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Fishy Tales of the Great Barrier Reef

Among the many life forms thriving in the waters off Queensland's coast, environmental activists and academic careerists are by the far most adaptable. Despite voluminous evidence that the Reef is healthy, they extract careers, grants and donations from dumb coral -- and dumber journalists

(http://quadrant.org.au/wp-content/uploads/2015/09/fishy.jpg) **A recent ABC news item, "Poor water quality poses huge threat to future of Great Barrier Reef (http://www.abc.net.au/local/stories/2015/09/08/4308239.htm) ", presents a remarkable litany of misleading, dubious and untrue statements in its brief length. Below you will find excerpts from that ABC bulletin, each followed by my comments. At the foot of this piece, my sources.**

> ***"Water quality is one of the biggest threats to the Great Barrier Reef, according to Great Barrier Reef Marine Park Authority (GBRMPA) water quality manager Leigh Gray."***

This is entirely an assumption. There is no firm scientific reason to believe any decline in reef water quality has occurred. No evidence can be mentioned because there is none.

An extensive review (Williams, 2001) of GBR water quality, conducted before GBRMPA began to beat the pollution drums, concluded: "Clear impacts of enhanced run-off of sediments, nutrients and contaminants (as a result of land use) on coral reefs of the Great Barrier Reef ecosystem have proven difficult to detect. Impacts are unlikely for the majority of reefs…." And then there is this: "It is tempting to conclude that the water quality status of the central Great Barrier Reef is not at immediate risk and that at current nutrient input rates, external sources will have little future impact on water quality …."

A subsequent key study (Carter, 2006) reviewed "the available data regarding nutrient contents in the Tully River, north Queensland, which is cited as the best (available) evidence for human-related changes in nutrient export from (GBR) catchments." It found that, "human-related nutrient enrichment in the Tully River, and regionally, is without substance."

It might be added that, if anything, the situation has subsequently improved in regard to reduced use of farm chemicals and fertilizer, as well as reduced erosion from farms.

> ***"Sediment and nutrients running off into the ocean in the wet tropics region are feeding young crown of thorns starfish, said Mr Gray."***

This, too, is mere speculation. Numerous species of starfish and sea urchins are known to experience erratic population booms and busts. Crown of thorns starfish are widely distributed throughout the tropical Indian and Pacific oceans. Population outbreaks have been reported throughout their range, including various oceanic reefs far removed from any possibility of influence by land runoff.

> ***"What we're finding is the actual crown of thorns outbreaks are larger than they were historically," Mr Gray said.***

The historical record is about 50 years. The only earlier indication of crown of thorns populations has been a study which looked at the varying frequency of their distinctive spines in reef sediment cores and these indicated ongoing fluctuations over some 7000 years. There is no evidence to indicate that crown of thorns population outbreaks on the GBR are caused by farm runoff or that they have increased in frequency or severity in recent years.

> ***"He said 50 per cent of the coral in the Great Barrier Reef has been lost in the last 27 years, 42 per cent of which is attributed to crown of thorns starfish."***

Interestingly, only three years ago some of the same researchers and using the same survey data found no evidence of any widespread decline in coral cover (Sweatman *et al*., 2011). The new evidence comes from more recent surveys made to assess coral damage from two severe tropical cyclones. Naturally, these surveys were made in the affected areas and not the majority of the reefs outside the storms' tracks. With a bit of statistical jiggery-pokery this new data was incorporated and "smoothed" into a 27-year decline. It is further worth noting that studies of the frequency and intensity of tropical cyclones have found no increase in either. Indeed, over the past century the GBR has enjoyed a lower incidence of severe storms than in the previous one.

As for the "42 per cent" attribution to the crown of thorns, this is a blatant use of what might be termed false precision. For something so sparsely sampled and poorly understood, saying "about 40%" is no better than a very rough and uncertain estimate.

> ***"If we can actually manage the nutrients going in which will then manage the development of crown of thorns outbreaks we could in fact reverse the loss of coral and have an increase of one per cent per year," he said.***

In recent years it has come to be understood that internal waves, at the interface between the warm upper layer of the ocean and the cold zone below it, frequently surge up the outer face of reefs and bathe them in nutrient-rich water from the deep. This produces regular fluxes in nutrient levels many times greater than anything being washed from the land onto the GBR. Far from damaging the reef, this natural event is thought to enrich them.

It is difficult to decide whether suggesting that "managing" the relatively tiny portion of nutrients in runoff which may derive from human input into runoff is going to "manage" crown of thorns populations is hopelessly naive, pathetically arrogant or simply delusional.

The 1% a year recovery rate seems for once to be wildly conservative by an order of magnitude compared to the well documented rates of recovery following various storm, bleaching and starfish events.

> ***"Mr Gray said the water quality in the Great Barrier Reef Marine Park is very poor and deteriorating at the moment."***

With no evidence presented to back this assertion one can only wonder why it conflicts so directly with the best-documented study I can find (Carter, 2006),which states that, "No detectable trends in GBR water quality have occurred since systematic measurements were first started in the 1980s."

> ***"Coral reefs and sea grass meadows have evolved to live in a low nutrient, low sediment environment," he said.***

Some have, some haven't. As a blanket statement this is demonstrably untrue and would seem to reflect very limited real-word experience of these communities. Rich reef and sea grass communities adapted to nutrient-rich inshore waters are common and thrive in these locations. An excellent and well documented **example (http://www.sciencedaily.com/releases/2012/07/120731201251.htm)** (Perry *et al*., 2012) exists virtually within sight of Mr. Gray's office at the GBRMPA headquarters. If Mr. Grey also looked in the library at GBRMPA he would find the following statement in GBRMPA's own extensive water quality review published in 2001 (Williams, 2001): "Thriving coral reefs with high coral cover, and in some cases high diversity, do occur in episodically turbid nearshore waters of the GBR."

> ***"Unfortunately since European settlement we've actually increased the loads of sediment and nutrients into those enviroments by at least two to three to four times and that also includes pesticides that are not naturally occuring within the catchment."***

This is another frequently cited factoid with very little real evidence to support it. It seems to be based largely on a single study indicating increased siltation which used a barium isotope in coral cores as an indicator of sediment discharge from the second-largest river in the region, the Burdekin. The isotope suggested a noticeable increase in the level of sediment, beginning abruptly in 1870. This was attributed to the introduction of some 50,000 head of cattle into the region at that time. At first glance this might appear significant but if such a

change is attributed to 50,ooo cattle it completely fails to explain why the million head of cattle and extensive farming now in the same catchment have had no further such effect. It also fails to consider if the long period of low rainfall which ended in 1870 might not have had a lot to do with the abrupt increase.

Pre-European inhabitants of the region regularly burned large areas of the countryside and the cessation of this practice has reduced this source of erosion. Natural hill slope erosion in rainforest is also quite high due the lack of ground cover in the forest itself. Clearing of rainforest and its replacement by grass or sugar cane can actually reduce erosion. Likewise, improved pasturage, even introduced weeds, can also provide better ground cover than the sparser native grasses they replace. These are simple facts in a complex web of effects, the net effect on rates of erosion unknown.

A fourfold increase in siltation (or evena decrease) is, in the end, irrelevant to the reef. Whether the metres of silt already blanketing the coastal sea floor (deposited by millennia of wet season floods) is a few centimetres deep more or less makes little difference. The water still becomes just as turbid when the wind blows and re-suspends the top few millimetres of it.

As for pesticides, concentrations in GBR waters and marine life are near global background levels for the world's most unpolluted regions. They are also far below any levels known to cause harm.

> ***"Mr Gray said about 80 per cent of the nitrogen load in the Great Barrier Reef Marine Park is from agricultural run-off."***

Total terrestrial run-off in the GBR catchment is estimated at about 70Km^3 of water per year and the GBR lagoon volume is about 7000 Km^3,, so runoff amounts to only about 1% of lagoon volume. Ridd (2007) has also pointed out that the lagoon is flushed very rapidly, "…in a matter of two to three months for the inshore waters and two to three weeks for the offshore waters. In such a huge volume of rapidly flushing water as the lagoon it would be virtually impossible to **eutrophy (https://en.wiktionary.org/wiki/eutrophy)** it over long periods of time. You would need such a large amount of fertiliser that it's just inconceivable, and we certainly don't discharge that much fertiliser into the lagoon."

> ***"Even if we reduce the concentrations or the amounts of sediment and nutrient in those waters it will still be released from the sediment in those waterways."***

With nitrate fertilizer, about one-third is oxidized and lost into the atmosphere; a third is taken up by the crop, with the remaining third taken up by other plants and soil microbes or washed away in runoff. Very little is trapped in sediments in a form which can be released later. Phosphate does not oxidise, but the portion trapped in sediment tends to become chemically sequestered into non-soluble form, which also limits its later availability. I can find no studies which indicate elevated levels of nutrients in recent sediments.

The most extensive survey (Brodie and Mitchell, 2006) of sediments and nutrients in North Queensland streams concluded: "In general, north Queensland tropical rivers have episodic flows with most material transport occurring during large flow events. The restricted period of these highly energetic events implies that little trapping of materials in waterways occurs. Loads are transported efficiently downstream and processes such as denitrification and in-channel sedimentation may be of limited importance."

Follow the money

To understand the true driver of the constant chorus singing of allegedly dire threats to the GBR, just follow the money. These imaginary perils are the foundation for a hundred-million dollar local industry of research and management based on addressing them. In turn, the alarmism generates multi-million dollar contributions to the environmental NGOs and their campaigns to "save" the reef. The unquestioning media get the shock! horror! headlines it craces. As for politicians, they find it useful when pandering for low-cost, low-risk green votes.

We now have a whole generation of managers and researchers whose entire training and experience of the reef has been in the context of perceived threats to it. Not surprisingly, they view every natural fluctuation as evidence of human impact. Nevertheless, and regardless of how understandable their perspective may be, the ethics of science, even basic honesty, have been put aside to promote a phony crisis and defraud the public on a huge scale.

When private enterprises are discovered to use false and misleading claims to defraud the public they are quickly and sternly dealt with. The save-the-reef fraud has continued for half a century and become more blatant with every passing year. It is a farce costing taxpayers upwards of a billion dollars, with nothing positive to show for that vast and ongoing expenditure but a permanent, all-expenses-paid Barrier Reef holiday for the cadres of researchers and bureaucrats involved.

The malfeasance is beyond obvious. It makes the unseemly expense-account charges of politicians look trivial by comparison. How much more blatant does it have to become before the law is enforced?

Walter Starck, a regular Quadrant contributor, has been researching coral reefs for more than 50 years. His biography can be found here (http://www.goldendolphin.com/wstarck.htm)

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