

## Comments on an Issues Paper: “Greenhouse Sinks and the Kyoto Protocol W.H. Burrows, Queensland Beef Industry Institute, Rockhampton

### This submission contends:

- (i) The case Australia took to Kyoto arguing that this country’s Land Use Change and Forestry (LUC&F) sector was a net source of emissions in 1990 is fundamentally flawed.
- (ii) Australia effectively overstated net emissions for 1990 by at least 100 Mt CO<sub>2</sub> equivalent at Kyoto. With better estimates for below ground contributions, along with similar data for grazed woodlands in New South Wales and the Northern Territory as well as Queensland, this error may well be > 150 Mt CO<sub>2</sub> equivalents per year.
- (iii) Australia should renegotiate its Kyoto Protocol commitments on the basis that the LUC&F sector is a net **sink**, rather than net source of emissions. As a consequence there would also be very large reductions in this country’s total reported annual net emissions and real probabilities that the sequestration value in woodlands via “positive spillover” or “foregone harvest” provisions could be unlocked. [There is no embarrassment attached to reporting more accurate LUC&F data e.g. biomass estimates for areas subject to clearing have changed appreciably as better data comes to hand; current information suggests soil carbon loss on conversion of woodland to pasture was very much overstated in Australia’s Kyoto inventory etc. Rather there is a real risk of shame and international condemnation if, given our stance at Kyoto, this country knowingly suppresses material data that reveals its LUC&F sector to be a net sink!!].

### General Comments:

The basis of the above assertions is the Workshop convened by the Department of Environment, Sport and Territories in October 1996 to consider “The Contribution of “Vegetation Thickening” to Australia’s Greenhouse Gas Inventory”. The Report of this workshop (Noble 1997) concluded “*that there is a strong case to include the sequestration of CO<sub>2</sub> resulting from the management actions leading to “vegetation thickening” in the National Greenhouse Gas Inventory. The net effect, after allowing for the CO<sub>2</sub> losses through clearing affected areas (about 300,000 hectares per year), is an additional sink of over 100 million tonnes of CO<sub>2</sub>. This would almost balance the emissions from other activities relating to land-use change and forestry practices and is roughly a fifth of Australia’s net greenhouse gas emissions (576 million tonnes of CO<sub>2</sub> in 1994)*”.

One of the leading overseas ecologists (and an Intergovernmental Panel on Climate Change (IPCC) Guidelines author) invited to attend this vegetation thickening workshop, Dr Robert Scholes, RSA, concluded “*that the contribution to carbon budgets from “vegetation thickening” must logically be included in national inventories and should have been so at the outset of the inventory process. The uncertainties in its estimation are no greater than in some other areas of the inventory*” (Noble 1997, p. 5 2<sup>nd</sup> para). Further, in a recent email exchange with the undersigned Dr Sandra Brown, Winrock International, Oregon, a leading contributor to the Revised IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual and other IPCC Reports advised that “*thickening as you call it, is a result of human decisions about how to use the land – if this is having an impact on the atmosphere (which is what we care about) and it is a result of human decisions on land management then I agree – how can it be anything but anthropogenic!*”.

The Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories are repeatedly quoted throughout the ‘Greenhouse Sinks’ Issues Paper as providing guidance for what can and cannot be included in country reporting. Relevant quotes from this Revised 1996 IPCC Reference Manual include:-

p.5.12 “NOTE: Forests classified as natural, or abandoned/regrowing, can be excluded from the woody biomass stocks accounting **only** if there is no significant human interaction with these forests. If they are being used as a source of fuelwood, or being affected in other ways by ongoing human activities they should be accounted for on an annual basis as part of *changes in forest and other woody biomass stocks*”. [Bolding inserted].

(It may be surprising to some, but the management of plant communities for domestic livestock production is a human activity that has a pronounced influence on the structure and composition of vegetation).

p. 5.13 “..... other types of biomass such as non-forest trees (e.g. in villages, cities etc) and **woody shrubs in grassland should be included when they are a significant component of total changes in biomass stocks**”. [Bolding added].

The Issues Paper claims (p. 8 last para) that vegetation thickening “is part of a natural disturbance – recovery cycle”. Certainly vegetation waxes and wanes with seasons/fire regimes etc. This equally applies to plantations as it does to natural forests of course. However the proliferation of woody plants in **grazed** sub-tropical/tropical savannas is clearly shown to be unidirectional (towards more woody biomass) in the worldwide reviews undertaken by Archer (1994, 1995), Idso (1995), Gifford and Howden (1999), Scholes and Archer (1997) and Archer *et al.*(2000). A comprehensive updated synthesis of the enormous published literature detailing vegetation thickening has recently been compiled and is maintained at:- <http://cnrit.tamu.edu/rlem/faculty/archer/bibliography.html>. Most tellingly, for Australia’s northern grazed savannas, there is no evidence from  $\delta^{13}\text{C}$  signatures down the soil profile to suggest previous periods when woody plants dominated. Rather the signatures (less negative values down the chronosequence) consistently suggest that these woodlands had an even more open structure in the past than is currently evident to-day (see attachment - Burrows *et al.* 1998; Figs 1, 2, 3a, b).

Furthermore, as Fensham and Holman (1999) observe, there is irrefutable evidence of forest or scrub encroachment across a range of continents, including rainforest expansion (Harrington and Sanderson 1994) and the invasion of grassland in Australia (Fensham and Fairfax 1996; Crowley and Garnett 1998). Fensham and Holman (1999) attribute these changes to reduced fire frequency or, more particularly, a decline in high intensity fires. These observations are in accord with the observations collated in the Burrows (1996) compilation to the DEST “Vegetation Thickening” Workshop (Noble 1997) and more recent reports by Binnington (1997), Lunt (1998a, b), M<sup>c</sup>Callum (1998) and Rolls (1999).

Such widespread quantitative evidence of vegetation thickening throughout eastern Australia supports the  $\delta^{13}\text{C}$  data of Burrows *et al.* (1998) and their contention that the woodlands were maintained as a fire mediated sub-climax prior to the introduction of domestic livestock. The consistency of the unidirectional thickening response is clearly over and above any overlapping climatic cycle effects (cf. Fensham and Holman 1999) which may or may not have occurred. For, even supposing a woodland had ‘opened up’ (e.g. following severe drought), then it is entirely reasonable to propose that, under Aboriginal management, the same process that protected grasslands from tree invasion before management changes wrought by Europeans, would also have protected any climatically induced open woodland, in the main, from re-invasion by trees. Nevertheless it is more logical that the burning regime

imposed by Aborigines for tens of thousands of years was most effective in maintaining the open nature of **both** the woodlands and grasslands prior to the advent of Europeans.

Crowley and Garnett's (1998) paper provides very compelling evidence that an open grassland/woodland habitat was maintained in parts of northern Australia for a very long time – exceeding any normal climatic cycle. They contend that the golden shouldered parrot of their study could only have developed its nesting habit in termite mounds in an open grassland environment. Apparently these nests were protected from predatory butcher birds over evolutionary time scales. However to-day these predators are able to perch in trees now closing in on the grassland mounds, enabling them to attack emerging parrot fledglings to the extent that they threaten the very survival of the species.

The author(s) of this Issues Paper claim (p. 8 2<sup>nd</sup> last para) that there is “considerable confusion surrounding the meaning of the terms, vegetation thickening and woody weed invasion”. This confusion is most apparent in the authors themselves. Throughout Queensland and the Western Division of NSW woody weed invasion is understood by landholders to be synonymous with thickening – both terms equating with the increase in cover/density/biomass of **native** woody plants on grazing lands. In other continents this phenomenon is sometimes referred to as ‘bush encroachment’. The weed connotation derives from the fact that the native woody plants are competing with pasture – they are therefore given the colloquial ‘weed’ descriptor in similar manner to exotic woody weeds which also compete with pasture, but affect much smaller areas *in toto*.

I am **appalled** at the suggestion (p. 9 5<sup>th</sup> para) that there would be “*significant implications for Australia’s Kyoto target if, as a consequence, there was a requirement to count woody weeds [= thickening] in Australia’s 1990 emissions profile. There is the prospect that Australia would then become a net sink in the land-use change and forestry sector. This means that we would be unable to include emissions from land clearing in 1990 in the baseline for the calculation of our assigned amount under Article 3.7. Such an outcome has the potential to increase Australia’s abatement task under the Kyoto Protocol*”.

This is nothing more than a preposterous proposal that ecologists/range management scientists documenting tree-shrub biomass changes in our grazed woodlands should compromise their scientific integrity, if need be, to protect Australia’s post Kyoto position. It is unconscionable that this country would consider misleading fellow Annex 1 countries should better inventory data (even if deleterious to our present position) become available (e.g. if soil C losses following clearing are lower than the current IPCC default values are we going to suppress such data in case they nullify the “Australia Clause”? Its scary to think that such a mindset may already be in place - reassurances to the contrary would be most welcome.)

Any intelligent person would surely question the logic that says this country would be worse off by honestly reporting and reducing the net emissions budget it took to Kyoto by 100-150Mt CO<sub>2</sub> equivalents?? Yes – correcting the Kyoto error would negate the “Australia Clause” (Article 3.7 - last sentence) – but the argument for it was based on Australia’s extenuating circumstances and the concession granted for these circumstances should be just as robust when based on correct, rather than incorrect LUC&F emissions. There is also no logical reason why Australia would not still obtain an enormous reduction in its NGGI by proceeding with its proposals to reduce tree clearing. Having obtained a concession on the basis of inadequate data is no justification for perpetuating the error!

**Flow-on effects** of continuing to treat thickening as non-existent or not man induced in our grazed savannas could be potentially serious, not only for rural Australia but also for non Annex 1 countries with grazed savanna systems analogous to our own:-

First, our Inventory would not be able to claim credit for very large actual and potential additional sink benefits arising from ‘positive spillover’ or ‘foregone harvest’ provisions. The latter occurs when tree clearing controls are imposed on grazing lands to meet conservation/greenhouse gas mitigation objectives. In Queensland’s case ‘business as usual’ clearing (of standing woodland + regrowth) has averaged c. 300, 000 ha/yr for 15+ years. Both the ‘net growth’ and ‘foregone harvest’ options should apply in this situation, revolving around the concept that credits should be provided for forested areas where there is a change in management of such sites from harvest [clearing] and regeneration to a protected area where harvest [clearing] is excluded [prevented]. (See Issues Paper Box 4.5 p. 62).

Such forest protection (especially where legislatively enforced to meet environmental or greenhouse objectives) should entitle the owner to trade the ongoing growth as a carbon offset, analogously to that being proposed for plantation forests. Likewise Australia's NNGI would benefit by a huge **cumulative** sink building on the annual growth increment on lands protected since 1990. Access to carbon offsets would also offer significant environmental benefits by providing a very strong inducement for landholders to reduce clearing activity.

Second, bush encroachment (woody plant proliferation, thickening, woody weed invasion) is a phenomenon common throughout the grazed savannas of eastern-southern Africa and North and South America (see earlier citations). Just as in Australia, the phenomenon was triggered on these continents by management changes accompanying the introduction of domestic livestock into lands previously managed by hunter-gatherers. However non Annex 1 countries would hardly be able to claim thickening effects, to benefit their limited GHG amelioration options, if an unthinking, selfish Annex 1 country such as Australia falsely denied that this phenomenon exists. Alternatively, if non Annex 1 countries did include sinks from thickening in their inventories the question would soon be asked why Australia had not done the same? Such questions would have even more sting if an Annex 1 country also did so e.g. the USA - based on information in Archer *et al.* 2000?

Third, Guy Fitzhardinge (Meat and Livestock Australia, Board Member) addressed a North Australia Peer Review Program Meeting on 20 October 1999 and warned of market signals suggesting that North Australia could have its beef labelled as “greenhouse unfriendly” as a marketing ploy by countries and vested interests wishing to limit access of our beef to their domestic markets. [The EU is successfully using such a ploy to deny access to its markets by beef grown with the benefit of growth promotants]. As it stands our beef producers could not reject factually false accusations that they had a “greenhouse unfriendly” product while Australia maintains an international stance which says that its LUC&F sector is a net **source** rather than net **sink** of greenhouse gases.

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**Background documents appended:**

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\*NOTE: References marked with an asterisk are also appended.