Detailed comments on Productivity Commission draft research report

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I have used references already cited in PC draft report where these are already included. Other references are enclosed with posted copy of this review.

1. Phosphorus spelling throughout.

2. Statement page XXV. '*There is no conclusive evidence yet of declining water quality within GBR lagoon or of any resulting damage to ecosystems (but …).*

This is a two part statement and the amount of evidence for each part is very different. For the first part there is ample and conclusive evidence of declining water quality in many parts of the GBR lagoon. The best (but not only) examples are:
(a) river water discharging into GBR lagoon (and hence in GBR lagoon) with elevated and higher than 'natural' nutrient concentrations and pesticide concentrations ie a decline in water quality from natural (refs: Mitchell et al, 2001 for Tully River; Mitchell et al, 1997 and Bramley and Roth, 2002 for Herbert River; White et al, 2002 for Pioneer River (enclosed); Furnas, 2002 for many rivers; many other river pollution studies see Brodie, in press (enclosed) for summary).
(b) flood plume studies (eg Devlin et al, 2001 – enclosed) show elevated (higher than natural) levels of nutrients in plumes from 'polluted' rivers ie *in flood conditions* concentrations of parameters such as nitrate, total nitrogen, ammonia, phosphate and total phosphorus are far higher than 'natural' or pre-catchment development concentrations thus showing *declining water quality* at least in these periods.
(c) the sediment studies of Haynes et al (2000a) show diuron concentrations in coastal sediments at above effect levels. This is another example of declining water quality.
(d) chlorophyll concentrations (an indicator of nutrient status) are higher (about double) in inner-shelf waters of the central and southern GBR compared to the northern GBR (Haynes et al, 2001 – cited in PC draft as GBRMPA 2001c). This is possibly/probably a sign of decline in water quality in these areas due to nutrient discharge from the developed catchments of the central and southern GBR.

The second statement (resulting damage….) has far less 'conclusive evidence'. However some evidence exists besides the circumstantial eg van Woesik et al, 1999 (enclosed). We also know that all inner-shelf reefs between Townsville and Port Douglas are in very poor condition at present but cannot solely attribute this to water quality decline.

Page 22. Paras. 2 and 3.

Trends in concentrations of chlorophyll have been detected but these are spatial trends as noted in next sentence. Temporal trends also exist but these do not show any consistent pattern between regions (Haynes et al, 2001 – cited in PC draft as GBRMPA 2001c).

Note that the only published study (Brodie et al, 1997 – enclosed) to look at long-term chlorophyll results (over 20+ years) examined mid and outer-shelf data and found no increasing trend. Inner-shelf waters were *not* included at that time.

Page 23. Para. 2.

Large quantities of diuron (about half a tonne) and lesser quantities of other herbicides were measured in a flood flow in the Pioneer River in Feb. 2002 (White et al, 2002 – enclosed). This is of course the same area in which mangrove dieback has been attributed to herbicide effects (Duke et al, 2001).

Page 27. Paras. 1 and 2.

Sugar cane is also grown widely in the dry tropics (with irrigation) eg Burdekin, Bundaberg districts. Recent expansion is onto coastal plain areas in *both* wet (eg Tully – Murray catchments) and dry tropics (eg Burdekin River Irrigation Area).

Page 27. Para 3.

Sugar cane cultivation also contributes to water quality problems through pesticide (particularly herbicide) use and removal of wetlands and riparian vegetation which act as water quality filters in the landscape.

Page 27. Para 4.

There is much more published information available on losses of fertilizer from paddocks under sugarcane (and to a lesser extent horticulture) than cited here. Some of this work is summarized in Brodie et al, 2001; Brodie, in press; Brodie and Furnas, in press – all enclosed, and references within these papers.

Page 28. Para 2.

The 'higher levels of atrazine and diuron' came from paper by Haynes et al (2000) also cited in PC draft. It is best to cite it directly rather that via Furnas (2002). I'm not sure where you got the words 'elevated' and 'extreme' levels from but it is far better to use the words as used directly in Haynes et al (2000). Note the levels were above those known through experimental studies to effect seagrass (Haynes et al, 2000b – enclosed).

Page 37. Para. 3. (Summing up)

In fact it is *freshwater wetlands* not mangroves which have been destroyed and this is the main reason for the loss of natural filtering/buffering. Most mangroves along GBR coast are in natural condition and extent but about 80% of freshwater wetlands have been destroyed through agricultural and urban development south of Port Douglas to Brisbane.

Papers which show a permanent, systematic lowering of ambient water quality within the GBR lagoon include Devlin et al, 2001 – enclosed; Haynes et al, 2000 (herbicides in sediments) and Haynes et al, 2001 (cited as GBRMPA 2001c) (Chlorophyll status).

Page 38. Point 2.

While the risk analysis cited here (originally from Haynes et al, 2001) identifies the Port Douglas to Hinchinbrook and from Whitsundays to Mackay as at highest risk more recent

risk analysis (Devlin et al, in press – enclosed) has refined this risk analysis but generally confirmed the earlier crude analysis.

Page 131. Para 4.

There is considerable published data that over-fertilization ie usage above recommendations is common in sugarcane cultivation and in horticulture (Mitchell et al, 2001; CRC Sugar, 2002; Schroeder et al, 1998; Schroeder and Wood, 2001; Wegener, 1999; - last 3 enclosed). Note also published material (Mallawaarachchi et al, 2002 – enclosed) showing it is actually more profitable at a farm scale to use less nitrogen fertilizer (around 60 kg/ha) than the current recommended or actual rates (140 – 250 kg/ha).

Page 146. Para 4.

While 'most point sources are already thoroughly controlled' in a legislative sense, considerable amounts of effluent (particularly sewage effluent) continue to be discharged in to GBRWHA waters directly or through rivers. As this discharge is chronic rather than episodic (the case for diffuse runoff) it presents a different environmental problem to the agricultural pollutants. As such it should not be neglected in the analysis of policy options.

Page 148. Paras. 2 – 5.

I have enclosed papers describing un-necessary use of phosphorus fertilizer in sugarcane (Sugar CRC, 2002), the economics of fertilizer use in sugarcane (Mallawaarachchi et al, 2002; Wegener, 1999), land selection and suitability analysis (Smith et al, 2000), pesticide management options (Simpson et al, 2001). Note also estimates of costs of wetland and riparian vegetation restoration in Brodie (in press).