

Submission to Senate enquiry on “Identification of leading practices in ensuring evidence-based regulation of farming practices that impact water quality outcomes in the Great Barrier Reef.

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Summary of submission

1. The existing evidence based data appear inadequate to use for the purpose of the regulation of farming practices as -
 - a) they largely ignore basic aspects of Reef history and dynamics by making the assumption that most of the perceived health problem of the Reef can be attributed to the farming sector,
 - b) they ignore the complexity of Nitrogen cycles and other chemical interactions with living organisms, and
 - c) they exclude the contribution of nutrients inputs, chemical contaminants and sediments from land uses other than farming.
2. The financial cost of the regulations will ultimately be unfairly borne by only one sector of the North Queensland community.
3. Direct benefits to rural producers from the imposition of these regulations, are not at all obvious.
4. These regulations would appear very inequitable unless it is envisaged by the Government that similar regulations are currently being prepared for the urban and broader business communities within this region.

Reef history and dynamics

The following account has been adapted from Johnson, D (2004) *The Geology of Australia*. University of Cambridge.

Briefly, the very existence of the reef is dependent on climate change driven, sea level rise and ocean warming which commenced about 20,000 years ago. A popular perception is that the Reef has been around for millions of years. While it is true that there have been corals growing somewhere along the coast for this long, the Reef as we know it began its current life when at this time, the World emerged from an ice age. During this ice age the climate of the north was cooler and drier. The sea level was about 115m lower and a vast plain joined North Australia and New Guinea. Over the next 12,000 years the climate warmed, some ice caps melted and by about 3,700 years ago the sea had risen to a metre or two above its current level.

In north-east Queensland an extensive coastal plain existed from the edge of the continental shelf to just about the current shore line. The rate rise during this period was about 10 times the general rise currently observed. As the sea level rose the region's rivers deposited layers of sediment on the flooded plain.

Discussion - I believe that a major hurdle to an understanding of the Reef is general belief that the Reef is unchanging. I am surprised that the sea level fall of one or two metres (noted above) does not seem to have been considered (at least in the general literature) as a possible source of change in the apparent health of the Reef. Even a fall of this magnitude would cause a cessation of vertical coral growth in some if not all areas and exposed many areas to higher sea surface temperatures at least within the Reef Lagoon. The possible effects of agricultural chemicals and sedimentation must be considered within the context of Reef history and dynamics if the data collected are to provide a sound basis for land management decisions.

Sedimentation

While excessive soil loss is indicative of poor land management and needs to be discouraged, it must be remembered that some soils are relatively unstable as they are old and formed under drier climates than currently experienced. Newer soils of basaltic origin also have high inherent rates of erosion which with proper land management can be considerably reduced. The bed loads of most rivers flowing into the Reef Lagoon are high and useful measures to slow down their seaward movement are virtually impossible.

The sea floor under most of the Reef Lagoon is mud. Indeed much of the Reef can be said to have been built on mud which even in the deep parts of the Lagoon can be stirred up by water turbulence created by cyclone winds. The gentle SE Trades frequently stir mud in shallow waters along the coast and cause many of the public to blame farmers for the discoloration when, for most of the time during the presence of SE winds, streams flowing into the Lagoon carry no noticeable sediment load.

Scientific literature would indicate that sediment from river systems rarely reaches the Outer Reef and damage there is minimal. Inner Reefs are more vulnerable. Corals here however are somewhat more resistant to periodic dusting by sediment.

Given existing stream bed-loads and the dynamics of the great carpet of mud on the floor of the Reef Lagoon, I believe the Regulations coming into force will do little, if anything, to solve what I suspect are largely problems of perception.

Fertilizer

N compounds in various forms are usually the focus of concerns about the effects of fertilizers on the Reef. The compounds used as fertilizer are very ephemeral when exposed to the elements and are similar to compounds occurring naturally in all soils. Some end up as part of the harvested crop or are temporarily fixed in crop residues. Much gets broken down by plants and soil micro-organisms, and are converted to gaseous forms. Overall the amount of N compounds in natural systems is known to be significant and it is not clear in the data I have seen exactly from where the N compounds found in streams or the Reef Lagoon have actually originated. For instance how much comes from the rainforests. Has this been measured?

Discussion

Until sufficient data are available to develop a quantitative N cycle for the region, I believe controls on the use of N compounds in agriculture are premature at best. Farmers who use excess N compounds in an effort to increase production will soon realise further expenditure is rendering their business uneconomic.

Farm chemicals

Additional data may be required for certain chemicals and in particular information should be gathered on their interaction with aquatic organisms. Research must be conducted and conclusions drawn using realistic concentrations of the chemical concerned. Data indicating decay rates in northern environments are also required.

Discussion

Additional regulation to those currently used may be needed but should not require excessive documentation by the primary producer. Regulation regarding the use of chemicals which may adversely affect Reef should be consistent across all sectors of the community (see below).

Related matters

The inequities inherent in these Regulations are a major concern as their whole focus is on the farming community. Farmers will soon wake up and start asking the following questions especially about the potential for chemical pollution originating from urban centres. For example –

1. What is the impact of sewage containing nutrients and chemicals such as pharmaceutical residues, hormones and drugs (illicit and legal), household and industrial chemicals, entering the Reef Lagoon?
2. What effect could residues from anti-fouling paint have on the Reef and other marine organisms?
3. Are the products of urban wear and tear such as paint flakes, rubber from tyres and bitumen powdered by traffic on roads of importance for they may be washed into Reef Lagoon through urban storm water systems, affecting marine life?
4. What effect do the gasses, especially those of N compounds, emitted from the underwater exhausts of most tourist and recreational craft and which are often in close proximity to living coral, have on the health of marine life in their vicinity?

Thank you for the opportunity of preparing a submission on this vitally important topic.