provides them with ecosystem resilience in the face of external perturbations including fire, disease, invasives and climate change, delivering more stable carbon stocks. This is also true for agro-ecological food production systems.
- Australia has substantial ecosystem carbon stocks particularly in its forests, woodlands and shrublands.
- We need to take an ecosystem-based approach to develop mitigation options for land carbon that avoid perverse outcomes and generate multiple co-benefits including carbon storage, healthy soils, water security, wildlife conservation, and sustainable communities.
- We need to invest in R&D for technical-solar energy conversion and recognise the important role of the plantation sector in providing wood fibre as well as the need for investment in "value adding processing" of plantation timber.
- The time has come for a more holistic approach to National Land Policy.

Virginia Young, Chair, Australian Committee for IUCN

Australian policy opportunities arising from UNFCCC and CBD Strategic Plan

- Policy opportunities arise in both UNFCCC and the CBD Strategic Plan and these international settings can help guide Australian policy responses.
- The CBD is starting to head towards potential integration with UNFCCC, but unfortunately that is not seen in the reverse. While the goals of the two are very similar they don't interact very well. In particular the intentions of UNFCCC are inadequately replicated in the Kyoto Protocol – the aim of Convention is to protect and restore stocks, but that is not reflected in Protocol.

- All carbon is not the same – for example an old growth forest and a monoculture plantation both secure carbon, but have very different, climate, broad environmental, social and other impacts. These differences are not reflected in Kyoto rules on land and forests (LULUCF).

- The failure of the current definition of a forest to recognise the difference between a natural forest and agricultural tree crop leads to perverse outcomes, whereby natural forests can be converted to plantations without de-forestation being deemed to have occurred.

- The LULUCF rules under the Kyoto Protocol do not differentiate between quite different stocks and the relative security of the stock. For example there is no differentiation between the large, relatively secure carbon stock in an old growth forest and the smaller, less resilient, store in a mono-cultural tree crop. There is no recognition that a biodiverse forest is more resilient and therefore the carbon is more secure.

- It is difficult to know whether REDD, REDD+ and other mechanisms aimed at reducing emissions from deforestation and forest degradation in developing countries will be effective in helping to protect natural forests in developing countries or avoiding serious perverse outcomes, such as conversion of forests to palm oil or other plantations.

- Current exclusions from the policy framework, are distorting flows of money with adverse impacts on natural landscapes.

- It is not mandatory for developed countries to account for forest management,which means emissions associated with highly degrading logging activities are not fully accounted for.

- There is a need for a process of prioritisation for what is done in the landscape, but under current rules protection of intact natural stocks can't be prioritised over restoration .

- Policy approaches and accounting rules should firstly encourage protection and better management of relatively intact natural carbon stocks ; secondly facilitate ecological recovery of degraded natural ecosystems ; and thirdly promote revegation projects which improve ecological resilience.

- Approaches to accounting for carbon in landscapes needs to change:
  - to integrate biodiversity solutions into climate solutions we need to incorporate both a profit and loss (fluxes)and balance sheet (stock)approach.
  - Stock (including its quality) is more important than fluxes and is actually a simpler approach to carbon accounting.

- Australia should be guided by Target 15 of the CBD where recognition of ecosystems is very important:
  Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

- If we wish to avoid the many pitfalls of perverse outcomes for biodiversity in climate change policy and maximise the climate benefits from changes in the management of forests and land in Australia we should:
  - move towards full land based accounting.
  - recognise the differences between natural ecosystems and agricultural landscapes.

- incorporate the need for actions outside market offsets into climate policy responses by encouraging emissions reduction in the land and forests sectors in their own right.
- develop a major area of 'complementary' measures aimed at ecosystem based mitigation and adaptation. Biodiversity shouldn't be seen as just a 'co – benefit ' but understood as a 'core benefit' which enhances the security of the carbon.
- prioritise protecting intact systems and ameliorating known degrading practices to protect and restore carbon in landscapes.
- invest in science to build a comprehensive understanding of the current stock of carbon in all natural ecosystems, the emissions which could be avoided if degrading practices were avoided or reduced and the potential for carbon stocks to recover under improved management and/or protection.

- Security is also profoundly important. Any investment needs to truely consider natural ecosystems as natural capital, we need the legal, administrative and management structures to maintain these investments, and we need the social capital of willing public and private sectors to manage these lands and coastal systems in perpetuity.

Shayleen Thompson, FAS, Division of Land Carbon, DCCEE

The Australian Government's Carbon Farming Initiative.
Presentation Appendix 4

- The goal of the Carbon Farming Initiative is three fold : to improve carbon outcomes; add co-benefits like biodiversity conservation; and avoid negative impacts. It is designed for the voluntary market.

- All programs have to meet integrity priciples to ensure 'real, additional and permanent abatement'.

- Additionality refers to activities that go beyond 'common business practice'.

- Regarding permanence, the obligation of the credit holder for biosequestration projects is to maintain carbon or hand back credits. This includes re-establishing carbon after a fire or drought. The carbon credit 'runs with the property'.

- There is both a positive list of eligible activities and a 'negative list' of projects that risk significant adverse impacts for water, biodiversity, communities or employment.

- Examples of eligible activities are: reforestation, revegetation, native forest protection, managed regrowth forests, rangelands restoration, savanna fire management, landfill gas flaring, soil carbon, fertiliser management, manure management, reduced enteric fermentation, and feral camel culling.

- A 'premium market' will be created for those projects that go the 'extra mile' to create other environmental and social benefits.

- Biodiversity co-benefits will be sought and extra weight given to those projects which generate significant co benefits especially in biodiversity and benefits to indigenous people.

- The co-benefits will be identified in project application and audited through project audits.

SUMMARY POINTS PANELISTS

Session 2. What are the 'road blocks' to integrating the protection and restoration of ecosystems into climate change mitigation policy? How can these be removed?

Don Henry, Director, Australian Conservation Foundation
ACF's approach to getting ecosystems integrated into Mitigation Policy

- In addition to supporting a price on carbon, ACF is seeking a government committment to 10% of carbon funds to go into protection of new areas and better management of existing protected areas.
- Protected areas meet all the criteria of permanent carbon sequestration, plus the co-benefit of building resilience in the landscape.
- The complexity of whether something is Kyoto/not Kyoto has too often been one of the 'road blocks', but complexity is not sufficient reason to embrace the obvious imperative to tackle both climate change and our biodiversity crisis intelligently.
- ACF is keen to build a ground swell of public opinion for this use of carbon funds and polling by ACF shows that nearly 80% would be more prepared to support a carbon price if the funds were going towards protecting the environment – as opposed to less than 40% who would be more inclined to support a carbon price if funds were to go directly to the emitters.

Mike Berwick, Chair of Terrain NRM
The role of NRM bodies in Carbon Policy

- Terrain, the Wet Tropics NRM Regional body with its joint venture partner, Biocarbon, have built a model for aggregation and abatement at the regional scale.
- The model is based on the fact that existing Natural Resource Management plans, activities, networks and governance arrangements can provide the basis for carbon sequestration and abatement at the landscape scale.
- Regional Bodies such as Catchment Mangement Authorities and other NRM bodies can aggregate myriad small carbon activities that contribute to the Regional Plan.
- Regional Plans can guide or direct investment toward co-benefits and landscape priorities and improved adaptation to climate change by providing multiple biodiversity, soil productivity and water quality outcomes.
- New opportunities and income streams can be forged for regional Australia in a changing world.
- It has become the basis for a national effort across Australia's 56 regions
- Regional bodies are particularly suitable as they are about building resilience of the entire landscape . They recognise resilient landscapes are linked to resilient social and economic systems and support ecosystem services which by becoming a new commodity will add resilience to both landscapes and communities.

- However if the system is not well designed or if investment is misdirected the outcomes could be all perverse, e.g. all going to monoculture landscapes at the expense of biodiversity, water and food security.

- If carbon offsets are not legitimate and verifiable, the system has no integrity.

- If the safeguards around permanence, additionality and leakage are themselves perverse, legitimate sequestration will stymied.

- If there is no investment in capacity building and carbon literacy across Australia's land managers, suspicion and misinformation will prevail, and it will derail the best opportunity so far to put serious investment into Australian landscape health.

- Regional NRM plans can be modified to ensure delivery of the CFI Acts 3rd objective , i.e., be used to ensure terrestial carbon brings co-benefits and avoids perverse activities.

- Regional NRM plans are increasingly aligning with statutory land use and zoning plans, providing them with an NRM foundation and giving statutory effect, but not regulatory responsibility, to the Plans.

- The Plans can set benchmarks for avoidance activities eg. avoided deforestation; define duty of care and hence additionality; assist alignment across silos (biodiversity, water, drought, Caring for our Country) ; assist alignment across jurisdictions Federal, state, regional and local.

- Regions are generally (but not always) an appropriate scale to plan, engage communities, build capacity, generate ownership and seek consensus.

- All regional plans need upgrading to make them fit for purpose. Australia's 56 regions support the upgrade in full, and NRM groups are working collectively to more closely define what such a plan would look like.

Corey Watts, Regional Projects Manager, The Climate Institute
The CFI and beyond

- The 25% of land based carbon that 'goes up and down' has been completely ignored because it is in the 'too hard' basket.

- Land carbon needs to be brought in under ETS – but that would be in ideal world. Political, economic and technical factors make it very hard to do this but this is not to say it can't be done.

- The Climate Change Institute has looked at regulation and taxing, direct funding, education, extension, R&D as methods to tackle land carbon.

- There is currently no liability on land based emissions. The Climate Institute is calling for liability.

- However there is difficult 'real politic' about bringing agriculture and land sector along. Some 70% or rural people are still sceptical, cynical or in denial.

- There is a very real need to create new mandate of support by creating a low carbon economy in rural and regional Australia and giving land holders a stake in this low carbon future.

- This will require building 'carbon literacy' and ownership over changes and need to be self sustaining which raises questions about sustainability of direct funding as opposed to a market.

- There is a need for more research and innovation to ensure co-benefits to biodiversity, ecosystem health and regional economies are incorporated into carbon sequestration.

- What needs to be done:
  - Pass the bill
  - Improve the bill, there are a number of avenues at various levels
  - Review it in 2014
  - Any scheme must be linked to price
  - Any scheme needs extra investment, R&D and extension support
  - There needs to be a carbon officer in every major industry, conservation group, indigenous group and NRM body to improve 'carbon literacy'.

- There will be many items which the CFI will not deal with that need to be secured – the National Reserve System lands and many other ecosystems that are difficult to measure exactly, but we know will provide carbon and other benefits.

- This investment should be a priority for carbon revenues, but will also need public subsidies.

Flinders Ranges SA, Penelope Figgis

Session 3. Which land carbon mitigation policies and actions should be given priority and where?

Dr. David Freudenberger, Chief Scientist, Greening Australia
Restoring ecosystem health rural sustainability and mitigating carbon

- Greening Australia is an NGO in the land repair business.
- The imperative is to build pollution into the cost of doing business. When this policy signals is sent you suddenly enter the real economy.
- When Australian producers believed there would be a price on carbon with the ETS there were a very large number of people interested in the kind of biodiverse offsets being offered by Greening Australia.
- With the possibility of a price on carbon and the CFI imminent, again pollution is involved in the cost of production and better natural resource management has some of the answers.
- However, there need to be some reality checks - the voluntary carbon market is very small within Australia.
- We also have to accept that biodiverse restoration is hard to do – only average 30% of species can be returned to the land. There are real challenges in the 'agronomy' of restoration, challenges of restoring range of native species in the landscape.
- A massive investment in R&D around restoration is needed.

Assoc Prof Grant Wardell-Johnson, Director, Curtin School for Biodiversity and Climate
Priorities for land carbon mitigation policies and actions

- Priorities for land carbon mitigation actions that best support biodiversity can be based on a range of adaptation strategies that were developed for terrestrial biodiversity and NCCARF (http://hosting2.arcs.org.au/terrestrialbiodiversity/index.php/resources/presentations.html).
- They include several complementary approaches.
  - **Prioritising the cessation of clearing and the enforcement of compliance**. This includes the maintenance and restoration of old-growth forests, the highest stores of carbon. The protection and retention of remnant vegetation in all areas provide the greatest conservation of biodiversity and ecosystem carbon benefit/cost ratio.
  - **Siezing of opportunities for emissions trading.** This particularly includes the development of plantations and restoration on long-cleared land. Conversely, continued clearing (deforestation), degradation or logging of natural stands provides a net loss of both carbon and biodiversity.
  - **Reducing other environmental stresses.** This includes prioritising the protection of refugia – the safe havens for biodiversity. The needs for these areas will become more critical as built-in global warming and associated climate change become more pronounced.
  - **Increase the area of the reserve system** by providing secure and most effective management tenure to land with relatively high carbon stocks.

- **Increase private land conservation.** The area of plantations to build carbon stocks, biodiversity values and other ancillary benefits will be vastly enlarged by providing ecosystem carbon with monetary value. The establishment of plantations on already cleared land will provide high net benefit of both carbon and biodiversity, but restoration of partly degraded native vegetation may provide a higher benefit/cost ratio.

- **Increase habitat and landscape connectivity.** It is necessary to develop and implement integrative approaches in managing landscapes as systems. Carefully targeted purchase, covenanted land, and restoration can have major benefits for both carbon stocks and biodiversity values.

- **The move from a preservationist to conservationist agenda** will be enabled by newer and pragmatic approaches to carbon and biodiversity recovery. These include 1) the application of engineering solutions in conjunction with stakeholder engagement and strategic plantation establishment; and 2) the application of return on investment (ROI) approaches.

- No one of these approaches will be sufficient on its own. The challenge is too great for any single solution, and a whole of landscape program which includes multiple approaches is necessary. Thus all of these approaches, and others, will be required to increase the value we place on ecosystem carbon, hence providing the impetus for its retention and sequestration in Australian landscapes.

Dr. Stephen Roxburgh, CSIRO Sustainable Ecosystems
Fire Management and Climate Mitigation

The major points are:

- Fires emit about the same amount of greenhouse gases(GHG) as all of our polluting industries combined. However, there are also the countering effects of regrowth after fire. Nevertheless there is a net contribution by fire. Fire management strategies can reduce this net contribution, for example - shift from late season fires to early season fires.

- However, an important caveat, most of the carbon from bushfires comes from combustion of short-lived organic carbon pools especially litter and living foliage, which is carbon already in the active sub-systems of the global carbon cycle. Whereas, industrial polution is fossil fuel carbon which in the absence of human use would remain out of contact with the atmosphere. So there is a qualitative difference between the two sources of emissions.

- Fire management for greenhouse benefit has been demonstrated to work in the tropical savanna's (at least for non-CO2 greenhouse gasses).

- It also provides significant cultural, social and biodiversity benefits.

- In US temperate forests it has been argued similar GHG benefits could arise , but this has also been refuted by other authors.

- Analyses done so far for Australia would suggest it would be very difficult to generate a GHG benefit through using fuel management to reduce wildfire emissions.

- There are also several practical constraints to implementation .

- Fuel management in temperate forests should remain focussed on the protection of life and property, and on maintaining an appropriate landscape-scale mosaic of fire age (i.e. biodiversity outcomes).

- It may turn out there are also some secondary GHG benefits to the activity which is a bonus but my assessment thus far is that is not likely to happen.

Fire in savannah Pentacost River, Pew Environment Group

Anissa Lawrence Asia Pacific Program Leader for Blue Carbon, UNEP/GRID-Arendal
Importance of coastal ecosystems to mitigation

- Marine areas seem to often get missed on the agenda with climate change with barely any recognition of blue carbon in Australia. Yet Blue & Green carbon combined could bind at least 25% of projected required emissions reductions.

- Coastal ecosystems are integral components of global carbon storage –mangroves, salt marshes and sea grasses in particular sequester large amounts of carbon. These systems are being degraded at a faster rate than forests.

- There's no doubt that coastal ecosystems have huge ecosystem service value globally. Global coastal ecosystem services have been estimated at having a value of US$25,000 billion

- What is needed are novel mechanisms connecting purchasers & suppliers of coastal ecosystem services & funding maintenance of natural capital generating goods/services

- As with other ecosystems, conserving blue carbon sinks offers Win-Win - adaptation and mitigation strategy. Coastal ecosystems are critical to livelihoods of over 100 million in Coral Triangle and the Pacific. Despite this high dependence 40% of mangroves lost in last 40 years in Coral Triangle. Deterioration of coastal ecosystems is often associated with increased poverty and hardship.

- But despite this clear alignment of goals blue carbon is not recognised by IPCC or Voluntary Carbon Schemes yet.We should be looking at blue carbon as another tool in the toolbox when it comes to climate change mitigation.

- Large gaps in research are a significant barrier. We need more data gathering and targeted research. For a start, we need to start to quantify degradation – keeping in mind that even though many of our coastal ecosystems are protected, this does not mean that they are exempt from degradation . We also need to keep in mind that these ecosystems are affected by downstream and upstream processes.

Mangrove forests Pulu Keeling National Park, Commonwealth of Australia

Session 4 – How can we maximise co benefits for biodiversity from mitigation efforts?

Peter Cochrane, Director of National Parks, Austral ian Government
The role of Protcted Areas in climate change mitigation

- Protected areas are uniquely positioned to support national CC mitigation and adaptation strategies.

- They are secure, or at least more secure for biodiversity conservation, and hence carbon, than other land tenures.

- Protected areas play keystone roles in managing for conservation in wider landscapes and corridors, linking other initiatives and activities that contribute to biodiversity conservation.

- The majority of the National Reserve System (82%) is in 168 parks and reserves larger than 100,000 hectares – so they operate at large scale.

- The Australian Government's current targets for the NRS are a 25% increase in extent, and to address gaps in coverage (comprehensiveness, adequacy and representativeness,).

- While the primary purpose of the NRS is biodiversity conservation –the evidence is strong and growing that natural systems hold more carbon than other systems (plantations), and hold it more securely.

- Australia's Strategy for the NRS acknowledges the significant role of protected areas in providing essential ecosystem services such as carbon sequestration, and the role of the NRS in coordinated on-ground actions to address climate change.
- This and other key policy documents recognise the intersection of conservation and carbon sequestration.

- On the positive side, there are a number of practical examples already, such as restoring traditional savannah burning to reduce wildfire intensity, retain carbon, and protect biodiversity in northern Australia. This example reflects the linkage and synergy between carbon sequestration and conservation. Similarly the purchase of pastoral leases for conservation and inclusion in the NRS, leads to de-stocking and recovery and restoration of native ecosystems, and carbon sequestration.

- In addition we need to be mindful that legislation, policies and programs aimed at retaining and sequestering carbon, do not have negative impacts on biodiversity conservation.

- On both issues (enhancing the positive, and managing the negative), considerable efforts have and are being made. Environment department officers are working closely with their colleagues in the Climate Change department on the CFI and related policies. NGOs work closely with both agencies.

- There are other relevant risks and issues to be addressed ; one being the security of protected areas is at times under threat from competing interests. A value for the carbon in the NRS could enhance their security.

- Private lands in the reserve system are usually protected by covenants – these are not consistent in application, requirements or strength between jurisdictions. There is considerable improvement needed.

- The conversion of pastoral leases to perpetual leasehold for conservation is similarly inconsistent between jurisdictions. Some are addressing this, in different ways. Native title issues need to be addressed, as they can be relevant when there is a change in land use.

- Continuing support for IPA management – some 25% of the NRS - needs to be considered for the long term. Long-term security of outcomes is closely linked to long-term security of support.

- The adequacy of resources for management of public reserves, and the more complex management issues relating to accounting for carbon, needs to be considered. Invasive species impacts are generally carbon negative in reserves – better control and management will have carbon benefits. As will weed control in most circumstances.

- And finally, following the old maxim that you can only manage what you can measure, knowing more and having rigorous metrics on carbon stores and enhanced sequestration (e.g., from rehabilitation and restoration programs) will make communication, reporting and management tasks more focussed and effective.

Assoc Prof Rod Fensham **Principal Botanist, Queensland Herbarium**
Dr Don Butler, **Project Manager CATER Queensland Herbarium**
Carbon Accumulation Through Ecosystem Recovery

- There is a spectrum of views on the inclusion of land-based sinks for carbon trading, from leave it out altogether (focus on the real nub of the problem – emissions from fossil fuels) to incorporate as much as possible (especially if it allows for the attainment of spectacular outcomes, such as reducing the loss of tropical forest).

- Progressing along this spectrum involves risks, including letting the emitters off the hook and technical difficulties with accounting. The former provides a motive, and the latter plenty of scope for corruption.

- The Kyoto protocol sets a bar in relation to land-based sinks that includes some activities (avoided deforestation, reforestation) and leaves others as optional (forest management, grazing land management)

- The management of millions of hectares of natural regrowth in north-eastern Australia, to change land-use from pasture to forest, is generally within the rule-set inherited from Kyoto and provides great scope for the restoration of natural ecosystems.

- The CATER (Carbon Accumulation Through Ecosystem Recovery) will provide information via the web on carbon sequestration, recommended management and biodiversity values of restored ecosystem in Queensland.

- It aims to facilitate ecosystem restoration in emerging carbon trading schemes.

Dr Nicola Markus **Former Chief Conservation Officer, Bush Heritage Australia**
Private land conservation and carbon mitigation

- Carbon off-set providers can help to finance complex restoration projects with benefit to species and ecosystems provided that their planting regimes are structured accordingly. This may entail some compromises in the types of vegetation planted to meet both objectives.

- Models to estimate carbon in the landscape must be simple, accessible and as accurate as possible to be useful to land managers.

- The ability to assign a value to carbon accumulated via natural regeneration would be useful and potentially enable land management NGOs to create their own niche in the carbon market by trading in carbon offset units derived from good management. Excluding the activities of NGOs as non-additional under the Carbon Farming Initiative will be counter-productive to these organisations and discount their considerable and costly contributions to the combined carbon storage/biodiversity conservation goal.

- An accreditation scheme for carbon offset suppliers is needed to ensure that providers comply with the relevant legislation and provide a quality product.

- A potential clash between conservation covenants and carbon covenants must be avoided and amounts to a perverse outcome; every effort must be made to ensure their compatibility.

Hon Bob Debus, Chair, National Wildlife Corridors Advisory Committee
Commentry on the Day's deliberations

- The presenters and panel members were thanked for the strength and "exceptional intellectual quality of their contributions". The day's discussion evidently reinforced the argument for the urgent development of a national strategy for landscape scale connectivity conservation initiatives across all land tenures in all jurisdictions.

- He observed that the attitudes of "climate change deniers" and the "wild hostility that Will Steffen and others have to endure" bore a close resemblance to attitudes and behaviour of supporters of the ideas of creationism -- with whom as a Minister he had been forced to deal in the 1980s with the particular help of Professor Michael Archer. "The great mistake is to think that such folk will respond to rational argument -- the point is that they are not trying to be rational and sensible people should deny them legitimacy by simply bypassing them , knowing that most of the community does in fact accept that climate change is occurring and must be dealt with".

- In the face of climate change and the decline of biodiversity there was a "quite crucial need to establish and maintain stable administrative structures and funding arrangements to deliver permanent conservation measures".

- He said that there had been in the past "a disturbing and quite pronounced tendency " of government to provide only short term grant funding to organisations attempting to deal with situations that needed long term solutions.There was an equally pronounced tendency to replace or remove funding from organisations suffering some form of management difficulty, when the better stable and permanent solution would be to help the organisation to improve its management capacity.

- In the area of conservation , as in the area of social welfare, the frequent failure of government to seriously pursue permanent solutions ,especially at regional level, had led to much waste of investment.

- The need to respond to the effects of climate change on biodiversity were now of such urgency in the next critical decade that it was vital improve the capacity of existing NRM bodies to deliver new initiatives.

Carnarvon Station Reserve, Bush Heritage Australia

Day 2.

Session 1. What kind of complementary financial mechanisms and institutional arrangements are needed to drive good policy outcomes?

Dr Sarah Ryan, Chair, Australian Regional NRM Chairs
The role of NRM bodies in climate change mitigation

To improve the strength of NRM bodies to deliver better outcomes for natural resource managment, biodiversity and climate change adaptation and mitigation there is a need to:

- resolve the roles of the Australian Government, state/territory governments, regional NRM bodies and community landcare through more enduring collaborative arrangements.

- complete, align and/or update the set of 56 regional plans with 8 state/territory NRM plans and a national NRM policy that together are needed to direct NRM decisions and investments across scales.

- empower and enable communities to engage in and be accountable for their role in NRM decision-making

.

- increase the quality and accountability of NRM decision-making by establishing a set of agreed national guidelines against which there is independent assessment and continuous improvement of plans, policies and performance of all participating organisations.

- strengthen the evidence base for investment in natural resource repair and maintenance through (a) instituting a national set of environmental accounts based on a more systematic approach to resource condition monitoring across scales and (b) developing more coordinated and collaborative R&D including knowledge management and brokering.

Andrew McIntosh, Associate Director ANU Centre for Climate Law and Policy
Accountability and avoiding perverse outcomes

- There is justifiable skepticism when it comes to this new transition period in dealing with climate change.

- Counting methods can cause major distortions especially in flux based accounting versus stock based accounting.

- If we want to encourage protection of forests, we need processes additional to the CFI.

Dr. Paul Sinclair, Australian Conservation Foundation
A Climate Change and Ecosystem Protection Fund

- **Concept:** ACF's concept is to use revenue from a price on carbon pollution to boost carbon storage in the landscape by protecting and building the resilience of the natural environment to climate change.
- **Funding**: new and additional funds of 10% of the annual revenue from a price on carbon pollution, or at least $1 billion per year.
- **Mechanism:** establish a Climate Change and Ecosystem Protection Fund to implement programs that enhance non market storage of carbon in the landscape by protecting natural systems of national significance and building their resilience to climate change impacts.
- **Scope of the Fund:**

- **Objective 1** (70% of the Fund): Protect, connect up, and improve management of natural systems of national significance including Australian and World Heritage areas and Indigenous Protected Areas.
- In year one, priorities should be Tasmania's High Conservation Value Forests, Cape York and Kimberley National and World Heritage listing, and enhanced management of Australia's natural World Heritage Properties and Indigenous Protected Areas.

- **Objective 2** (30% of the Fund): Expand rural stewardship programs to reduce degradation of carbon stores in natural systems, and expand programs to counter the spread of pests and weeds.
- **Governance and Accountability:** The Fund would be administered by the Ministers responsible for the environment and for climate change policy.
- **Timetable:** Establish the Fund in the climate legislative package in 2011, with initial funding available for expenditure in its first year of operation.
- **Monitoring and Reporting:** Ensure the National Plan for Environmental Information is adequately resourced and developed to deliver a set of national environmental accounts by May 2012 as the framework for reporting progress on the objectives under the Fund.

- **Background:**
  - Australia's ecosystems hold and have the ability to absorb large additional amounts of carbon pollution. Climate change is the greatest single threat to Australia's ecosystems according to scientific reports prepared for the Australian government.[2] There is an urgent need to boost investment from carbon price revenue into action that:
    - Reduces pollution by enhancing the ability of natural landscapes to store carbon;
    - Improves the health of the environment – particularly of our unique and iconic landscapes – so they securely hold the large quantities of carbon stored in them;
  - And in delivering these benefits in the long term national interest this investment will also:
    - Provide new and secure income stream and jobs for rural, regional and remote communities.
  - Current Federal Government spending is inadequate to slow and reverse the decline of Australia's environment and optimise their climate change mitigation

2 Steffen, W. (et al), *Australia's Biodiversity and Climate Change*, 2009, http://www.climatechange.gov.au/~/media/publications/biodiversity/biodiversity-summary-policy-makers.pdf

and adaptive qualities. Australia's investment through its current environment protection programs represents less than one third of the estimated cost of restoring Australia's environment to health.[3]

- A new Climate Change and Ecosystem Protection Fund is needed to address climate impacts and maximise cost effective carbon storage opportunities outside of market mechanisms. This is consistent with the recommendations in Professor Garnaut's Climate Change Review update paper on *Transforming Rural Land Use,* to develop "complementary conservation mechanisms" to help improve the health of the environment alongside the carbon price incentive for the bio-sequestration of greenhouse gas emissions.[4]

Examples of investment opportunities (Carbon Storage Ranking – from analysis by Queensland Herbarium[5])

- **Wet Temperate Forests – including Tasmanian Forests,** Carbon Storage Ranking: HIGH: The largest stocks of carbon in Australia's wet temperate forests are found in the mountain ash forests of the central highlands of Victoria and Tasmania. These forests store more than 1200 tonnes of carbon per hectare.6

- **Cape York, Queensland,** Carbon Storage Ranking: HIGH The landscape's of Cape York Peninsula can store over 130 tonnes of carbon per hectare. Cape York is home to rare and threatened flora species, has high ecosystem diversity and endemism, and provides vital refugia for wetland wildlife.

- **The Kimberley, Western Australia,** Carbon Storage Ranking: MEDIUM.The Kimberley currently stores between 100 – 373 tonnes of carbon per hectare across 30 million hectares.7 The Kimberley is one of the most ecologically important regions in Australia containing 65 species of native wildlife found nowhere else in the world.8

- **Indigenous Protected Areas,** Carbon Storage Ranking: HIGH Indigenous communities manage the vegetation, wildlife and fire regimes that secure carbon held in the landscape of Indigenous Protected Areas which comprise 23 million hectares of Australia's protected area network.

3 Caring for our Country invests $2.25 billion over 5 years. The cost of repairing Australia's environment estimated to be up to $6 billion annually. Repairing the Country: Leveraging Private Investment http://www.allenconsult.com.au/publications

4 http://www.garnautreview.org.au/update-2011/update-papers/up4-transforming-rural-land-use.html

5 HIGH (>131 tonnes of biomass/ha), MEDIUM (45-131 tonnes of biomass per ha); LOW (<45 tonnes of biomass per ha. Source: Queensland Herbarium

6 Mackey, B (et al) Green Carbon – The Role of Natural Forests in Carbon Storage, The Fenner School of Environment & Society, Australian National University. Sourced at http://tasmaniasforests.com.au/greencarbon/greencarbon.html

7 http://www.agric.wa.gov.au/objtwr/imported_assets/content/lwe/rpm/landup/carbonreport2010.pdf

8 Carwardine, J. (et al), Priority threat management to protect Kimberley wildlife, CSIRO and The Wilderness Society

Claire Parkes, The Wentworth Group of Concerned Scientists
Key steps to capture opportunities and avoid risks from the terrestrial carbon market:

- **Link any future carbon pricing mechanism to the Carbon Farming Initiative**
  This means that parties liable to pay for their emissions can offset some of these liabilities by buying carbon farming credits. Without a link, there would be limited demand for carbon offset credits and therefore limited activity in the terrestrial carbon market. With a link, substantial finance will become available to the land sector for carbon farming projects.

- **Upgrade regional NRM plans so that they can guide and incentivise carbon farming**
  Regional NRM plans integrate community values, best science and government priorities at the regional scale. With support, regional NRM plans can be improved to provide information on where and how to maximise benefits and avoid risks from carbon farming.

- **Improve statutory planning and approvals systems to manage risks from carbon farming.** Many of the possible risks are likely to arise as a result of land use change from carbon farming. Land use change is governed by statutory land use planning systems and other resource use legislation. State, territory and local governments (and in some cases the Australian Government) need to improve these systems. Regional NRM plans should inform zoning schemes, land use policies, and regulatory approvals processes.

- **Agreements between state and Commonwealth governments on NRM, planning and carbon farming.** The Commonwealth government, state and local governments and regional NRM bodies all have roles in capturing the opportunities and avoiding the risks from carbon farming, which requires cooperation at all scales. Bilateral agreements should set out how carbon farming will be managed through the use of regional natural resource management and statutory planning systems. Agreements should include standards and accreditation processes for upgrading regional NRM plans, mechanisms to ensure a formal relationship between regional NRM plans and statutory land use plans, funding and accountability arrangements for upgrading and implementing plans, and a coordinated approach for growing the carbon literacy of landholders.

- **Explore the use of economic instruments to address market failure in biodiversity conservation.** The co-benefits index within the Carbon Farming Initiative is a good way of expressing the additional environmental or social value of a carbon farming project. However, the market cannot be expected to fully account for the value of all co-benefits. Governments should explore other mechanisms such as direct funding grants, topping up carbon farming projects under government NRM programs, environmental markets, tax incentives or stewardship accreditation schemes.

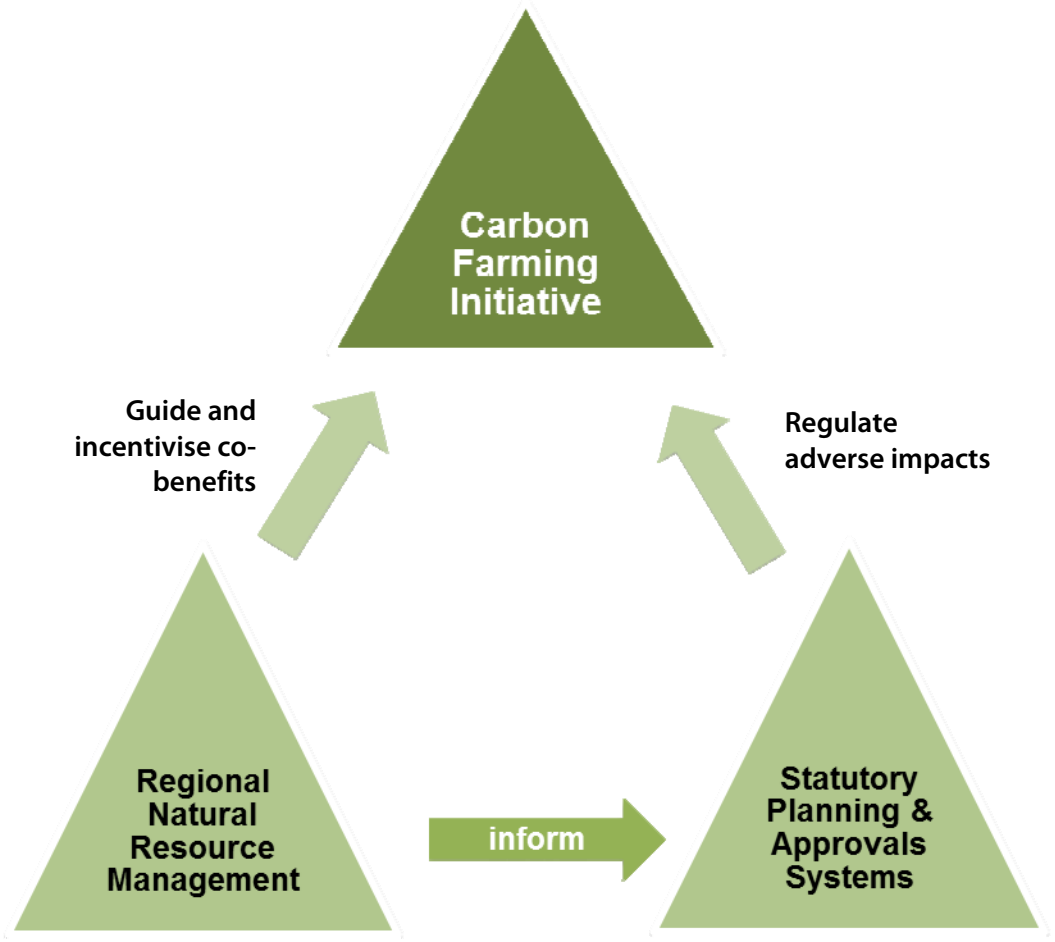


Diagram : Wentworth Group of Concerned Scientists

Session 2. What are the critical information gaps/research needs necessary to guide policy and implementation?

Dr George Wilson, Australian Wildlife Services
Science informing policy

- Although there is extensive competition for available dollars to fund operational programs and subsidies, it is also most important that research and innovation proceed as a priority and be adequately funded.

- It is generally accepted that innovation is essential to our lives and a key component of human endeavour. Indeed, not to innovate is to go backwards. It is the basis of competition in the economy as a whole, and in most artistic and many cultural activities.

- Innovation backed by research goes without question in the electronics industry. Continuous innovation is axiomatic to national defence. In the past it has been well recognised that not to continue to innovate in the rural sector reduces Australia's competitiveness. Australian agriculture and land management has been the beneficiary of funding through R&D programs.

- However, when it comes to many environmental and conservation activities, innovation does not seem to have the same priority. There is comparatively little expenditure on NRM research, biodiversity or indeed carbon management.

- The Department of Climate Change and Energy Efficiency does not have a research fund or program and the Caring for Our Country Program does not sponsor research. There is an assumption that compared to other sectors in the economy, conservation land managers know what to do and achieving success is just a matter of going out and doing it.

- Yet clearly we are making many land management mistakes and many opportunities are being missed. This observation also applies to Indigenous land management. 20% of Australia is again Aboriginal land. Aboriginal communities are given the responsibility for managing their lands and often under the misguided assumption that they will use traditional practice to do so. Notwithstanding that their lives have been totally transformed through access to Western technology, they are not given guidance and support and how to use it in land management.

- Changes are afoot in the management of agricultural research with a report soon to be brought down by the Productivity Commission. It's too late now to make an input to it but when it does come down I would advocate that the government in its response be encouraged to incorporate environmental land management, conservation of biodiversity and carbon management including Indigenous land and resource management as key components in the new funding arrangements.

- As John Kerin, one of the most effective and long serving primary industry/agriculture ministers used to say when I worked for him in the Department, 'good policy is based on good science'. At the moment it would appear Australia is at the other end of the spectrum where policy is often science-free and driven by the opinions of shock jocks, focus groups and the 24-hour news cycle.

Dr Jacqueline Schirmer, Research Fellow, ANU
Social Research in carbon mitigation

- Addressing climate change requires changes in people's behaviour.

- Even when we have the technologies needed, the 'people factor' remains a block in many cases.

- Can social science research help get past these 'human barriers'?

- Research by ANU focussed on understanding factors that influence landholder adoption of tree planting for carbon sequestration.

- The Research showed that there was no significant relationship between beliefs about climate change and willingness to adopt but those who think good land should grow food, not trees were significantly less willing to adopt.

- We need social science – but it needs to be useful.

- Research needs to inform development of initiatives – not come 'after the fact'.

- Lessons from our work:
    - Landholders are diverse
    - Explore instruments that work for different landholders

- Use this to inform design of multiple instrument approaches with diverse options to meet needs of diverse people

Heather Keith, **Fenner School ANU**
Research gaps in carbon accounting methods.

- Carbon accounting methodology has been based mainly on existing data to provide a system relatively quickly for policy needs. Data for calibration of models was derived from a variety of sources and not collected for the specific purpose. For example, vegetation data had been collected to quantify particular commodities such as timber volumes or from ecological studies to describe habitat or nutrient cycling, rather than quantifying carbon stocks of entire ecosystems.

- To improve carbon accounting methods there is a need now to evaluate calibration data and processes described in models. Data needs to be representative, comprehensive and using a consistent methodology.

- Practicalities of measurements must also be considered in determining the policies and regulations for carbon accounting and the associated methodology.

- The following are the main types of data and gaps in their current information.
  - *Inventory data*
    - Every tree in a given area of land needs to be measured.
    - The measurement area needs to be large enough to account for spatial variability of scattered large old trees both in forests and woodlands.

  - *Carbon stocks*
    - inventory measurements of tree dimensions need to be converted to biomass using allometric equations or stem volume, wood density and expansion factors. There is insufficient information about these conversions to biomass to cover the taxonomic and environmental variability in tree form foundin Australian ecosystems ;
    - There is little information about the proportion of biomass below ground, and the variation in this proportion with environmental conditions, particularly soil depth and water availability ;
    - Components of dead biomass in standing dead trees, coarse woody debris and litter are poorly quantified in a range of ecosystems. This is an important component of carbon stocks but has not been an important parameter in many other studies when data was collected ;
    - Soil carbon stock requires data carbon concentration, bulk density and soil depth. Soil is sampled commonly in the top 10 or 30 cm but much of the carbon stock in forest soils is below 30 cm.

  - **Carbon fluxes**.
    - A flux is a rate of change in a stock over time. If the measurement is over the same time period, such as a year, then they are equivalent. Usually fluxes are measured at shorter time intervals than stock changes. Change in a stock can be difficult to measure when it is a small change against a background of a large and variable stock.
    - Full carbon accounting of carbon fluxes in an ecosystem is difficult. Adequate sampling to account for spatial and temporal variability is difficult. Factors that control rates of processes such as decomposition and soil respiration are poorly understood and quantified.

- Measurements of ecosystem carbon fluxes are very useful at sites to help understand the processes, their rate of change over time, and their response to different conditions of climate and disturbance regimes.
- Gross fluxes need to be reported, that is the flux derived from a single process, not the net flux as the difference between two processes.
- A combination of stock and flux measurements is very useful for full carbon accounting to provide information about the actual change in the land stock and the resulting change in the atmosphere stock, and also the processes involved in the transfer of carbon between the land and atmosphere.

- **Disturbance history.**
  - Measurements are made on ecosystems in their current state but it is important to understand this state in relation to past disturbance events including land use history and hence its position on a growth curve. Predicting future carbon accumulation rates depends on this position on the growth curve and the effect of changing climate conditions on carbon fluxes.
  - The effect of disturbance events needs to be quantified in terms of the time scale of events and their effect on carbon stocks.

APPENDIX1 Professor Will Steffen

20/06/2011

CLIMATE COMMISSION

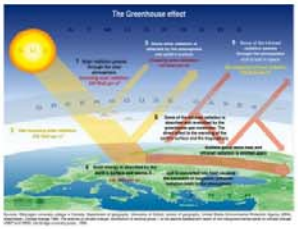
The Critical Decade

Climate science, risks and responses

Professor Will Steffen

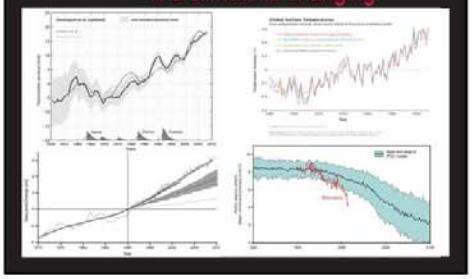
CLIMATE COMMISSION

Why is the climate warming? The Greenhouse Effect



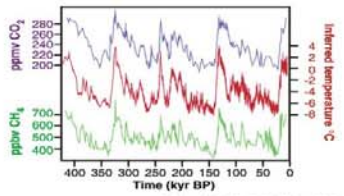
CLIMATE COMMISSION

The climate is changing



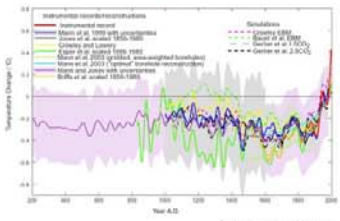
CLIMATE COMMISSION

Long-term relationship between CO_2 and climate



CLIMATE COMMISSION

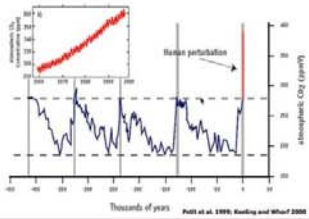
A long-term perspective
Northern hemisphere surface temperature



Source, Mann et al. 2003 (EOS)

CLIMATE COMMISSION

Human impact on atmospheric CO_2



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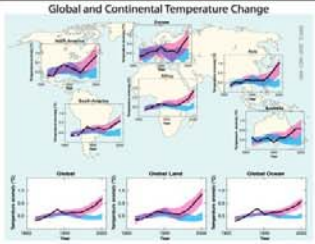
CLIMATE COMMISSION

Only CO_2 can explain the warming

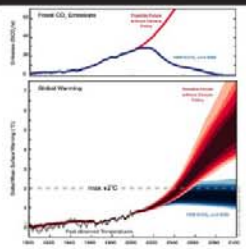
Global and Continental Temperature Change



IPCC AR4

CLIMATE COMMISSION

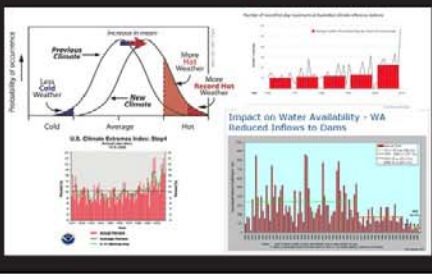
The critical decade



Meinshausen et al. 2009

CLIMATE COMMISSION

Climate change brings risks



CLIMATE COMMISSION

Key Messages

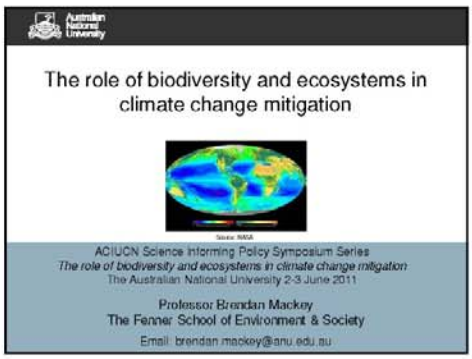
- There is no doubt that the climate is changing. The evidence is overwhelming and clear.
- It is beyond reasonable doubt that human activities - the burning of fossil fuels and deforestation - are triggering the changes we are witnessing in the global climate.
- We are already seeing the social, economic and environmental impacts of a changing climate.
- This is the critical decade. Decisions we make from now to 2020 will determine the severity of climate change our children and grandchildren experience.

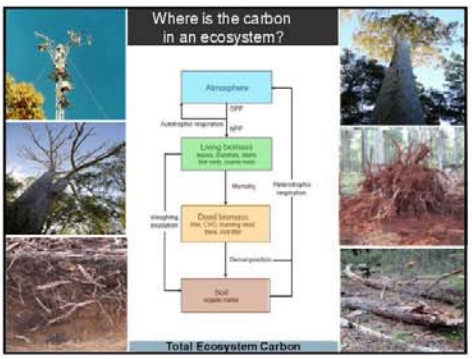
CLIMATE COMMISSION

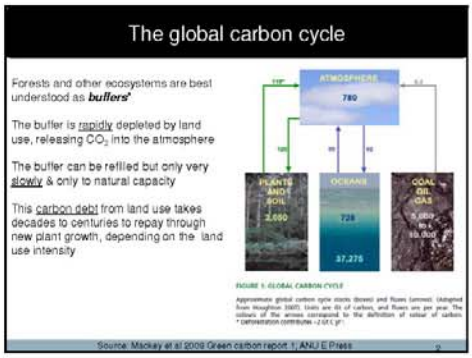
Impacts of climate change are happening now

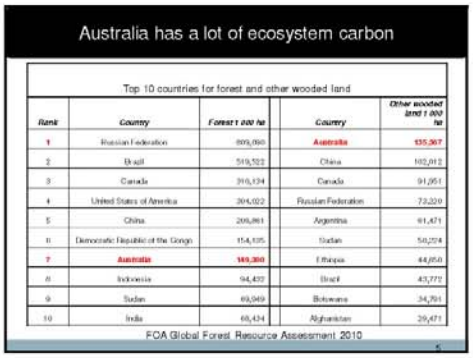
APPENDIX 2 Professor Brendan Mackey

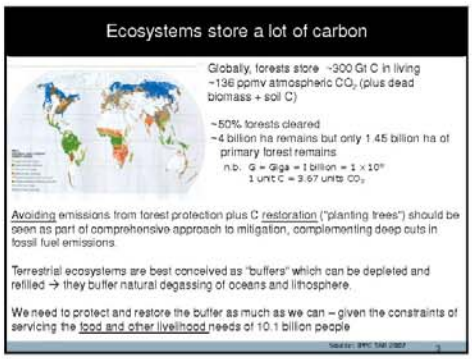
20/06/2011

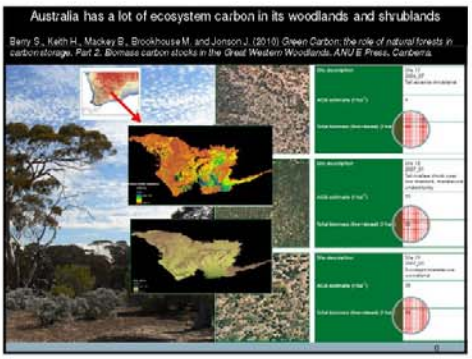




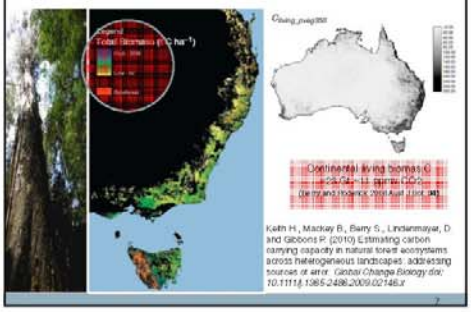








Australia has a lot of ecosystem carbon in its native forests



Keith H., Mackey B., Berry S., Lindenmayer, D and Gibbons P. (2010) Estimating carbon carrying capacity in natural forest ecosystems across heterogeneous landscapes: addressing sources of error. *Global Change Biology* doi: 10.1111/j.1365-2486.2009.02146.x

Healthy landscape not perverse outcomes or tradeoffs

We need to be thinking about mitigation options for land carbon that generate multiple co-benefits: an ecosystem-based approach

- ✓ Carbon
- ✓ Water
- ✓ Wildlife
- ✓ Communities

Biodiversity has mitigation co-benefits providing ecosystem resilience and more stable C stocks

The natural biodiversity of forests and woodlands (and other ecosystem types) provides them with *ecosystem resilience* in the face of external perturbations including fire, disease, invasives, and climate change delivering more stable carbon stocks (also true for agro-ecological food production systems)

Ecosystem resilience capacities:

- Self-regeneration after disturbance such as fire
- Resistance to and recovery from pests and diseases
- Local adaptations to new environmental conditions
- Tight controls on nutrient cycles in mature ecosystems

Thompson I., Mackey B., McNutty S. and Mosseler A. (2009). *Forest Resilience, Biodiversity, and Climate Change. A synthesis of the biodiversity/resilience/stability relationship in forest ecosystems.* Secretariat of the Convention on Biological Diversity, Montreal. Technical Series no. 43, 67 pages.

Landscape co-benefits not perverse outcomes

✓ **Protecting and restoring carbon stocks in ecosystems is a vital component of a comprehensive approach to climate change mitigation** i.e. "restore their buffering" functionality (within limits of meeting food production etc)

✓ **We need international and national policy that recognizes the mitigation value of healthy native forests and ecosystems;** Biodiversity provides ecosystems (natural, semi-natural, and agro-ecological systems) with resilience against impacts of climate change and other disturbances

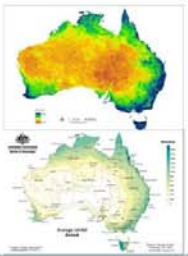
✓ **Invest in R&D for technical-solar energy conversion & Recognize important role of plantation sector in providing wood fibre,** and the need for investment in "value adding processing"

✓ Do we need a holistic National Land Policy?

Tradeoffs between competing land uses derive from photosynthesis being a thirsty process

Most of the energy and water are used to obtain the CO_2: 0.170 kg of glucose requires ~20 kg of water for transpiration

Therefore, biomass fuel competes with food production and biodiversity conservation because it needs well watered, fertile land



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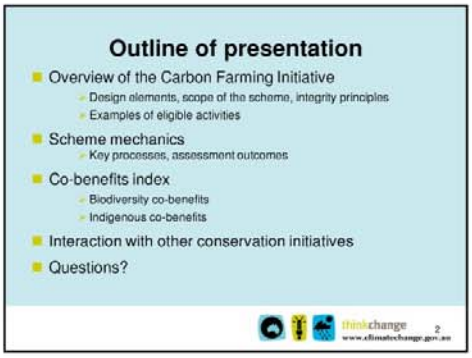
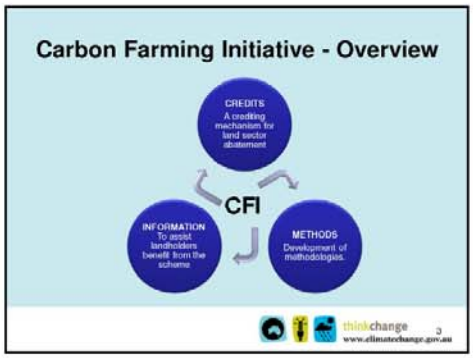
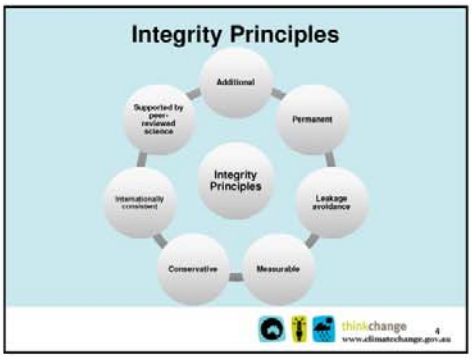
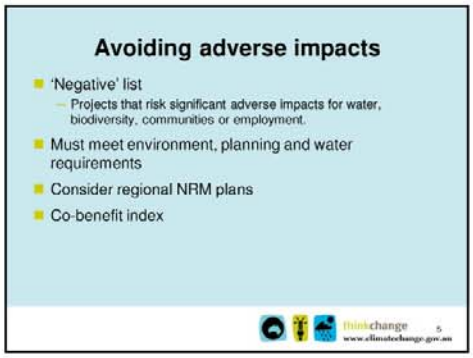
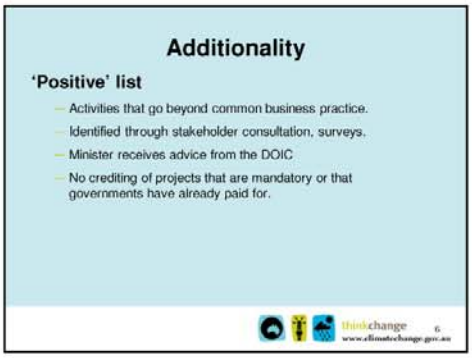
APPENDIX3 Shayleen Thompson











Permanence obligations

- Maintain carbon or hand back credits
  - For biosequestration projects only.
- Re-establish carbon after a fire or drought.
- Risk of reversal buffer
  - temporary losses whilst carbon is re-established
  - wrong doing that can't be remedied.
- Carbon maintenance obligation
  - 'runs with the land'.

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Examples of Eligible Activities

- Reforestation
- Revegetation
- Native forest protection
- Managed regrowth forests
- Rangelands restoration
- Savanna fire management
- Landfill gas flaring
- Soil carbon
- Fertiliser management
- Manure management
- Reduced enteric fermentation
- Feral camel culling

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Scheme Mechanics – Key Processes

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Project Assessment Outcomes

Project poses risks for biodiversity and is not eligible under the CFI.

Project is eligible under the CFI.

Project is eligible AND offers co-benefits for biodiversity.

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Co-Benefits Index

- Creates a 'premium' market
  - For projects that go the 'extra mile' to create other environmental and social benefits.
- Credible, straightforward and low-cost approach
  - Less complex and costly compared to other offset schemes.
  - Upfront accreditation to assist with project financing.
- Two main types under development:
  - Biodiversity co-benefits
  - Indigenous co-benefits

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Co-Benefits Index contd.

- Biodiversity co-benefits
  - Applies to bio-sequestration, native forest protection, savanna management.
  - Consulting on criteria
    - Location; quality of habitat diversity; security (covenants); management plan; or special values (threatened species protection)
  - Co-benefits identified in project application.
  - Co-benefit audited through project audits
- Indigenous co-benefits
  - Ongoing consultation is being led by SEWPAC.

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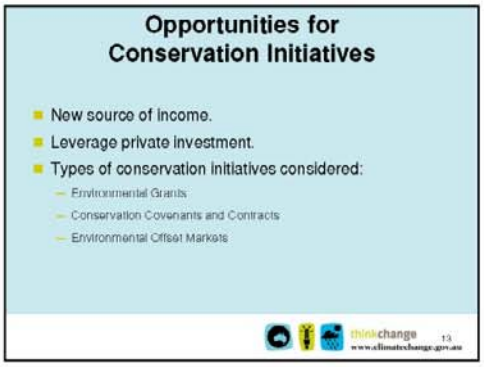
Opportunities for Conservation Initiatives
New source of income.
Leverage private investment.
Types of conservation initiatives considered:
Environmental Grants
Conservation Covenants and Contracts
Environmental Offset Markets
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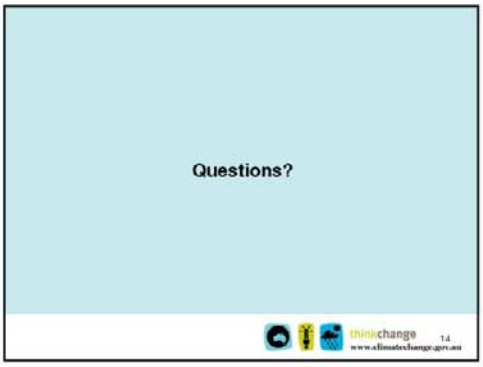
Questions?
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RESOURCES

- **Solving the biodiversity crisis with carbon**
  Investment in large-scale habitat restoration can meet costs through the sale of carbon and maintain regional economic activity, a recent case study has found. The report looks at the investment needed to deliver 255,000 hectares of biodiverse restoration on private land over 30 years.

  http://victorianaturally.org.au/page.php?nameIdentifier=resourcesinvestment

- **CBD Technical Series 41** '**Connecting Biodiversity and Climate Change Mitigation and Adaptation**'
  http://www.cbd.int/doc/publications/cbd-ts-41-en.pdf

- **CBD Technical Series 43 'Forest Resilience, Biodiversity and Climate Change'**
  http://www.cbd.int/doc/publications/cbd-ts-43 -en.pdf

- **The Accounting for Nature Blueprint** which details the environmental accounts work of the regional NRM bodies, the Wentworth Group and others can be found at
  http://www.wentworthgroup.org/blueprints/accounting-for-nature

- **UNEP YEARBOOK Emerging perspectives on forest biodiversity.pdf**
  Forests are the focus of renewed global attention because of their role in climate change mitigation. However, biodiversity loss continues to put forests at risk, diminishing their capacity to adapt to pressures, including climate change. New approaches to biodiversity conservation are promising, but they need to be matched by more effective governance and greater financial investments.
  http://www.ourplanet.com/unep-yearbook-2011/05-

- Environment Department, The World Bank (2009) **Convenient solutions to an inconvenient truth: ecosystem-based approaches to climate change**. June 2009.

  http://climatechange.worldbank.org/climatechange/content/convenient-solutions-inconvenient-truth

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